

PRAEPAGEN TQ

Page 1(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name

PRAEPAGEN TQ

Material number: 183691

Chemical nature:

Fatty acids, C16-18 (even numbered) and C18 unsatd.,
reaction products with triethanolamine, di-Me sulfate-
quaternized - EC no. 931-203-0 (former CAS RN 91995-81-2)
in Isopropanol

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses of the substance or mixture

Industry sector : Detergents KA

Type of use : Raw material for the production of soft wash rinsing agents

Exposure scenarios: see annex

1.3. Details of the supplier of the safety data sheet

Identification of the company

Clariant Produkte (Deutschland) GmbH

65926 Frankfurt am Main

Telephone no. : +49 69 305 18000

Information about the substance/mixture

BU Industrial & Consumer Specialties

Product Stewardship

e-mail: SDS.Europe@clariant.com

1.4. Emergency telephone number

00800-5121 5121 (24 h)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

Additional Labelling

EUH210 Safety data sheet available on request.

PRAEPAGEN TQ

Page 2(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Flammable solvent vapours may collect in the vapour spaces of closed containers. Keep away from fire and other sources of ignition.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Hazardous components

| Chemical name | CAS-No. EC-No. Index-No. Registration number | Classification | Concentration (% w/w) |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|--------------------------|
| Propan-2-ol | 67-63-0 200-661-7 603-117-00-0 01-2119457558-25 01-2119457558-25-0000 01-2119457558-25-0001 01-2119457558-25-0002 01-2119457558-25-0005 01-2119457558-25-0006 01-2119457558-25-0016 01-2119457558-25-0028 01-2119457558-25-XXXX | Flam. Liq. 2; H225 Eye Irrit. 2; H319 STOT SE 3; H336 | >= 3 - < 10 |

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : Remove/Take off immediately all contaminated clothing.

If inhaled : Remove to fresh air.
Get medical attention if symptoms occur.

In case of skin contact : In case of contact, immediately flush skin with soap and plenty of water.

In case of eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

PRAEPAGEN TQ

Page 3(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

If swallowed : If swallowed, seek medical advice immediately and show this container or label.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : No symptoms known currently.

Risks : No hazards known at this time.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Water spray jet
Alcohol-resistant foam
Carbon dioxide (CO₂)
Dry powder

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting : In case of fires, hazardous combustion gases are formed:
Carbon monoxide (CO)

Nitrogen oxides (NO_x)

Sulphur dioxide (SO₂)

5.3 Advice for firefighters

Special protective equipment for firefighters : Self-contained breathing apparatus

Further information : Wear suitable protective equipment.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Ensure adequate ventilation.
Wear suitable protective clothing.
Keep away sources of ignition.

6.2 Environmental precautions

Environmental precautions : Do not allow to enter drains or waterways

PRAEPAGEN TQ

Page 4(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).

6.4 Reference to other sections

Information regarding Safe handling, see chapter 7., For personal protection see section 8., For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling : Provide adequate ventilation.
Handle and open container with care.

Advice on protection against fire and explosion : Traces of flammable substances can collect in the vapour space of closed systems, therefore keep sources of ignition away. Take precautionary measures against build-up of electrostatic charges, e.g. earthing during loading and off-loading operations.

Hygiene measures : Wash hands before breaks and at the end of workday. Use protective skin cream before handling the product. Take off immediately all contaminated clothing and wash it before reuse.

7.2 Conditions for safe storage, including any incompatibilities

Further information on storage conditions : - frost-sensitive - if the product becomes turbid as a result of exposure to low temperatures, warm it slowly to approx. 50°C and stir it. Before using the product, ensure that it is completely homogeneous.

Packaging material : Suitable material: Stainless steel, glass, Polyethylene

7.3 Specific end use(s)

Specific use(s) : No further recommendations.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

| Substance name | End Use | Exposure routes | Potential health effects | Value |
|---------------------------------|---------|-----------------|----------------------------|-----------------------|
| Propan-2-ol CAS-No.: 67-63-0 | Workers | Dermal | Long-term systemic effects | 888 mg/kg bw/day |
| Remarks: | DNEL | | | |
| | Workers | Inhalation | Long-term systemic effects | 500 mg/m ³ |

PRAEPAGEN TQ

Page 5(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | | | |
|------------------------------------------------------------------------------------------------------------------------|--------------------|------------|----------------------------|--------------------|
| Remarks: | DNEL | | | |
| | Consumers | Dermal | Long-term systemic effects | 319 mg/kg bw/day |
| Remarks: | DNEL | | | |
| | Consumers | Inhalation | Long-term systemic effects | 89 mg/m3 |
| Remarks: | DNEL | | | |
| | Consumers | Oral | Long-term systemic effects | 26 mg/kg bw/day |
| Remarks: | DNEL | | | |
| Fatty acids, C16-18 (even numbered) and C18 unsatd., reaction products with triethanolamine, di-Me sulfate-quaternized | Workers | Dermal | Long-term systemic effects | 312,5 mg/kg bw/day |
| Remarks: | DNEL | | | |
| | Workers | Inhalation | Long-term systemic effects | 44 mg/m3 |
| Remarks: | DNEL | | | |
| | General population | Dermal | Long-term systemic effects | 187,5 mg/kg bw/day |
| Remarks: | DNEL | | | |
| | General population | Inhalation | Long-term systemic effects | 13 mg/m3 |
| | General population | Oral | Long-term systemic effects | 7,5 mg/kg bw/day |
| Remarks: | DNEL | | | |

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

| Substance name | Environmental Compartment | Value | |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------|
| Propan-2-ol CAS-No.: 67-63-0 | Fresh water | 140,9 mg/l | |
| | Marine water | 140,9 mg/l | |
| | Fresh water sediment | 552 mg/kg dry weight (d.w.) | |
| | Marine sediment | 552 mg/kg dry weight (d.w.) | |
| | Soil | 28,0 mg/kg dry weight (d.w.) | |
| | Water (intermittent release) | 140,9 mg/l | |
| | Sewage treatment plant | 2251 mg/l | |
| | Oral | 160 mg/kg food | |
| | Fatty acids, C16-18 (even numbered) and C18 unsatd., reaction products with triethanolamine, di-Me sulfate-quaternized | Fresh water | 0,00191 mg/l |
| | | Fresh water sediment | 0,58 mg/kg dry weight (d.w.) |
| Sediment | | 4,15 mg/kg wet weight | |
| | Soil | 0,115 mg/kg dry | |

PRAEPAGEN TQ

Page 6(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | weight (d.w.) |
|--|------------------------|-----------------------|
| | Sewage treatment plant | 2,96 mg/l |
| | Marine water | 0,000191 mg/l |
| | intermittent releases | 0,0191 mg/l |
| | Soil | 16,9 mg/kg wet weight |

8.2 Exposure controls

Personal protective equipment

Eye protection : Safety glasses

Hand protection

Remarks : Protective gloves complying with EN 374. Minimum thickness (glove): not determined With solid dry substances permeation is not to be expected, therefore the breakthrough-time for this protective glove has not been measured.

Remarks : These types of protective gloves are offered by various manufacturers. Please note the manufacturers' detailed statements, especially about the minimum thickness and the minimum breakthrough time. Consider also the particular working conditions under which the gloves are being used.

Respiratory protection : Use respiratory protection in case of insufficient exhaust ventilation or prolonged exposure
Full mask to standard DIN EN 136
Filter A (organic gases and vapours) to standard DIN EN 141
Filter class 2
The use of filter apparatus presupposes that the environment atmosphere contains at least 17% oxygen by volume, and does not exceed the maximum gas concentration, usually 0.5% by volume. Relevant guidelines to be considered include EN 136/141/143/371/372 as well as other national regulations.

Protective measures : Avoid contact with skin.
Avoid contact with eyes.
Do not inhale vapours

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance : Waxy/solid

Colour : white to slightly yellow

Odour : of isopropanol

Odour Threshold : not tested.

pH : 2,5 - 3,5 (25 °C)
Concentration: 50 g/l

PRAEPAGEN TQ

Page 7(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Method: DIN EN 1262

| | | |
|----------------------------------------|---|----------------------------------------------------------------------------------------------------------------|
| Melting point | : | 45 - 55 °C |
| Boiling point | : | approx. 92 °C |
| Flash point | : | Not applicable The lower explosion point was determined to be approximately 36 °C. |
| Evaporation rate | : | Not applicable |
| Flammability (solid, gas) | : | Not classified as supporting combustion according to the transport regulations. Method: UN-Test L.2 |
| Burning number | : | 3 Local combustion without spreading |
| Upper explosion limit | : | Not applicable |
| Lower explosion limit | : | Not applicable |
| Vapour pressure | : | 42 mbar (20 °C) The data refer to both the solvent and the solvent mixture |
| Relative vapour density | : | Not applicable |
| Density | : | approx. 0,961 g/cm ³ (60 °C) Method: OECD Test Guideline 109 |
| Bulk density | : | not tested. |
| Solubility(ies) | : | |
| Water solubility | : | dispersible |
| Solubility in other solvents | : | Description: soluble in isopropanol |
| Partition coefficient: n-octanol/water | : | Not applicable |
| Auto-ignition temperature | : | Not applicable |
| Decomposition temperature | : | > 280 °C Heating rate : 3 K/min Method: DSC The substance or mixture is not classified self-reactive. |
| Viscosity | : | |
| Viscosity, dynamic | : | not tested. |
| Viscosity, kinematic | : | not tested. |
| Explosive properties | : | There are no chemical groups associated with explosive |

PRAEPAGEN TQ

Page 8(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

properties present in the molecule.

Oxidizing properties : There are no chemical groups associated with oxidising properties present in the molecule.

9.2 Other information

Metal corrosion rate : Not corrosive to metals

Minimum ignition energy : not tested.

Particle size : not tested.

Self-ignition : The product melts below 160 °C. Therefore, no further testing of self-heating properties is required. The substance or mixture is not classified as pyrophoric.

SECTION 10: Stability and reactivity

10.1 Reactivity

See section 10.3. "Possibility of hazardous reactions"

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : Uncleaned empty vessels may contain product gases which can form explosive mixtures with air.

10.4 Conditions to avoid

Conditions to avoid : None known.

10.5 Incompatible materials

Materials to avoid : not known

10.6 Hazardous decomposition products

When handled and stored appropriately, no dangerous decomposition products are known

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product:

Acute oral toxicity : LD50 (Rat, male and female): 4.480 mg/kg
Method: OECD Test Guideline 401
Remarks: The values mentioned are those of the active ingredient.

Acute inhalation toxicity : Remarks: not tested.

PRAEPAGEN TQ

Page 9(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Acute dermal toxicity : LD50 (Rat, male and female): > 2.000 mg/kg
Method: OECD Test Guideline 402

Components:

Propan-2-ol:

Acute oral toxicity : LD50 (Rat): 5.840 mg/kg
Method: OECD Test Guideline 401
GLP: no

Acute inhalation toxicity : LC50 (Rat, male and female): > 25 mg/l
Exposure time: 6 h
Method: OECD Test Guideline 403
GLP: yes

Acute dermal toxicity : LD50 (Rabbit): ca. 12.800 mg/kg
Method: OECD Test Guideline 402
GLP: no

Skin corrosion/irritation

Product:

Remarks: not tested.

Components:

Propan-2-ol:

Species: Rabbit
Exposure time: 4 h
Method: Other
Result: No skin irritation
GLP: no

Serious eye damage/eye irritation

Product:

Species: rabbit eye
Method: OECD Test Guideline 405
Result: No eye irritation

Components:

Propan-2-ol:

Species: rabbit eye
Method: OECD Test Guideline 405
Result: Severe eye irritation
GLP: no

PRAEPAGEN TQ

Page 10(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Respiratory or skin sensitisation

Product:

Species: Guinea pig
Method: OECD 406 * 1981 Buehler test
Result: non-sensitizing
Remarks: Information based on the active ingredient.

Components:

Propan-2-ol:

Test Type: Guinea pig maximization test
Exposure routes: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Does not cause skin sensitisation.
GLP: yes

Germ cell mutagenicity

Product:

- Genotoxicity in vitro : Test Type: Ames test
Method: OECD Test Guideline 471
Result: Negative with and without metabolic activation
- : Test Type: HGPRT assay
Species: V79 cells (embryonic lung fibroblasts) of the Chinese hamster
Method: OECD Test Guideline 476
Result: Negative with and without metabolic activation
- : Test Type: Chromosome Aberration Test
Species: V79 cells (embryonic lung fibroblasts) of the Chinese hamster
Method: OECD Test Guideline 473
Result: Negative with and without metabolic activation
- Genotoxicity in vivo : Test Type: Micronucleus test
Species: Mouse (male and female)
Application Route: oral (gavage)
Method: OECD Test Guideline 474
Result: negative
- Germ cell mutagenicity-Assessment : It is concluded that the product is not mutagenic based on evaluation of several mutagenicity tests.

Components:

Propan-2-ol:

PRAEPAGEN TQ

Page 11(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

- Genotoxicity in vitro : Test Type: In vitro gene mutation study in mammalian cells
Species: Chinese hamster ovary cells
Concentration: 500 - 5000 µg/ml
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
GLP: yes
- : Test Type: Ames test
Species: Salmonella typhimurium
Concentration: 100 - 10000 µg/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: no
- Genotoxicity in vivo : Test Type: Micronucleus test
Species: Mouse (male and female)
Strain: ICR
Cell type: Bone marrow
Application Route: Intraperitoneal injection
Exposure time: Single exposure
Dose: 350-1173-2500-3500 mg/kg
Method: OECD Test Guideline 474
Result: negative
GLP: yes
- Germ cell mutagenicity-
Assessment : It is concluded that the product is not mutagenic based on
evaluation of several mutagenicity tests.

Carcinogenicity

Product:

- Carcinogenicity -
Assessment : No information available.

Components:

Propan-2-ol:

- Carcinogenicity -
Assessment : Did not show carcinogenic effects in animal experiments.

Reproductive toxicity

Product:

- Reproductive toxicity -
Assessment : No information available.

No information available.

Components:

Propan-2-ol:

PRAEPAGEN TQ

Page 12(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Effects on fertility : Test Type: Two-generation study
Species: Rat, male and female
Strain: Sprague-Dawley
Application Route: oral (gavage)
Dose: 100 - 500 - 1000 mg/kg
General Toxicity - Parent: NOAEL: 500 mg/kg body weight
General Toxicity F1: NOAEL: 500 mg/kg body weight
General Toxicity F2: NOAEL: 500 mg/kg body weight
Method: OECD Test Guideline 416
GLP: yes

Effects on foetal development : Species: Rat
Strain: Sprague-Dawley
Application Route: oral (gavage)
Dose: 400 - 800 - 1200 mg/kg
General Toxicity Maternal: NOAEL: 400 mg/kg body weight
Teratogenicity: NOAEL: 400 mg/kg body weight
Method: OECD Test Guideline 414
GLP: yes

Reproductive toxicity - Assessment : No reproductive toxicity to be expected.
No teratogenic effects to be expected.

STOT - single exposure

Product:

Remarks: not tested.

Components:

Propan-2-ol:

Assessment: May cause drowsiness or dizziness.

STOT - repeated exposure

Product:

Remarks: not tested.

Components:

Propan-2-ol:

Assessment: The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Repeated dose toxicity

Product:

Species: Rat, male and female
NOAEL: 300 mg/kg
Application Route: Drinking water
Method: OECD Test Guideline 408
Remarks: Information refers to the main component.

PRAEPAGEN TQ

Page 13(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Species: Rat, male and female
NOAEL: 1.000 mg/kg
Application Route: oral (gavage)
Method: OECD Test Guideline 407
Remarks: Information refers to the main component.

Components:

Propan-2-ol:

Application Route: Oral
Remarks: This information is not available.

Species: Rat, male and female
NOAEL: ca. 12,5 mg/l
Application Route: Inhalation
Exposure time: 2 a
Number of exposures: 6 hours/day, 5 days/week
Dose: 500 - 2500 - 5000 ppm
Group: yes
Method: Other
GLP: yes

Application Route: Skin contact
Remarks: This information is not available.

Aspiration toxicity

Product:

no data available

Components:

Propan-2-ol:

No aspiration toxicity classification

SECTION 12: Ecological information

12.1 Toxicity

Product:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 1,91 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: The values mentioned are those of the active ingredient.

Toxicity to daphnia and other : LC50 (Daphnia magna (Water flea)): 2,23 mg/l
aquatic invertebrates : Exposure time: 48 h
Method: Directive 67/548/EEC, Annex V, C.2.
Remarks: The values mentioned are those of the active ingredient.

PRAEPAGEN TQ

Page 14(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

- Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 22,3 mg/l
End point: Growth rate
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: The values mentioned are those of the active ingredient.
- NOEC (Desmodesmus subspicatus (green algae)): 1,48 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: The values mentioned are those of the active ingredient.
- Toxicity to microorganisms : EC50 (activated sludge): > 243 mg/l
End point: Bacteria toxicity (respiration inhibition)
Exposure time: 3 h
Method: OECD Test Guideline 209
Remarks: The values mentioned are those of the active ingredient.

Components:

Propan-2-ol:

- Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 9.640 - 10.000 mg/l
Exposure time: 96 h
Test Type: flow-through test
Analytical monitoring: yes
Method: OECD Test Guideline 203
GLP: no
- Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): > 10.000 mg/l
Exposure time: 24 h
Test Type: static test
Analytical monitoring: no
Method: OECD Test Guideline 202
GLP: no
Remarks: The details of the toxic effect relate to the nominal concentration.
- Toxicity to algae : EC10 (Scenedesmus quadricauda (Green algae)): ca. 1.800 mg/l
Exposure time: 7 d
Test Type: static test
Analytical monitoring: no
Method: Other
GLP: no
- Toxicity to microorganisms : EC10 (Pseudomonas putida): ca. 1.050 mg/l
Exposure time: 16 h
Test Type: aquatic
Analytical monitoring: no

PRAEPAGEN TQ

Page 15(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Method: DIN 38412 T.8
GLP: no

Toxicity to fish (Chronic toxicity) : Remarks: not required

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : Remarks: not required

Toxicity to soil dwelling organisms : Remarks: Not applicable

Plant toxicity : IC50: 2.100 mg/l
Exposure time: 3 d
End point: emergence
Species: Lactuca sativa (lettuce)
Analytical monitoring: no
Method: Other
GLP:no

Sediment toxicity : Remarks: Not applicable

Toxicity to terrestrial organisms : Remarks: Not applicable

12.2 Persistence and degradability

Product:

Biodegradability : Inoculum: activated sludge, non-adapted
Biodegradation: 75 %
Exposure time: 28 d
Method: OECD Test Guideline 301B
Remarks: Information refers to the main component.
Readily biodegradable, according to appropriate OECD test.

Chemical Oxygen Demand (COD) : 2.218 mg/g
Method: ISO/DIS 15705

Components:

Propan-2-ol:

Biodegradability : Test Type: aerobic
Inoculum: activated sludge, domestic
Result: Readily biodegradable.
Biodegradation: 53 %
Related to: Biochemical Oxygen Demand (BOD)
Exposure time: 5 d
Method: Directive 67/548/EEC, Annex V, C.5
GLP: no

Stability in water : Remarks: Not applicable

PRAEPAGEN TQ

Page 16(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

12.3 Bioaccumulative potential

Product:

Bioaccumulation : Remarks: The bioaccumulation potential of the main component of the mixture is expected to be low.

Components:

Propan-2-ol:

Bioaccumulation : Remarks: Not applicable

12.4 Mobility in soil

Product:

Distribution among environmental compartments : Remarks: not tested.

Components:

Propan-2-ol:

Distribution among environmental compartments : Remarks: Not applicable

12.5 Results of PBT and vPvB assessment

Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher..

Components:

Propan-2-ol:

Assessment : This substance is not considered to be persistent, bioaccumulating and toxic (PBT)..

12.6 Other adverse effects

Product:

Environmental fate and pathways : no data available

Adsorbed organic bound halogens (AOX) : Remarks: Product does not contain any organic halogens.

Additional ecological information : no data available

PRAEPAGEN TQ

Page 17(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Components:

Propan-2-ol:

Environmental fate and pathways : not available

Additional ecological information : slightly water endangering
Do not allow to enter ground water, waterways or waste water.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : In accordance with local authority regulations, take to special waste incineration plant

Contaminated packaging : Packaging that cannot be cleaned should be disposed of as product waste

SECTION 14: Transport information

Section 14.1. to 14.5.

| | |
|------|----------------|
| ADR | not restricted |
| ADN | not restricted |
| RID | not restricted |
| IATA | not restricted |
| IMDG | not restricted |

14.6. Special precautions for user

See sections 6 to 8 of this Safety Data Sheet.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code (International Bulk Chemicals Code)

No transport as bulk according IBC - Code.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : Not applicable

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer : Not applicable

PRAEPAGEN TQ

Page 18(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Regulation (EC) No 850/2004 on persistent organic pollutants : Not applicable

Volatile organic compounds : Directive 1999/13/EC on the limitation of emissions of volatile organic compounds
Volatile organic compounds (VOC) content: 9,6 %

Other regulations:

The surfactant(s) contained in this mixture complies(comply) with the biodegradability criteria as laid down in Regulation (EC) No.648/2004 on detergents. Data to support this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them, at their direct request or at the request of a detergent manufacturer.

15.2 Chemical safety assessment

Chemical Safety Assessments (CSAs) are available for one or more of the component substances contained in this product.

SECTION 16: Other information

Full text of H-Statements

H225 : Highly flammable liquid and vapour.
H319 : Causes serious eye irritation.
H336 : May cause drowsiness or dizziness.

Full text of other abbreviations

Eye Irrit. : Eye irritation
Flam. Liq. : Flammable liquids
STOT SE : Specific target organ toxicity - single exposure

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of

PRAEPAGEN TQ

Page 19(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

Other information : Observe national and local legal requirements

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REG_EU / EN

PRAEPAGEN TQ

Page 20(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Exposure scenario

| Number | Title |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ES 1 | Manufacture of substance; Manufacture of substance SU8, SU9 - PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15 - ERC1, ERC4 Propan-2-ol |
| ES 2 | Industrial use; Use as an intermediate SU8, SU9 - PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15 - ERC6a Propan-2-ol |
| ES 3 | Formulation or re-packing; Distribution of substance SU8, SU9 - PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15 - ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC7 Propan-2-ol |
| ES 4 | Formulation or re-packing; Formulation & (re)packing of substances and mixtures SU10 - PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15 - ERC2 Propan-2-ol |
| ES 5 | Industrial use; Use in coatings PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15 - ERC4 Propan-2-ol |
| ES 6 | Professional use; Use in coatings PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC15, PROC19 - ERC8a, ERC8d Propan-2-ol |
| ES 7 | Consumer use; Use in coatings PC1, PC4, PC8, PC9a, PC9b, PC9c, PC15, PC18, PC23, PC24, PC31, PC34 - ERC8a, ERC8d Propan-2-ol |
| ES 8 | Industrial use; Use in cleaning agents PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13 - ERC4 Propan-2-ol |
| ES 9 | Professional use; Use in cleaning agents PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13 - ERC8a, ERC8d Propan-2-ol |
| ES 10 | Consumer use; Use in cleaning agents PC3, PC4, PC8, PC9a, PC9b, PC9c, PC24, PC35, PC38 - ERC8a, ERC8d Propan-2-ol |

PRAEPAGEN TQ

Page 21(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ES 11 | Industrial use; Use in oil and gas field drilling and production operations PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b - ERC4 Propan-2-ol |
| ES 12 | Industrial use; Use in lubricants PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18 - ERC4, ERC7 Propan-2-ol |
| ES 13 | Professional use; Use in lubricants PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20 - ERC8a, ERC8d, ERC9a, ERC9b Propan-2-ol |
| ES 14 | Consumer use; Use in lubricants PC1, PC24, PC31 - ERC8a, ERC8d Propan-2-ol |
| ES 15 | Industrial use; Metal working fluids PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17 - ERC4 Propan-2-ol |
| ES 16 | Professional use; Metal working fluids PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17 - ERC8a, ERC8d Propan-2-ol |
| ES 17 | Industrial use; Use in blowing agents PROC1, PROC2, PROC3, PROC4, PROC8b, PROC9, PROC12 - ERC4 Propan-2-ol |
| ES 18 | Industrial use; Use in binder and release agents PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8b, PROC10, PROC14 - ERC4 Propan-2-ol |
| ES 19 | Professional use; Use in binder and release agents PROC1, PROC2, PROC3, PROC4, PROC6, PROC8b, PROC10, PROC11, PROC14 - ERC8a, ERC8d Propan-2-ol |
| ES 20 | Professional use; Use in agrochemicals PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC11, PROC13 - ERC8a, ERC8d Propan-2-ol |
| ES 21 | Consumer use; Use in agrochemicals PC12, PC27 - ERC8a, ERC8d Propan-2-ol |
| ES 22 | Industrial use; Use in fuel PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16 - ERC7 Propan-2-ol |

PRAEPAGEN TQ

Page 22(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ES 23 | Professional use; Use in fuel PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16 - ERC9a, ERC9b Propan-2-ol |
| ES 24 | Consumer use; Use in fuel PC13 - ERC9a, ERC9b Propan-2-ol |
| ES 25 | Industrial use; Use in functional fluids PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9 - ERC7 Propan-2-ol |
| ES 26 | Professional use; Use in functional fluids PROC1, PROC2, PROC3, PROC8a, PROC9, PROC20 - ERC9a, ERC9b Propan-2-ol |
| ES 27 | Consumer use; Fuels PC16, PC17 - ERC9a, ERC9b Propan-2-ol |
| ES 28 | Professional use; Anti-freeze and de-icing products PROC1, PROC2, PROC8a, PROC8b, PROC10, PROC11 - ERC8d Propan-2-ol |
| ES 29 | Consumer use; Anti-freeze and de-icing products PC4 - ERC8d Propan-2-ol |
| ES 30 | Professional use; Use in road and construction products PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13 - ERC8d, ERC8f Propan-2-ol |
| ES 31 | Consumer use; Cosmetics, personal care products PC28, PC39 - ERC8a, ERC8d Propan-2-ol |
| ES 32 | Industrial use; Use in laboratories PROC10, PROC15 - ERC2, ERC4 Propan-2-ol |
| ES 33 | Professional use; Use as laboratory reagent PROC10, PROC15 - ERC8a Propan-2-ol |
| ES 34 | Professional use; Use in explosives PROC1, PROC3, PROC5, PROC8a, PROC8b - ERC8d Propan-2-ol |
| ES 35 | Industrial use; Use in rubber production and processing PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15, PROC21 - ERC1, ERC4, ERC6d Propan-2-ol |

PRAEPAGEN TQ

Page 23(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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| ES 36 | Industrial use; Use in polymer processing PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC21 - ERC4 Propan-2-ol |
| ES 37 | Professional use; Use in polymer processing PROC1, PROC2, PROC6, PROC8a, PROC8b, PROC14, PROC21 - ERC8a, ERC8d Propan-2-ol |
| ES 38 | Industrial use; Use in water treatment agents PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13 - ERC3 Propan-2-ol |
| ES 39 | Professional use; Use in water treatment agents PROC1, PROC3, PROC8a, PROC8b, PROC13 - ERC8f Propan-2-ol |
| ES 40 | Consumer use; Use in water treatment agents PC36, PC37 - ERC8f Propan-2-ol |
| ES 41 | Industrial use; Use in mining chemicals PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9 - ERC4 Propan-2-ol |

1. ES 1: Manufacture of substance; Manufacture of substance; SU8, SU9

1.1. Title section

| | | |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Manufacture of bulk, large scale chemicals (including petroleum products) (SU8) | | |
| Manufacture of fine chemicals (SU9) | | |
| Environment | | |
| CS1: | Manufacture of substance (Manufacture of the substance, Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | ERC1, ERC4 |
| Workers | | |
| CS2: | Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS3: | Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS4: | Manufacture of substance (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS5: | Manufacture of substance (Chemical production where opportunity for exposure arises) | PROC4 |

PRAEPAGEN TQ

Page 24(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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| CS6: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS7: Manufacture of substance (Use as laboratory reagent) | PROC15 |
| CS8: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS9: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS10: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS11: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS12: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |

1.2. ES 1 Conditions of use affecting exposure

1.2.1 ES 1 - CS 1: Control of environmental exposure: Manufacture of substance (Manufacture of the substance, Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC1, ERC4)

Remarks : No exposure assessment presented for the environment.

1.2.2 ES 1 - CS 2: Control of worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : General exposures (closed systems)
No sampling

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
No sampling

Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.

Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 25(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

1.2.3 ES 1 - CS 3: Control of worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Continuous process
With sample collection
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

1.2.4 ES 1 - CS 4: Control of worker exposure: Manufacture of substance (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

PRAEPAGEN TQ

Page 26(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

- Type of Application (Use) : General exposures (closed systems)
Batch process
Use in contained systems
With sample collection
- Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

1.2.5 ES 1 - CS 5: Control of worker exposure: Manufacture of substance (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : General exposures (open systems)
Batch process
- Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Ensure material transfers are under containment or extract ventilation.

1.2.6 ES 1 - CS 6: Control of worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Process sampling

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

PRAEPAGEN TQ

Page 27(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Product sampling
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Ensure material transfers are under containment or extract ventilation., Ensure operatives are trained to minimise exposures., Avoid carrying out activities involving exposure for more than 1 hour per day.

1.2.7 ES 1 - CS 7: Control of worker exposure: Manufacture of substance (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Laboratory activities
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Handle in a fume cupboard or under extract ventilation.

1.2.8 ES 1 - CS 8: Control of worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers
Open systems

PRAEPAGEN TQ

Page 28(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Open systems
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374., Avoid carrying out activities involving exposure for more than 1 hour per day.

1.2.9 ES 1 - CS 9: Control of worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers
Open systems
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Open systems
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to points where emissions occur.
Effectiveness (of a measure) : 90 %

PRAEPAGEN TQ

Page 29(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

1.2.10 ES 1 - CS 10: Control of worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers
Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Closed systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Ensure material transfers are under containment or extract ventilation.
Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Avoid carrying out activities involving exposure for more than 1 hour per day.

1.2.11 ES 1 - CS 11: Control of worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

PRAEPAGEN TQ

Page 30(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

- | | | |
|-----------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------------------------|
| Type of Application (Use) | : | Equipment cleaning and maintenance |
| Organisational measures to prevent /limit releases, dispersion and exposure | : | Avoid direct eye contact with product, also via contamination on hands. |
| Technical conditions and measures | : | Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. |
| Personal protective measures | : | Use suitable eye protection. |

Additional good practice advice beyond the REACH Chemical Safety Assessment

- | | | |
|---------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Additional good practice advice | : | Drain down system prior to equipment break-in or maintenance., Provide extract ventilation to points where emissions occur., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374. |
|---------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

1.2.12 ES 1 - CS 12: Control of worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

- | | | |
|---------|---|---------|
| Remarks | : | Storage |
|---------|---|---------|

Product characteristics

- | | | |
|---------------------------------------------------|---|----------|
| Concentration of the Substance in Mixture/Article | : | <= 100 % |
| Physical Form (at time of use) | : | Liquid |
| Vapour pressure | : | 6020 Pa |

Frequency and duration of use

- | | | |
|---------|---|--------------------------------------|
| Remarks | : | Covers daily exposures up to 8 hours |
|---------|---|--------------------------------------|

Risk Management Measures

- | | | |
|-----------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------|
| Type of Application (Use) | : | Storage |
| Organisational measures to prevent /limit releases, dispersion and exposure | : | Store substance within a closed system. Avoid direct eye contact with product, also via contamination on hands. Avoid dip sampling. |
| Technical conditions and measures | : | Provide a good standard of controlled ventilation (10 to 15 air changes per hour). |
| Personal protective measures | : | Use suitable eye protection. |

Additional good practice advice beyond the REACH Chemical Safety Assessment

- | | | |
|---------------------------------|---|-----------------------------------------------------------------------------|
| Additional good practice advice | : | Provide extract ventilation to material transfer points and other openings. |
|---------------------------------|---|-----------------------------------------------------------------------------|

1.3. ES 1 Exposure estimation and reference to its source

PRAEPAGEN TQ

Page 31(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

1.3.2 ES 1 - CS 2: Worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

1.3.3 ES 1 - CS 3: Worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,05 |

1.3.4 ES 1 - CS 4: Worker exposure: Manufacture of substance (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

1.3.5 ES 1 - CS 5: Worker exposure: Manufacture of substance (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3) | 0,10 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,11 |

1.3.6 ES 1 - CS 6: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

PRAEPAGEN TQ

Page 32(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Process sampling) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Process sampling) | 0,01 |
| combined routes | Process sampling | 0,25 |

1.3.7 ES 1 - CS 7: Worker exposure: Manufacture of substance (Use as laboratory reagent) (PROC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | 0,05 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,05 |

1.3.8 ES 1 - CS 8: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------|------|
| inhalative | 150 ppm (ECETOC TRA worker V3, Bulk transfers, Open systems) | 0,74 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Open systems) | 0,01 |
| combined routes | Bulk transfers, Open systems | 0,75 |

1.3.9 ES 1 - CS 9: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------|------|
| inhalative | 2,5 ppm (ECETOC TRA worker V3, Bulk transfers, Open systems, Aerosol) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Open systems, Aerosol) | 0,01 |
| combined routes | Bulk transfers, Open systems, Aerosol | 0,26 |

1.3.10 ES 1 - CS 10: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|------|
| inhalative | 150 ppm (ECETOC TRA worker V3, Bulk transfers, Closed systems) | 0,74 |

PRAEPAGEN TQ

Page 33(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|--------------------------------------------------------------------------|------|
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Closed systems) | 0,01 |
| combined routes | Bulk transfers, Closed systems | 0,75 |

1.3.11 ES 1 - CS 11: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

1.3.12 ES 1 - CS 12: Worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

1.4. ES 1 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

2. ES 2: Industrial use; Use as an intermediate; SU8, SU9

2.1. Title section

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Manufacture of bulk, large scale chemicals (including petroleum products) (SU8) | |
| Manufacture of fine chemicals (SU9) | |
| Environment | |
| CS1: Industrial use (Use of intermediate) | ERC6a |
| Workers | |
| CS2: Manufacture of substance (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |

PRAEPAGEN TQ

Page 34(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| CS3: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS4: Manufacture of substance (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS5: Manufacture of substance (Chemical production where opportunity for exposure arises) | PROC4 |
| CS6: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS7: Manufacture of substance (Use as laboratory reagent) | PROC15 |
| CS8: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS9: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS10: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS11: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS12: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |

2.2. ES 2 Conditions of use affecting exposure

2.2.1 ES 2 - CS 1: Control of environmental exposure: Industrial use (Use of intermediate) (ERC6a)

Remarks : No exposure assessment presented for the environment.

2.2.2 ES 2 - CS 2: Control of worker exposure: Manufacture of substance (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
No sampling
Organisational measures to : Handle substance within a closed system.

PRAEPAGEN TQ

Page 35(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

prevent /limit releases, dispersion and exposure Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

2.2.3 ES 2 - CS 3: Control of worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Continuous process
With sample collection

Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

2.2.4 ES 2 - CS 4: Control of worker exposure: Manufacture of substance (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

PRAEPAGEN TQ

Page 36(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Batch process
Use in contained systems
With sample collection

Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

2.2.5 ES 2 - CS 5: Control of worker exposure: Manufacture of substance (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Batch process

Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Ensure material transfers are under containment or extract ventilation.

2.2.6 ES 2 - CS 6: Control of worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Process sampling

Product characteristics

PRAEPAGEN TQ

Page 37(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Product sampling
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Ensure material transfers are under containment or extract ventilation., Ensure operatives are trained to minimise exposures., Avoid carrying out activities involving exposure for more than 1 hour per day.

2.2.7 ES 2 - CS 7: Control of worker exposure: Manufacture of substance (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Laboratory activities
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour), Handle in a fume cupboard or under extract ventilation.

2.2.8 ES 2 - CS 8: Control of worker exposure: Manufacture of substance (Transfer of

PRAEPAGEN TQ

Page 38(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers
Open systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Open systems
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374., Avoid carrying out activities involving exposure for more than 1 hour per day.

2.2.9 ES 2 - CS 9: Control of worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers
Open systems
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Open systems
Aerosol
Organisational measures to : Handle substance within a closed system.

PRAEPAGEN TQ

Page 39(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

prevent /limit releases, dispersion and exposure Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to points where emissions occur.
Effectiveness (of a measure) : 90 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

2.2.10 ES 2 - CS 10: Control of worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers
Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Closed systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Ensure material transfers are under containment or extract ventilation.
Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Avoid carrying out activities involving exposure for more than 1 hour per day.

2.2.11 ES 2 - CS 11: Control of worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

PRAEPAGEN TQ

Page 40(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Equipment cleaning and maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Clear spills immediately.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain down system prior to equipment break-in or maintenance., Provide extract ventilation to points where emissions occur., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

2.2.12 ES 2 - CS 12: Control of worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Store substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Avoid dip sampling.
Technical conditions and measures : Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to material transfer points and other openings.

PRAEPAGEN TQ

Page 41(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

2.3. ES 2 Exposure estimation and reference to its source

2.3.2 ES 2 - CS 2: Worker exposure: Manufacture of substance (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

2.3.3 ES 2 - CS 3: Worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,05 |

2.3.4 ES 2 - CS 4: Worker exposure: Manufacture of substance (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

2.3.5 ES 2 - CS 5: Worker exposure: Manufacture of substance (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3) | 0,10 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,11 |

PRAEPAGEN TQ

Page 42(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

2.3.6 ES 2 - CS 6: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Process sampling) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Process sampling) | 0,01 |
| combined routes | Process sampling | 0,25 |

2.3.7 ES 2 - CS 7: Worker exposure: Manufacture of substance (Use as laboratory reagent) (PROC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | 0,05 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,05 |

2.3.8 ES 2 - CS 8: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------|------|
| inhalative | 150 ppm (ECETOC TRA worker V3, Bulk transfers, Open systems) | 0,74 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Open systems) | 0,01 |
| combined routes | Bulk transfers, Open systems | 0,75 |

2.3.9 ES 2 - CS 9: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------|------|
| inhalative | 2,5 ppm (ECETOC TRA worker V3, Bulk transfers, Open systems, Aerosol) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Open systems, Aerosol) | 0,01 |
| combined routes | Bulk transfers, Open systems, Aerosol | 0,26 |

2.3.10 ES 2 - CS 10: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

PRAEPAGEN TQ

Page 43(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------|------|
| inhalative | 150 ppm (ECETOC TRA worker V3, Bulk transfers, Closed systems) | 0,74 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Closed systems) | 0,01 |
| combined routes | Bulk transfers, Closed systems | 0,75 |

2.3.11 ES 2 - CS 11: Worker exposure: Manufacture of substance (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

2.3.12 ES 2 - CS 12: Worker exposure: Manufacture of substance (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

2.4. ES 2 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

3. ES 3: Formulation or re-packing; Distribution of substance; SU8, SU9

3.1. Title section

| |
|------------------------------------------------------------------------------------------------------------------------|
| Manufacture of bulk, large scale chemicals (including petroleum products) (SU8) Manufacture of fine chemicals (SU9) |
|------------------------------------------------------------------------------------------------------------------------|

PRAEPAGEN TQ

Page 44(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Environment | | |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| CS1: | Formulation or re-packing (Manufacture of the substance, Formulation into mixture, Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use at industrial site leading to inclusion into/onto article, Use of intermediate, Use of functional fluid at industrial site) | ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC7 |
| Workers | | |
| CS2: | Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |
| CS3: | Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS4: | Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS5: | Formulation or re-packing (Chemical production where opportunity for exposure arises) | PROC4 |
| CS6: | Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS7: | Formulation or re-packing (Use as laboratory reagent) | PROC15 |
| CS8: | Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS9: | Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS10: | Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS11: | Formulation or re-packing (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS12: | Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS13: | Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |

3.2. ES 3 Conditions of use affecting exposure

3.2.1 ES 3 - CS 1: Control of environmental exposure: Formulation or re-packing (Manufacture of the substance, Formulation into mixture, Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use at industrial site leading to inclusion into/onto article, Use of intermediate, Use of functional fluid at industrial site) (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC7)

Remarks : No exposure assessment presented for the environment.

3.2.2 ES 3 - CS 2: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes

PRAEPAGEN TQ

Page 45(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
No sampling
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

3.2.3 ES 3 - CS 3: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
With sample collection
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

3.2.4 ES 3 - CS 4: Control of worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with

PRAEPAGEN TQ

Page 46(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
With sample collection
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

3.2.5 ES 3 - CS 5: Control of worker exposure: Formulation or re-packing (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

PRAEPAGEN TQ

Page 47(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

3.2.6 ES 3 - CS 6: Control of worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : Process sampling

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Process sampling
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid dip sampling. Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374., Avoid carrying out activities involving exposure for more than 1 hour per day.

3.2.7 ES 3 - CS 7: Control of worker exposure: Formulation or re-packing (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Laboratory activities
Organisational measures to prevent /limit releases, dispersion : Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 48(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Handle in a fume cupboard or under extract ventilation., Wear suitable gloves tested to EN374.

3.2.8 ES 3 - CS 8: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers
Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Closed systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Ensure operation is undertaken outdoors., Wear suitable gloves tested to EN374.

3.2.9 ES 3 - CS 9: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers
Open systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

PRAEPAGEN TQ

Page 49(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Open systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Ensure operation is undertaken outdoors., Wear suitable gloves tested to EN374.

3.2.10 ES 3 - CS 10: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers
Open systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Open systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable respiratory protection.

3.2.11 ES 3 - CS 11: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture into small containers (dedicated filling line, including

PRAEPAGEN TQ

Page 50(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

weighing)) (PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Drum and small package filling
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Clear spills immediately.
Put lids on containers immediately after use.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Fill containers/cans at dedicated fill points supplied with local extract ventilation., Wear suitable gloves tested to EN374.

3.2.12 ES 3 - CS 12: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Equipment cleaning and maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Technical conditions and measures : Apply vessel entry procedures including use of forced supplied air.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain down and flush system prior to equipment break-in or maintenance., Transfer via enclosed lines., Wear suitable

PRAEPAGEN TQ

Page 51(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin.

3.2.13 ES 3 - CS 13: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Store substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Avoid dip sampling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Transfer via enclosed lines., Ensure operation is undertaken outdoors.

3.3. ES 3 Exposure estimation and reference to its source

3.3.2 ES 3 - CS 2: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

3.3.3 ES 3 - CS 3: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or

PRAEPAGEN TQ

Page 52(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,05 |

3.3.4 ES 3 - CS 4: Worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,12 |

3.3.5 ES 3 - CS 5: Worker exposure: Formulation or re-packing (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3) | 0,10 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,11 |

3.3.6 ES 3 - CS 6: Worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Process sampling) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Process sampling) | < 0,01 |
| combined routes | Process sampling | 0,12 |

3.3.7 ES 3 - CS 7: Worker exposure: Formulation or re-packing (Use as laboratory reagent) (PROC15)

PRAEPAGEN TQ

Page 53(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | 0,05 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,05 |

3.3.8 ES 3 - CS 8: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers, Closed systems) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Closed systems) | 0,01 |
| combined routes | Bulk transfers, Closed systems | 0,25 |

3.3.9 ES 3 - CS 9: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers, Open systems) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Open systems) | 0,01 |
| combined routes | Bulk transfers, Open systems | 0,25 |

3.3.10 ES 3 - CS 10: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers, Open systems) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Open systems) | 0,01 |
| combined routes | Bulk transfers, Open systems | 0,25 |

3.3.11 ES 3 - CS 11: Worker exposure: Formulation or re-packing (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------|-----|
| | | |

PRAEPAGEN TQ

Page 54(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

3.3.12 ES 3 - CS 12: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

3.3.13 ES 3 - CS 13: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

3.4. ES 3 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

4. ES 4: Formulation or re-packing; Formulation & (re)packing of substances and mixtures; SU10

4.1. Title section

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Formulation [mixing] of preparations and/or re-packaging (SU10) | |
| Environment | |
| CS1: Formulation or re-packing (Formulation into mixture) | ERC2 |
| Workers | |
| CS2: Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |

PRAEPAGEN TQ

Page 55(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| CS3: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS4: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS5: Formulation or re-packing (Chemical production where opportunity for exposure arises) | PROC4 |
| CS6: Formulation or re-packing (Chemical production where opportunity for exposure arises) | PROC4 |
| CS7: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS8: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS9: Formulation or re-packing (Use as laboratory reagent) | PROC15 |
| CS10: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS11: Formulation or re-packing (Mixing or blending in batch processes) | PROC5 |
| CS12: Formulation or re-packing (Mixing or blending in batch processes) | PROC5 |
| CS13: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS14: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS15: Formulation or re-packing (Tabletting, compression, extrusion, pelettisation, granulation) | PROC14 |
| CS16: Formulation or re-packing (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS17: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS18: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |

4.2. ES 4 Conditions of use affecting exposure

4.2.1 ES 4 - CS 1: Control of environmental exposure: Formulation or re-packing (Formulation into mixture) (ERC2)

Remarks : No exposure assessment presented for the environment.

4.2.2 ES 4 - CS 2: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in : <= 100 %
Mixture/Article

PRAEPAGEN TQ

Page 56(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
No sampling
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

4.2.3 ES 4 - CS 3: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

4.2.4 ES 4 - CS 4: Control of worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in : <= 100 %

PRAEPAGEN TQ

Page 57(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Mixture/Article

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
With sample collection
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

4.2.5 ES 4 - CS 5: Control of worker exposure: Formulation or re-packing (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : General exposures (open systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

4.2.6 ES 4 - CS 6: Control of worker exposure: Formulation or re-packing (Chemical production where opportunity for exposure arises) (PROC4)

PRAEPAGEN TQ

Page 58(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : General exposures (open systems)
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Aerosol

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

4.2.7 ES 4 - CS 7: Control of worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : Batch process
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Batch process
Elevated temperature
With sample collection

PRAEPAGEN TQ

Page 59(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Formulate in enclosed or ventilated mixing vessels., Ensure material transfers are under containment or extract ventilation.

4.2.8 ES 4 - CS 8: Control of worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : Process sampling

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Process sampling
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid dip sampling.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

4.2.9 ES 4 - CS 9: Control of worker exposure: Formulation or re-packing (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 60(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Laboratory activities
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Handle in a fume cupboard or under extract ventilation., Wear suitable gloves tested to EN374.

4.2.10 ES 4 - CS 10: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

- Remarks : Bulk transfers

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid
- Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Bulk transfers
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Remotely vent displaced vapours.
- Technical conditions and measures : Clear transfer lines prior to de-coupling.
Clear spills immediately.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

4.2.11 ES 4 - CS 11: Control of worker exposure: Formulation or re-packing (Mixing or blending in batch processes) (PROC5)

- Remarks : Mixing operations (open systems)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 61(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mixing operations (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

4.2.12 ES 4 - CS 12: Control of worker exposure: Formulation or re-packing (Mixing or blending in batch processes) (PROC5)

Remarks : Mixing operations (open systems)
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mixing operations (open systems)
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

PRAEPAGEN TQ

Page 62(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

4.2.13 ES 4 - CS 13: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Manual
Transfer from/pouring from containers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Manual
Transfer from/pouring from containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Use drum pumps., Wear suitable gloves tested to EN374.

4.2.14 ES 4 - CS 14: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Drum/batch transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 63(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Use drum pumps., Avoid spillage when withdrawing pump.,
Wear suitable gloves tested to EN374.

4.2.15 ES 4 - CS 15: Control of worker exposure: Formulation or re-packing (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Production or preparation of articles by tabletting, compression, extrusion or pelletisation

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Handle substance within a predominantly closed system provided with extract ventilation., Wear suitable gloves tested to EN374.

4.2.16 ES 4 - CS 16: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 64(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Drum and small package filling
Organisational measures to prevent /limit releases, dispersion and exposure : Put lids on containers immediately after use. Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Fill containers/cans at dedicated fill points supplied with local extract ventilation., Clear spills immediately., Wear suitable gloves tested to EN374.

4.2.17 ES 4 - CS 17: Control of worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

- Remarks : Equipment cleaning and maintenance

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Equipment cleaning and maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Apply vessel entry procedures including use of forced supplied air. Avoid direct eye contact with product, also via contamination on hands. Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Drain down and flush system prior to equipment break-in or maintenance., Transfer via enclosed lines., Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

4.2.18 ES 4 - CS 18: Control of worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

- Remarks : Storage

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 65(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Avoid dip sampling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Transfer via enclosed lines., Ensure operation is undertaken outdoors.

4.3. ES 4 Exposure estimation and reference to its source

4.3.2 ES 4 - CS 2: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

4.3.3 ES 4 - CS 3: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,05 |

PRAEPAGEN TQ

Page 66(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

4.3.4 ES 4 - CS 4: Worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,12 |

4.3.5 ES 4 - CS 5: Worker exposure: Formulation or re-packing (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures (open systems)) | 0,10 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems)) | < 0,01 |
| combined routes | General exposures (open systems) | 0,10 |

4.3.6 ES 4 - CS 6: Worker exposure: Formulation or re-packing (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------|------|
| inhalative | 5 ppm (ECETOC TRA worker V3, General exposures (open systems), Aerosol) | 0,50 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems), Aerosol) | 0,01 |
| combined routes | General exposures (open systems), Aerosol | 0,51 |

4.3.7 ES 4 - CS 7: Worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Batch process, Elevated temperature) | 0,49 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Batch process, Elevated temperature) | < 0,01 |
| combined routes | Batch process, Elevated temperature | 0,49 |

PRAEPAGEN TQ

Page 67(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

4.3.8 ES 4 - CS 8: Worker exposure: Formulation or re-packing (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Process sampling) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Process sampling) | < 0,01 |
| combined routes | Process sampling | 0,12 |

4.3.9 ES 4 - CS 9: Worker exposure: Formulation or re-packing (Use as laboratory reagent) (PROC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | 0,05 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,05 |

4.3.10 ES 4 - CS 10: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | 0,01 |
| combined routes | Bulk transfers | 0,25 |

4.3.11 ES 4 - CS 11: Worker exposure: Formulation or re-packing (Mixing or blending in batch processes) (PROC5)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Mixing operations (open systems)) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Mixing operations (open systems)) | < 0,01 |
| combined routes | Mixing operations (open systems) | 0,25 |

4.3.12 ES 4 - CS 12: Worker exposure: Formulation or re-packing (Mixing or blending in batch processes) (PROC5)

PRAEPAGEN TQ

Page 68(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------|------|
| inhalative | 5 ppm (ECETOC TRA worker V3, Mixing operations (open systems), Aerosol) | 0,50 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Mixing operations (open systems), Aerosol) | 0,02 |
| combined routes | Mixing operations (open systems), Aerosol | 0,52 |

4.3.13 ES 4 - CS 13: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Manual, Transfer from/pouring from containers) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Manual, Transfer from/pouring from containers) | 0,02 |
| combined routes | Manual, Transfer from/pouring from containers | 0,26 |

4.3.14 ES 4 - CS 14: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Drum/batch transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers) | 0,01 |
| combined routes | Drum/batch transfers | 0,25 |

4.3.15 ES 4 - CS 15: Worker exposure: Formulation or re-packing (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 3,43 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,25 |

4.3.16 ES 4 - CS 16: Worker exposure: Formulation or re-packing (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |

PRAEPAGEN TQ

Page 69(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|------------------------------------------|------|
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

4.3.17 ES 4 - CS 17: Worker exposure: Formulation or re-packing (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Equipment cleaning and maintenance) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Equipment cleaning and maintenance) | 0,02 |
| combined routes | Equipment cleaning and maintenance | 0,26 |

4.3.18 ES 4 - CS 18: Worker exposure: Formulation or re-packing (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

4.4. ES 4 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

5. ES 5: Industrial use; Use in coatings

5.1. Title section

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Environment | |
| CS1: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | ERC4 |
| Workers | |
| CS2: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |

PRAEPAGEN TQ

Page 70(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| CS3: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS4: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS5: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS6: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS7: Industrial use (Mixing or blending in batch processes) | PROC5 |
| CS8: Industrial use (Industrial spraying) | PROC7 |
| CS9: Industrial use (Industrial spraying) | PROC7 |
| CS10: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS11: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS12: Industrial use (Roller application or brushing) | PROC10 |
| CS13: Industrial use (Treatment of articles by dipping and pouring) | PROC13 |
| CS14: Industrial use (Use as laboratory reagent) | PROC15 |
| CS15: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS16: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) | PROC14 |

5.2. ES 5 Conditions of use affecting exposure

5.2.1 ES 5 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : No exposure assessment presented for the environment.

5.2.2 ES 5 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 71(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear suitable gloves tested to EN374.

5.2.3 ES 5 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

- Remarks : General exposures (closed systems)
With sample collection
Use in contained systems

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Process Temperature : 20 °C

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : General exposures (closed systems)
With sample collection
Use in contained systems
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear suitable gloves tested to EN374.

5.2.4 ES 5 - CS 4: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

PRAEPAGEN TQ

Page 72(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Film formation - force drying, stoving and other technologies

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Film formation - force drying, stoving and other technologies
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Handle substance within a closed system.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

5.2.5 ES 5 - CS 5: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mixing operations
General exposures (closed systems)

Organisational measures to prevent /limit releases, dispersion : Assumes a good basic standard of occupational hygiene is implemented

PRAEPAGEN TQ

Page 73(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

5.2.6 ES 5 - CS 6: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Film formation - air drying
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Avoid manual contact with wet work pieces., Wear suitable gloves tested to EN374.

5.2.7 ES 5 - CS 7: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Process Temperature : 20 °C

PRAEPAGEN TQ

Page 74(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Preparation of material for application
Mixing operations (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Avoid manual contact with wet work pieces., Wear suitable gloves tested to EN374.

5.2.8 ES 5 - CS 8: Control of worker exposure: Industrial use (Industrial spraying) (PROCT)

Remarks : Spraying (automatic/robotic)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying (automatic/robotic)
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Carry out in a vented booth provided with laminar airflow.
Provide extract ventilation to emission points when contact with warm (>50oC) lubricant is likely.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

PRAEPAGEN TQ

Page 75(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

5.2.9 ES 5 - CS 9: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Remarks : Manual
Spraying

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Manual
Spraying

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Provide a good standard of controlled ventilation (10 to 15 air changes per hour).

Effectiveness (of a measure) : 70 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

5.2.10 ES 5 - CS 10: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 76(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Material transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

5.2.11 ES 5 - CS 11: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Process Temperature : 20 °C

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Material transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

5.2.12 ES 5 - CS 12: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

PRAEPAGEN TQ

Page 77(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 5 - 100 hPa
Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Roller, spreader, flow application
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

5.2.13 ES 5 - CS 13: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Dipping, immersion and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid manual contact with wet work pieces.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur., Clear up spills immediately and dispose of waste safely., Wear suitable gloves tested to EN374.

PRAEPAGEN TQ

Page 78(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

5.2.14 ES 5 - CS 14: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Laboratory activities

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Avoid manual contact with wet work pieces., Wear suitable gloves tested to EN374.

5.2.15 ES 5 - CS 15: Control of worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Process Temperature : 20 °C

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Material transfers
Drum/batch transfers
Transfer from/pouring from containers

PRAEPAGEN TQ

Page 79(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide extract ventilation to material transfer points and other openings., Wear suitable gloves tested to EN374.

5.2.16 ES 5 - CS 16: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
- Vapour pressure : 5 - 100 hPa
- Process Temperature : 20 °C

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Production or preparation of articles by tabletting, compression, extrusion or pelletisation
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

5.3. ES 5 Exposure estimation and reference to its source

5.3.2 ES 5 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

PRAEPAGEN TQ

Page 80(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

5.3.3 ES 5 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------|
| inhalative | 10 ppm (ECETOC TRA worker V3, General exposures (closed systems), With sample collection, Use in contained systems) | < 0,1 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems), With sample collection, Use in contained systems) | < 0,1 |
| combined routes | General exposures (closed systems), With sample collection, Use in contained systems | 0,05 |

5.3.4 ES 5 - CS 4: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Film formation - force drying, stoving and other technologies) | 0,2 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Film formation - force drying, stoving and other technologies) | < 0,1 |
| combined routes | Film formation - force drying, stoving and other technologies | 0,25 |

5.3.5 ES 5 - CS 5: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,1 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,12 |

PRAEPAGEN TQ

Page 81(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

5.3.6 ES 5 - CS 6: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 20 ppm (ECETOC TRA worker V3) | 0,1 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,11 |

5.3.7 ES 5 - CS 7: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,26 |

5.3.8 ES 5 - CS 8: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Spraying (automatic/robotic)) | 0,2 |
| Dermal | 42,86 mg/kg bw/day (ECETOC TRA worker V3, Spraying (automatic/robotic)) | < 0,1 |
| combined routes | Spraying (automatic/robotic) | 0,29 |

5.3.9 ES 5 - CS 9: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|-------|
| inhalative | 75 ppm (ECETOC TRA worker V3, Manual, Spraying) | 0,4 |
| Dermal | 42,86 mg/kg bw/day (ECETOC TRA worker V3, Manual, Spraying) | < 0,1 |
| combined routes | Manual, Spraying | 0,42 |

5.3.10 ES 5 - CS 10: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,26 |

PRAEPAGEN TQ

Page 82(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

5.3.11 ES 5 - CS 11: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,25 |

5.3.12 ES 5 - CS 12: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,28 |

5.3.13 ES 5 - CS 13: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,25 |

5.3.14 ES 5 - CS 14: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | < 0,1 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,05 |

5.3.15 ES 5 - CS 15: Worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |

PRAEPAGEN TQ

Page 83(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|--|------|
| combined routes | | 0,25 |
|-----------------|--|------|

5.3.16 ES 5 - CS 16: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 3,43 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,25 |

5.4. ES 5 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

6. ES 6: Professional use; Use in coatings

6.1. Title section

| | | |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Environment | | |
| CS1: | Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |
| Workers | | |
| CS2: | Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |
| CS3: | Professional use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS4: | Professional use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS5: | Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS6: | Professional use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS7: | Professional use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS8: | Professional use (Mixing or blending in batch processes) | PROC5 |
| CS9: | Professional use (Mixing or blending in batch processes) | PROC5 |

PRAEPAGEN TQ

Page 84(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|--------------------------------------------------------------------------------------------------------------|--------|
| CS10: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS11: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS12: Professional use (Roller application or brushing) | PROC10 |
| CS13: Professional use (Roller application or brushing) | PROC10 |
| CS14: Professional use (Non-industrial spraying) | PROC11 |
| CS15: Professional use (Non-industrial spraying) | PROC11 |
| CS16: Professional use (Treatment of articles by dipping and pouring) | PROC13 |
| CS17: Professional use (Treatment of articles by dipping and pouring) | PROC13 |
| CS18: Professional use (Use as laboratory reagent) | PROC15 |
| CS19: Professional use (Manual activities involving hand contact) | PROC19 |
| CS20: Professional use (Manual activities involving hand contact) | PROC19 |

6.2. ES 6 Conditions of use affecting exposure

6.2.1 ES 6 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

6.2.2 ES 6 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Handle substance within a closed system.

PRAEPAGEN TQ

Page 85(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

6.2.3 ES 6 - CS 3: Control of worker exposure: Professional use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : Filling of equipment from drums or containers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Handle substance within a closed system.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

6.2.4 ES 6 - CS 4: Control of worker exposure: Professional use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : General exposures (closed systems)
Use in contained systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

PRAEPAGEN TQ

Page 86(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Use in contained systems
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

6.2.5 ES 6 - CS 5: Control of worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Preparation of material for application
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

PRAEPAGEN TQ

Page 87(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Clear up spills immediately and dispose of waste safely.,
Wear suitable gloves tested to EN374.

6.2.6 ES 6 - CS 6: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : Film formation - air drying
Outdoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Film formation - air drying
Outdoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Avoid manual contact with wet work pieces., Wear suitable gloves tested to EN374.

6.2.7 ES 6 - CS 7: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : Film formation - air drying
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

PRAEPAGEN TQ

Page 88(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Film formation - air drying
Indoor use
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Avoid manual contact with wet work pieces., Wear suitable gloves tested to EN374.

6.2.8 ES 6 - CS 8: Control of worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

Remarks : Preparation of material for application
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Preparation of material for application
Indoor use
Organisational measures to : Assumes a good basic standard of occupational hygiene is

PRAEPAGEN TQ

Page 89(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

prevent /limit releases, dispersion and exposure : implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

6.2.9 ES 6 - CS 9: Control of worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

Remarks : Preparation of material for application
Outdoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Preparation of material for application
Outdoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

6.2.10 ES 6 - CS 10: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

PRAEPAGEN TQ

Page 90(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
- Vapour pressure : 5 - 100 hPa
- Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Material transfers
Drum/batch transfers
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Wear suitable gloves tested to EN374.

6.2.11 ES 6 - CS 11: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
- Vapour pressure : 5 - 100 hPa
- Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Material transfers
Drum/batch transfers
- Organisational measures to prevent /limit releases, dispersion : Assumes a good basic standard of occupational hygiene is implemented

PRAEPAGEN TQ

Page 91(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to material transfer points and other openings., Wear suitable gloves tested to EN374.

6.2.12 ES 6 - CS 12: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Remarks : Roller, spreader, flow application
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Roller, spreader, flow application
Indoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Wear suitable gloves tested to EN374.

6.2.13 ES 6 - CS 13: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Remarks : Roller, spreader, flow application
Outdoor use

PRAEPAGEN TQ

Page 92(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Roller, spreader, flow application
Outdoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

6.2.14 ES 6 - CS 14: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying
Manual
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 93(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Spraying
Manual
Indoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Carry out in a vented booth provided with laminar airflow.

Effectiveness (of a measure) : 80 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

6.2.15 ES 6 - CS 15: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying
Manual
Outdoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Spraying
Manual
Outdoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Ensure operation is undertaken outdoors.
Avoid direct eye contact with product, also via contamination on hands.

Effectiveness (of a measure) : 70 %

Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 94(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear a respirator conforming to EN140., Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

6.2.16 ES 6 - CS 16: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Remarks : Dipping, immersion and pouring
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Dipping, immersion and pouring
Indoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid manual contact with wet work pieces.
Clear up spills immediately and dispose of waste safely.
Avoid direct eye contact with product, also via contamination on hands.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

6.2.17 ES 6 - CS 17: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Remarks : Dipping, immersion and pouring
Outdoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature

PRAEPAGEN TQ

Page 95(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : and Pressure
Remarks : 5 - 100 hPa
: Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Dipping, immersion and pouring
Outdoor use
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Clear up spills immediately and dispose of waste safely.
Avoid manual contact with wet work pieces.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Wear a respirator conforming to EN140., Wear suitable gloves tested to EN374.

6.2.18 ES 6 - CS 18: Control of worker exposure: Professional use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Laboratory activities
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 96(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

6.2.19 ES 6 - CS 19: Control of worker exposure: Professional use (Manual activities involving hand contact) (PROC19)

Remarks : Hand application - fingerpaints, pastels, adhesives
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Hand application - fingerpaints, pastels, adhesives
Indoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Open doors and windows.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

6.2.20 ES 6 - CS 20: Control of worker exposure: Professional use (Manual activities involving hand contact) (PROC19)

Remarks : Hand application - fingerpaints, pastels, adhesives
Outdoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 97(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Hand application - fingerpaints, pastels, adhesives
Outdoor use
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Avoid carrying out activities involving exposure for more than 4 hours per day., or, Wear a respirator conforming to EN140., Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.

6.3. ES 6 Exposure estimation and reference to its source

6.3.2 ES 6 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

6.3.3 ES 6 - CS 3: Worker exposure: Professional use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

PRAEPAGEN TQ

Page 98(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------|-------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,1 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers) | < 0,1 |
| combined routes | Filling of equipment from drums or containers | 0,10 |

6.3.4 ES 6 - CS 4: Worker exposure: Professional use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------|-------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures (closed systems), Use in contained systems) | 0,1 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems), Use in contained systems) | < 0,1 |
| combined routes | General exposures (closed systems), Use in contained systems | 0,10 |

6.3.5 ES 6 - CS 5: Worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,1 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,12 |

6.3.6 ES 6 - CS 6: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Film formation - air drying, Outdoor use) | 0,2 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Film formation - air drying, Outdoor use) | < 0,1 |
| combined routes | Film formation - air drying, Outdoor use | 0,25 |

6.3.7 ES 6 - CS 7: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

PRAEPAGEN TQ

Page 99(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Film formation - air drying, Indoor use) | 0,2 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, Film formation - air drying, Indoor use) | < 0,1 |
| combined routes | Film formation - air drying, Indoor use | 0,25 |

6.3.8 ES 6 - CS 8: Worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Preparation of material for application, Indoor use) | 0,5 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Preparation of material for application, Indoor use) | < 0,1 |
| combined routes | Preparation of material for application, Indoor use | 0,51 |

6.3.9 ES 6 - CS 9: Worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Preparation of material for application, Outdoor use) | 0,5 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Preparation of material for application, Outdoor use) | < 0,1 |
| combined routes | Preparation of material for application, Outdoor use | 0,51 |

6.3.10 ES 6 - CS 10: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,5 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,51 |

6.3.11 ES 6 - CS 11: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------|-----|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |

PRAEPAGEN TQ

Page 100(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|------------------------------------------|-------|
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,25 |

6.3.12 ES 6 - CS 12: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Roller, spreader, flow application, Indoor use) | 0,5 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Roller, spreader, flow application, Indoor use) | < 0,1 |
| combined routes | Roller, spreader, flow application, Indoor use | 0,52 |

6.3.13 ES 6 - CS 13: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Roller, spreader, flow application, Outdoor use) | 0,5 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Roller, spreader, flow application, Outdoor use) | < 0,1 |
| combined routes | Roller, spreader, flow application, Outdoor use | 0,52 |

6.3.14 ES 6 - CS 14: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Spraying, Manual, Indoor use) | 0,5 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Manual, Indoor use) | 0,1 |
| combined routes | Spraying, Manual, Indoor use | 0,61 |

6.3.15 ES 6 - CS 15: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------|-----|
| inhalative | 150 ppm (ECETOC TRA worker V3, Spraying, Manual, Outdoor use) | 0,7 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Manual, Outdoor use) | 0,1 |

PRAEPAGEN TQ

Page 101(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-------------------------------|------|
| combined routes | Spraying, Manual, Outdoor use | 0,86 |
|-----------------|-------------------------------|------|

6.3.16 ES 6 - CS 16: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Dipping, immersion and pouring, Indoor use) | 0,5 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Dipping, immersion and pouring, Indoor use) | < 0,1 |
| combined routes | Dipping, immersion and pouring, Indoor use | 0,51 |

6.3.17 ES 6 - CS 17: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Dipping, immersion and pouring, Outdoor use) | 0,5 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Dipping, immersion and pouring, Outdoor use) | < 0,1 |
| combined routes | Dipping, immersion and pouring, Outdoor use | 0,51 |

6.3.18 ES 6 - CS 18: Worker exposure: Professional use (Use as laboratory reagent) (PROC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | < 0,1 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,05 |

6.3.19 ES 6 - CS 19: Worker exposure: Professional use (Manual activities involving hand contact) (PROC19)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Hand application - fingerpaints, pastels, adhesives, Indoor use) | 0,5 |
| Dermal | 141,43 mg/kg bw/day (ECETOC TRA worker V3, Hand application - fingerpaints, pastels, adhesives, Indoor use) | 0,2 |
| combined routes | Hand application - fingerpaints, pastels, adhesives, Indoor use | 0,65 |

PRAEPAGEN TQ

Page 102(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

6.3.20 ES 6 - CS 20: Worker exposure: Professional use (Manual activities involving hand contact) (PROC19)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Hand application - fingerpaints, pastels, adhesives, Outdoor use) | 0,5 |
| Dermal | 141,43 mg/kg bw/day (ECETOC TRA worker V3, Hand application - fingerpaints, pastels, adhesives, Outdoor use) | 0,2 |
| combined routes | Hand application - fingerpaints, pastels, adhesives, Outdoor use | 0,65 |

6.4. ES 6 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

7. ES 7: Consumer use; Use in coatings

7.1. Title section

| | | |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Adhesives, sealants (PC1) | | |
| Anti-freeze and de-icing products (PC4) | | |
| Biocidal products (PC8) | | |
| Coatings and paints, thinners, paint removers (PC9a) | | |
| Fillers, putties, plasters, modelling clay (PC9b) | | |
| Finger paints (PC9c) | | |
| Non-metal surface treatment products (PC15) | | |
| Ink and toners (PC18) | | |
| Leather treatment products (PC23) | | |
| Lubricants, greases, release products (PC24) | | |
| Polishes and wax blends (PC31) | | |
| Textile dyes and impregnating products (PC34) | | |
| Environment | | |
| CS1: | Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |
| Consumer | | |
| CS2: | Consumer use (Adhesives, sealants) | PC1 |
| CS3: | Consumer use (Adhesives, sealants) | PC1 |
| CS4: | Consumer use (Adhesives, sealants) | PC1 |

PRAEPAGEN TQ

Page 103(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|--------------------------------------------------------------------|------|
| CS5: Consumer use (Adhesives, sealants) | PC1 |
| CS6: Consumer use (Anti-freeze and de-icing products) | PC4 |
| CS7: Consumer use (Anti-freeze and de-icing products) | PC4 |
| CS8: Consumer use (Anti-freeze and de-icing products) | PC4 |
| CS9: Consumer use (Biocidal products) | PC8 |
| CS10: Consumer use (Biocidal products) | PC8 |
| CS11: Consumer use (Biocidal products) | PC8 |
| CS12: Consumer use (Coatings and paints, thinners, paint removers) | PC9a |
| CS13: Consumer use (Coatings and paints, thinners, paint removers) | PC9a |
| CS14: Consumer use (Coatings and paints, thinners, paint removers) | PC9a |
| CS15: Consumer use (Coatings and paints, thinners, paint removers) | PC9a |
| CS16: Consumer use (Fillers, putties, plasters, modelling clay) | PC9b |
| CS17: Consumer use (Fillers, putties, plasters, modelling clay) | PC9b |
| CS18: Consumer use (Fillers, putties, plasters, modelling clay) | PC9b |
| CS19: Consumer use (Finger paints) | PC9c |
| CS20: Consumer use (Non-metal surface treatment products) | PC15 |
| CS21: Consumer use (Non-metal surface treatment products) | PC15 |
| CS22: Consumer use (Non-metal surface treatment products) | PC15 |
| CS23: Consumer use (Non-metal surface treatment products) | PC15 |
| CS24: Consumer use (Ink and toners) | PC18 |
| CS25: Consumer use (Leather treatment products) | PC23 |
| CS26: Consumer use (Leather treatment products) | PC23 |
| CS27: Consumer use (Lubricants, greases, release products) | PC24 |
| CS28: Consumer use (Lubricants, greases, release products) | PC24 |
| CS29: Consumer use (Lubricants, greases, release products) | PC24 |
| CS30: Consumer use (Polishes and wax blends) | PC31 |
| CS31: Consumer use (Polishes and wax blends) | PC31 |
| CS32: Consumer use (Textile dyes and impregnating products) | PC34 |

7.2. ES 7 Conditions of use affecting exposure

7.2.1 ES 7 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

7.2.2 ES 7 - CS 2: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks : Glues, hobby use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid

PRAEPAGEN TQ

Page 104(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 9 grams

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 35,73 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.3 ES 7 - CS 3: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks : Glues DIY-use (carpet glue, tile glue, wood parquet glue)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 6390 grams

Frequency and duration of use

Exposure duration : 6 h
Frequency of use : 1 uses per day
Frequency of use : 1 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 110,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.4 ES 7 - CS 4: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

PRAEPAGEN TQ

Page 105(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Glue from spray

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 85,05 grams

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : 1 uses per day
Frequency of use : 6 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 35,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.5 ES 7 - CS 5: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks : Sealants

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 75 grams

Frequency and duration of use

Exposure duration : 1 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 35,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

PRAEPAGEN TQ

Page 106(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.6 ES 7 - CS 6: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : Washing car window

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 0,5 grams

Frequency and duration of use

Exposure duration : 0,02 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

7.2.7 ES 7 - CS 7: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : Pouring into radiator

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 2000 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

PRAEPAGEN TQ

Page 107(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 428,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

7.2.8 ES 7 - CS 8: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : Lock de-icer

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 4 grams

Frequency and duration of use

Exposure duration : 0,25 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 214,40 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

7.2.9 ES 7 - CS 9: Control of consumer exposure: Consumer use (Biocidal products) (PC8)

Remarks : Laundry and dish washing products
Excipient only

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

PRAEPAGEN TQ

Page 108(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 15 grams

Frequency and duration of use

Exposure duration : 0,5 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.10 ES 7 - CS 10: Control of consumer exposure: Consumer use (Biocidal products) (PC8)

Remarks : Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)
Excipient only

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 27 grams

Frequency and duration of use

Exposure duration : 0,33 h
Frequency of use : 1 uses per day
Frequency of use : 128 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

PRAEPAGEN TQ

Page 109(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

7.2.11 ES 7 - CS 11: Control of consumer exposure: Consumer use (Biocidal products) (PC8)

Remarks : Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)
Excipient only

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 35 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 128 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.12 ES 7 - CS 12: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

Remarks : Waterborne latex wall paint

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 2760 grams

Frequency and duration of use

Exposure duration : 2,20 h
Frequency of use : 1 uses per day
Frequency of use : 4 days per year

PRAEPAGEN TQ

Page 110(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Human factors not influenced by risk management

Covers skin contact area up to : 428,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

7.2.13 ES 7 - CS 13: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

Remarks : Solvent rich, high solid, water borne paint

Product characteristics

Concentration of the Substance in Mixture/Article : <= 27,5 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 744 grams

Frequency and duration of use

Exposure duration : 2,20 h

Frequency of use : 1 uses per day

Frequency of use : 6 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

7.2.14 ES 7 - CS 14: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

Remarks : Aerosol spray can

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

PRAEPAGEN TQ

Page 111(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Amount per use : 215 grams

Frequency and duration of use

Exposure duration : 0,3 h
Frequency of use : 1 uses per day
Frequency of use : 2 days per year

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

7.2.15 ES 7 - CS 15: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

Remarks : Removers (paint-, glue-, wall paper-, sealant-remover)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 491 grams

Frequency and duration of use

Exposure duration : 2,00 h
Frequency of use : 1 uses per day
Frequency of use : 3 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.16 ES 7 - CS 16: Control of consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

Remarks : Fillers and putty

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

PRAEPAGEN TQ

Page 112(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 85 grams

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : 1 uses per day
Frequency of use : 12 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 35,73 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.17 ES 7 - CS 17: Control of consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

Remarks : Plasters and floor equalizers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 2 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 13800 grams

Frequency and duration of use

Exposure duration : 2 h
Frequency of use : 1 uses per day
Frequency of use : 12 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.18 ES 7 - CS 18: Control of consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

PRAEPAGEN TQ

Page 113(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Modelling clay

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

For each use event, assumes swallowed amount of : 1 grams

Frequency and duration of use

Exposure duration : 6 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 254,40 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.19 ES 7 - CS 19: Control of consumer exposure: Consumer use (Finger paints) (PC9c)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 15 %

Concentration of the Substance in Mixture/Article : <= 15 %
Avoid using at a product concentration greater than

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

For each use event, assumes swallowed amount of : 1,35 grams

Frequency and duration of use

Exposure duration : 6 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

PRAEPAGEN TQ

Page 114(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Covers skin contact area up to : 254,40 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.20 ES 7 - CS 20: Control of consumer exposure: Consumer use (Non-metal surface treatment products) (PC15)

Remarks : Waterborne latex wall paint

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 2760 grams

Frequency and duration of use

Exposure duration : 2,20 h
Frequency of use : 1 uses per day
Frequency of use : 4 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.21 ES 7 - CS 21: Control of consumer exposure: Consumer use (Non-metal surface treatment products) (PC15)

Remarks : Solvent rich, high solid, water borne paint

Product characteristics

Concentration of the Substance in Mixture/Article : <= 27,5 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 744 grams

PRAEPAGEN TQ

Page 115(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Exposure duration : 2,20 h
Frequency of use : 1 uses per day
Frequency of use : 6 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.22 ES 7 - CS 22: Control of consumer exposure: Consumer use (Non-metal surface treatment products) (PC15)

Remarks : Aerosol spray can

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 215 grams

Frequency and duration of use

Exposure duration : 0,3 h
Frequency of use : 1 uses per day
Frequency of use : 2 days per year

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

7.2.23 ES 7 - CS 23: Control of consumer exposure: Consumer use (Non-metal surface treatment products) (PC15)

Remarks : Removers (paint-, glue-, wall paper-, sealant-remover)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %
Physical Form (at time of use) : Liquid

PRAEPAGEN TQ

Page 116(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 491 grams

Frequency and duration of use

Exposure duration : 2,00 h
Frequency of use : 1 uses per day
Frequency of use : 3 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.24 ES 7 - CS 24: Control of consumer exposure: Consumer use (Ink and toners) (PC18)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 40 grams

Frequency and duration of use

Exposure duration : 2,20 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to fingertips.
Covers skin contact area up to : 71,40 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.25 ES 7 - CS 25: Control of consumer exposure: Consumer use (Leather treatment products) (PC23)

Remarks : Polishes, wax / cream (floor, furniture, shoes)

PRAEPAGEN TQ

Page 117(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 56 grams

Frequency and duration of use

Exposure duration : 1,23 h
Frequency of use : 1 uses per day
Frequency of use : 29 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 430 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.26 ES 7 - CS 26: Control of consumer exposure: Consumer use (Leather treatment products) (PC23)

Remarks : Polishes, spray (furniture, shoes)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 56 grams

Frequency and duration of use

Exposure duration : 0,33 h
Frequency of use : 1 uses per day
Frequency of use : 8 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 430 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6

PRAEPAGEN TQ

Page 118(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Covers use under typical household ventilation.

7.2.27 ES 7 - CS 27: Control of consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

Remarks : Liquids

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 2200 grams

Frequency and duration of use

Exposure duration : 0,17 h

Frequency of use : 1 uses per day

Frequency of use : 4 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 468 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³

Ventilation rate per hour : 1,5

Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

7.2.28 ES 7 - CS 28: Control of consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

Remarks : Pastes

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 34 grams

Frequency and duration of use

Exposure duration : 6 h

Frequency of use : 1 uses per day

PRAEPAGEN TQ

Page 119(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency of use : 10 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 468 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

7.2.29 ES 7 - CS 29: Control of consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

Remarks : Sprays

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 73 grams

Frequency and duration of use

Exposure duration : 0,17 h

Frequency of use : 1 uses per day

Frequency of use : 6 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

7.2.30 ES 7 - CS 30: Control of consumer exposure: Consumer use (Polishes and wax blends) (PC31)

Remarks : Polishes, wax / cream (floor, furniture, shoes)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

PRAEPAGEN TQ

Page 120(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Amount used

Amount per use : 142 grams

Frequency and duration of use

Exposure duration : 1,23 h
Frequency of use : 1 uses per day
Frequency of use : 29 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 430 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.31 ES 7 - CS 31: Control of consumer exposure: Consumer use (Polishes and wax blends) (PC31)

Remarks : Polishes, spray (furniture, shoes)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 35 grams

Frequency and duration of use

Exposure duration : 0,33 h
Frequency of use : 1 uses per day
Frequency of use : 8 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 430 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.2.32 ES 7 - CS 32: Control of consumer exposure: Consumer use (Textile dyes and impregnating products) (PC34)

Product characteristics

Concentration of the Substance in : <= 20 %

PRAEPAGEN TQ

Page 121(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Mixture/Article

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 115 grams

Frequency and duration of use

Exposure duration : 1 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

7.3. ES 7 Exposure estimation and reference to its source

7.3.2 ES 7 - CS 2: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------|--------|
| Dermal | 2,98 mg/kg bw/day (ECETOC TRA worker V3, Glues, hobby use, Chronic effects) | 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Glues, hobby use, Chronic effects) | < 0,01 |
| inhalative | 14,21 mg/m ³ (ECETOC TRA worker V3, Glues, hobby use, Chronic effects) | 0,16 |
| combined routes | Glues, hobby use, Chronic effects | 0,17 |

7.3.3 ES 7 - CS 3: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,02 mg/kg bw/day (ECETOC TRA worker V3, Glues DIY-use (carpet glue, tile glue, wood parquet glue), Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Glues DIY-use (carpet glue, tile glue, wood parquet glue), Chronic effects) | < 0,01 |

PRAEPAGEN TQ

Page 122(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|----------------------------------------------------------------------------------------------------------------------------|------|
| | effects) | |
| inhalative | 29,13 mg/m ³ (ECETOC TRA worker V3, Glues DIY-use (carpet glue, tile glue, wood parquet glue), Chronic effects) | 0,33 |
| combined routes | Glues DIY-use (carpet glue, tile glue, wood parquet glue), Chronic effects | 0,33 |

7.3.4 ES 7 - CS 4: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------|--------|
| Dermal | 0,05 mg/kg bw/day (ECETOC TRA worker V3, Glue from spray, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Glue from spray, Chronic effects) | < 0,01 |
| inhalative | 2,21 mg/m ³ (ECETOC TRA worker V3, Glue from spray, Chronic effects) | 0,02 |
| combined routes | Glue from spray, Chronic effects | 0,02 |

7.3.5 ES 7 - CS 5: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------|--------|
| Dermal | 2,98 mg/kg bw/day (ECETOC TRA worker V3, Sealants, Chronic effects) | 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Sealants, Chronic effects) | < 0,01 |
| inhalative | 58,75 mg/m ³ (ECETOC TRA worker V3, Sealants, Chronic effects) | 0,66 |
| combined routes | Sealants, Chronic effects | 0,67 |

7.3.6 ES 7 - CS 6: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Washing car window, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Washing car window, Chronic effects) | < 0,01 |
| inhalative | 0,01 mg/m ³ (ECETOC TRA worker V3, Washing car window, Chronic effects) | < 0,01 |
| combined routes | Washing car window, Chronic effects | < 0,01 |

7.3.7 ES 7 - CS 7: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

PRAEPAGEN TQ

Page 123(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------|--------|
| Dermal | 35,67 mg/kg bw/day (ECETOC TRA worker V3, Pouring into radiator, Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Pouring into radiator, Chronic effects) | < 0,01 |
| inhalative | 9,04 mg/m ³ (ECETOC TRA worker V3, Pouring into radiator, Chronic effects) | 0,10 |
| combined routes | Pouring into radiator, Chronic effects | 0,21 |

7.3.8 ES 7 - CS 8: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| Dermal | 17,87 mg/kg bw/day (ECETOC TRA worker V3, Lock de-icer, Chronic effects) | 0,06 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Lock de-icer, Chronic effects) | < 0,01 |
| inhalative | 0,51 mg/m ³ (ECETOC TRA worker V3, Lock de-icer, Chronic effects) | 0,01 |
| combined routes | Lock de-icer, Chronic effects | 0,06 |

7.3.9 ES 7 - CS 9: Consumer exposure: Consumer use (Biocidal products) (PC8)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,71 mg/kg bw/day (ECETOC TRA worker V3, Laundry and dish washing products, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Laundry and dish washing products, Chronic effects) | < 0,01 |
| inhalative | 6,75 mg/m ³ (ECETOC TRA worker V3, Laundry and dish washing products, Chronic effects) | 0,08 |
| combined routes | Laundry and dish washing products, Chronic effects | 0,08 |

7.3.10 ES 7 - CS 10: Consumer exposure: Consumer use (Biocidal products) (PC8)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 71,46 mg/kg bw/day (ECETOC TRA worker V3, Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects) | 0,22 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners | < 0,01 |

PRAEPAGEN TQ

Page 124(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| |), Chronic effects) | |
| inhalative | 8,42 mg/m ³ (ECETOC TRA worker V3, Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects) | 0,09 |
| combined routes | Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects | 0,32 |

7.3.11 ES 7 - CS 11: Consumer exposure: Consumer use (Biocidal products) (PC8)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 35,67 mg/kg bw/day (ECETOC TRA worker V3, Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects) | < 0,01 |
| inhalative | 5,78 mg/m ³ (ECETOC TRA worker V3, Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects) | 0,06 |
| combined routes | Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects | 0,18 |

7.3.12 ES 7 - CS 12: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------|--------|
| Dermal | 0,39 mg/kg bw/day (ECETOC TRA worker V3, Waterborne latex wall paint, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Waterborne latex wall paint, Chronic effects) | < 0,01 |
| inhalative | 38,63 mg/m ³ (ECETOC TRA worker V3, Waterborne latex wall paint, Chronic effects) | 0,43 |
| combined routes | Waterborne latex wall paint, Chronic effects | 0,44 |

7.3.13 ES 7 - CS 13: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,31 mg/kg bw/day (ECETOC TRA worker V3, Solvent rich, high solid, water borne paint, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Solvent rich, high solid, water borne paint, Chronic effects) | < 0,01 |

PRAEPAGEN TQ

Page 125(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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|-----------------|-------------------------------------------------------------------------------------------------------------|------|
| inhalative | 8,33 mg/m ³ (ECETOC TRA worker V3, Solvent rich, high solid, water borne paint, Chronic effects) | 0,09 |
| combined routes | Solvent rich, high solid, water borne paint, Chronic effects | 0,09 |

7.3.14 ES 7 - CS 14: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Aerosol spray can, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Aerosol spray can, Chronic effects) | < 0,01 |
| inhalative | 34,29 mg/m ³ (ECETOC TRA worker V3, Aerosol spray can, Chronic effects) | 0,39 |
| combined routes | Aerosol spray can, Chronic effects | 0,39 |

7.3.15 ES 7 - CS 15: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,59 mg/kg bw/day (ECETOC TRA worker V3, Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects) | < 0,01 |
| inhalative | 4,90 mg/m ³ (ECETOC TRA worker V3, Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects) | 0,06 |
| combined routes | Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects | 0,06 |

7.3.16 ES 7 - CS 16: Consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------|--------|
| Dermal | 0,1 mg/kg bw/day (ECETOC TRA worker V3, Fillers and putty, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Fillers and putty, Chronic effects) | < 0,01 |
| inhalative | 4,41 mg/m ³ (ECETOC TRA worker V3, Fillers and putty, Chronic effects) | 0,05 |
| combined routes | Fillers and putty, Chronic effects | 0,05 |

PRAEPAGEN TQ

Page 126(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

7.3.17 ES 7 - CS 17: Consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,09 mg/kg bw/day (ECETOC TRA worker V3, Plasters and floor equalizers, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Plasters and floor equalizers, Chronic effects) | < 0,01 |
| inhalative | 22,02 mg/m ³ (ECETOC TRA worker V3, Plasters and floor equalizers, Chronic effects) | 0,25 |
| combined routes | Plasters and floor equalizers, Chronic effects | 0,25 |

7.3.18 ES 7 - CS 18: Consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------|--------|
| Dermal | 2,54 mg/kg bw/day (ECETOC TRA worker V3, Modelling clay, Chronic effects) | 0,01 |
| Oral | 20 mg/kg bw/day (ECETOC TRA worker V3, Modelling clay, Chronic effects) | 0,77 |
| inhalative | 0 mg/m ³ (ECETOC TRA worker V3, Modelling clay, Chronic effects) | < 0,01 |
| combined routes | Modelling clay, Chronic effects | 0,78 |

7.3.19 ES 7 - CS 19: Consumer exposure: Consumer use (Finger paints) (PC9c)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|--------|
| Dermal | 38,16 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | 0,12 |
| Oral | 20,25 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | 0,78 |
| inhalative | 0 mg/m ³ (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| combined routes | Chronic effects | 0,90 |

7.3.20 ES 7 - CS 20: Consumer exposure: Consumer use (Non-metal surface treatment products) (PC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------|--------|
| Dermal | 0,16 mg/kg bw/day (ECETOC TRA worker V3, Waterborne latex wall paint, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Waterborne latex wall paint, Chronic effects) | < 0,01 |

PRAEPAGEN TQ

Page 127(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|----------------------------------------------------------------------------------------------|------|
| inhalative | 15,45 mg/m ³ (ECETOC TRA worker V3, Waterborne latex wall paint, Chronic effects) | 0,17 |
| combined routes | Waterborne latex wall paint, Chronic effects | 0,17 |

7.3.21 ES 7 - CS 21: Consumer exposure: Consumer use (Non-metal surface treatment products) (PC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,31 mg/kg bw/day (ECETOC TRA worker V3, Solvent rich, high solid, water borne paint, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Solvent rich, high solid, water borne paint, Chronic effects) | < 0,01 |
| inhalative | 8,33 mg/m ³ (ECETOC TRA worker V3, Solvent rich, high solid, water borne paint, Chronic effects) | 0,09 |
| combined routes | Solvent rich, high solid, water borne paint, Chronic effects | 0,09 |

7.3.22 ES 7 - CS 22: Consumer exposure: Consumer use (Non-metal surface treatment products) (PC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Aerosol spray can, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Aerosol spray can, Chronic effects) | < 0,01 |
| inhalative | 34,29 mg/m ³ (ECETOC TRA worker V3, Aerosol spray can, Chronic effects) | 0,39 |
| combined routes | Aerosol spray can, Chronic effects | 0,39 |

7.3.23 ES 7 - CS 23: Consumer exposure: Consumer use (Non-metal surface treatment products) (PC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,59 mg/kg bw/day (ECETOC TRA worker V3, Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects) | < 0,01 |
| inhalative | 4,90 mg/m ³ (ECETOC TRA worker V3, Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects) | 0,06 |
| combined routes | Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects | 0,06 |

PRAEPAGEN TQ

Page 128(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

7.3.24 ES 7 - CS 24: Consumer exposure: Consumer use (Ink and toners) (PC18)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------|--------|
| Dermal | 5,95 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | 0,02 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| inhalative | 50,89 mg/m ³ (ECETOC TRA worker V3, Chronic effects) | 0,57 |
| combined routes | Chronic effects | 0,59 |

7.3.25 ES 7 - CS 25: Consumer exposure: Consumer use (Leather treatment products) (PC23)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 35,83 mg/kg bw/day (ECETOC TRA worker V3, Polishes, wax / cream (floor, furniture, shoes), Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Polishes, wax / cream (floor, furniture, shoes), Chronic effects) | < 0,01 |
| inhalative | 50,84 mg/m ³ (ECETOC TRA worker V3, Polishes, wax / cream (floor, furniture, shoes), Chronic effects) | 0,57 |
| combined routes | Polishes, wax / cream (floor, furniture, shoes), Chronic effects | 0,68 |

7.3.26 ES 7 - CS 26: Consumer exposure: Consumer use (Leather treatment products) (PC23)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------------------|--------|
| Dermal | 35,83 mg/kg bw/day (ECETOC TRA worker V3, Polishes, spray (furniture, shoes), Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Polishes, spray (furniture, shoes), Chronic effects) | < 0,01 |
| inhalative | 17,62 mg/m ³ (ECETOC TRA worker V3, Polishes, spray (furniture, shoes), Chronic effects) | 0,20 |
| combined routes | Polishes, spray (furniture, shoes), Chronic effects | 0,31 |

7.3.27 ES 7 - CS 27: Consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------|------|
| Dermal | 78,00 mg/kg bw/day (ECETOC TRA worker V3, Liquids, Chronic effects) | 0,24 |

PRAEPAGEN TQ

Page 129(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-------------------------------------------------------------------------|--------|
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Liquids, Chronic effects) | < 0,01 |
| inhalative | 3,98 mg/m ³ (ECETOC TRA worker V3, Liquids, Chronic effects) | 0,04 |
| combined routes | Liquids, Chronic effects | 0,29 |

7.3.28 ES 7 - CS 28: Consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------|--------|
| Dermal | 15,6 mg/kg bw/day (ECETOC TRA worker V3, Pastes, Chronic effects) | 0,05 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Pastes, Chronic effects) | < 0,01 |
| inhalative | 0 mg/m ³ (ECETOC TRA worker V3, Pastes, Chronic effects) | < 0,01 |
| combined routes | Pastes, Chronic effects | 0,05 |

7.3.29 ES 7 - CS 29: Consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------|--------|
| Dermal | 35,73 mg/kg bw/day (ECETOC TRA worker V3, Sprays, Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Sprays, Chronic effects) | < 0,01 |
| inhalative | 12,06 mg/m ³ (ECETOC TRA worker V3, Sprays, Chronic effects) | 0,14 |
| combined routes | Sprays, Chronic effects | 0,25 |

7.3.30 ES 7 - CS 30: Consumer exposure: Consumer use (Polishes and wax blends) (PC31)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 2,87 mg/kg bw/day (ECETOC TRA worker V3, Polishes, wax / cream (floor, furniture, shoes), Chronic effects) | 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Polishes, wax / cream (floor, furniture, shoes), Chronic effects) | < 0,01 |
| inhalative | 10,31 mg/m ³ (ECETOC TRA worker V3, Polishes, wax / cream (floor, furniture, shoes), Chronic effects) | 0,12 |
| combined routes | Polishes, wax / cream (floor, furniture, shoes), Chronic effects | 0,12 |

PRAEPAGEN TQ

Page 130(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

7.3.31 ES 7 - CS 31: Consumer exposure: Consumer use (Polishes and wax blends) (PC31)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------------------|--------|
| Dermal | 35,83 mg/kg bw/day (ECETOC TRA worker V3, Polishes, spray (furniture, shoes), Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Polishes, spray (furniture, shoes), Chronic effects) | < 0,01 |
| inhalative | 11,01 mg/m ³ (ECETOC TRA worker V3, Polishes, spray (furniture, shoes), Chronic effects) | 0,12 |
| combined routes | Polishes, spray (furniture, shoes), Chronic effects | 0,24 |

7.3.32 ES 7 - CS 32: Consumer exposure: Consumer use (Textile dyes and impregnating products) (PC34)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------|--------|
| Dermal | 0,29 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| inhalative | 36,03 mg/m ³ (ECETOC TRA worker V3, Chronic effects) | 0,40 |
| combined routes | Chronic effects | 0,41 |

7.4. ES 7 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

8. ES 8: Industrial use; Use in cleaning agents

8.1. Title section

| | | |
|-----------------------------------------------------------------------------------------------------------------|--|--------|
| Environment | | |
| CS1: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | | ERC4 |
| Workers | | |
| CS2: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | | PROC8a |
| CS3: Industrial use (Chemical production or refinery in closed continuous | | PROC2 |

PRAEPAGEN TQ

Page 131(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| | process with occasional controlled exposure or processes with equivalent containment conditions) | |
| CS4: | Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS5: | Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS6: | Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS7: | Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS8: | Industrial use (Treatment of articles by dipping and pouring) | PROC13 |
| CS9: | Industrial use (Roller application or brushing) | PROC10 |
| CS10: | Industrial use (Industrial spraying) | PROC7 |
| CS11: | Industrial use (Roller application or brushing) | PROC10 |

8.2. ES 8 Conditions of use affecting exposure

8.2.1 ES 8 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : No exposure assessment presented for the environment.

8.2.2 ES 8 - CS 2: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Clear transfer lines prior to de-coupling.

PRAEPAGEN TQ

Page 132(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

8.2.3 ES 8 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : Automated process with (semi) closed systems
Use in contained systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Automated process with (semi) closed systems
Use in contained systems

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

8.2.4 ES 8 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

PRAEPAGEN TQ

Page 133(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Automated process with (semi) closed systems
Drum/batch transfers
Use in contained systems

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

8.2.5 ES 8 - CS 5: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : Application of cleaning products in closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Application of cleaning products in closed systems

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

8.2.6 ES 8 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 134(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

8.2.7 ES 8 - CS 7: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Batch process
Use in contained systems
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 135(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

8.2.8 ES 8 - CS 8: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Degreasing small objects in cleaning station

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

8.2.9 ES 8 - CS 9: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Remarks : Cleaning with low-pressure washers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 136(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Cleaning with low-pressure washers
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

8.2.10 ES 8 - CS 10: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Cleaning with high pressure washers
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Effectiveness (of a measure) : 70 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Avoid carrying out activities involving exposure for more than 4 hours per day., or, Wear a respirator conforming to EN140.

8.2.11 ES 8 - CS 11: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

- Remarks : Manual

PRAEPAGEN TQ

Page 137(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Surface cleaning
No spraying

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Manual
Surface cleaning
No spraying

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

8.3. ES 8 Exposure estimation and reference to its source

8.3.2 ES 8 - CS 2: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,26 |

8.3.3 ES 8 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

PRAEPAGEN TQ

Page 138(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------|-------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Automated process with (semi) closed systems, Use in contained systems) | < 0,1 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Automated process with (semi) closed systems, Use in contained systems) | < 0,1 |
| combined routes | Automated process with (semi) closed systems, Use in contained systems | 0,05 |

8.3.4 ES 8 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,1 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,12 |

8.3.5 ES 8 - CS 5: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------|-------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Application of cleaning products in closed systems) | < 0,1 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Application of cleaning products in closed systems) | < 0,1 |
| combined routes | Application of cleaning products in closed systems | 0,05 |

8.3.6 ES 8 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,25 |

8.3.7 ES 8 - CS 7: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

PRAEPAGEN TQ

Page 139(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,5 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,50 |

8.3.8 ES 8 - CS 8: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,26 |

8.3.9 ES 8 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Cleaning with low-pressure washers) | 0,2 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Cleaning with low-pressure washers) | < 0,1 |
| combined routes | Cleaning with low-pressure washers | 0,28 |

8.3.10 ES 8 - CS 10: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 75 ppm (ECETOC TRA worker V3) | 0,4 |
| Dermal | 42,86 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,42 |

8.3.11 ES 8 - CS 11: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,26 |

8.4. ES 8 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

9. ES 9: Professional use; Use in cleaning agents

9.1. Title section

| Environment | | |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| CS1: | Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |
| Workers | | |
| CS2: | Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS3: | Professional use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS4: | Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS5: | Professional use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS6: | Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS7: | Professional use (Treatment of articles by dipping and pouring) | PROC13 |
| CS8: | Professional use (Roller application or brushing) | PROC10 |
| CS9: | Professional use (Non-industrial spraying) | PROC11 |
| CS10: | Professional use (Non-industrial spraying) | PROC11 |
| CS11: | Professional use (Roller application or brushing) | PROC10 |
| CS12: | Professional use (Roller application or brushing) | PROC10 |
| CS13: | Professional use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS14: | Professional use (Chemical production where opportunity for exposure arises) | PROC4 |

9.2. ES 9 Conditions of use affecting exposure

9.2.1 ES 9 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

PRAEPAGEN TQ

Page 141(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : No exposure assessment presented for the environment.

9.2.2 ES 9 - CS 2: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented

Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

9.2.3 ES 9 - CS 3: Control of worker exposure: Professional use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 142(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Automated process with (semi) closed systems
Use in contained systems
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

9.2.4 ES 9 - CS 4: Control of worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
- Vapour pressure : 5 - 100 hPa
- Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Automated process with (semi) closed systems
Drum/batch transfers
Use in contained systems
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

9.2.5 ES 9 - CS 5: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

- Remarks : Semi automated process. (e.g.: semi automatic application of floor care and maintenance products)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

PRAEPAGEN TQ

Page 143(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Semi automated process. (e.g.: semi automatic application of floor care and maintenance products)
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Wear suitable gloves tested to EN374.

9.2.6 ES 9 - CS 6: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

PRAEPAGEN TQ

Page 144(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice : Ensure operation is undertaken outdoors., Wear suitable gloves tested to EN374.

9.2.7 ES 9 - CS 7: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Manual
Surface cleaning
Dipping, immersion and pouring

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Wear suitable gloves tested to EN374.

9.2.8 ES 9 - CS 8: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Remarks : Cleaning with low-pressure washers
Rolling, Brushing
No spraying

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

PRAEPAGEN TQ

Page 145(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Cleaning with low-pressure washers
Rolling, Brushing
No spraying

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

9.2.9 ES 9 - CS 9: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Cleaning with high pressure washers
Spraying
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Cleaning with high pressure washers
Spraying
Indoor use

Organisational measures to prevent /limit releases, dispersion : Assumes a good basic standard of occupational hygiene is implemented

PRAEPAGEN TQ

Page 146(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

Effectiveness (of a measure) : 70 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Limit the substance content in the product to 5 %, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

9.2.10 ES 9 - CS 10: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Cleaning with high pressure washers
Spraying
Outdoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 1 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Cleaning with high pressure washers
Spraying
Outdoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Limit the substance content in the product to 1 %.
Ensure operation is undertaken outdoors.
Avoid direct eye contact with product, also via contamination on hands.

Effectiveness (of a measure) : 30 %

Personal protective measures : Use suitable eye protection.
Wear suitable gloves tested to EN374.

9.2.11 ES 9 - CS 11: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

PRAEPAGEN TQ

Page 147(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Manual
Surface cleaning
Spraying

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Manual
Surface cleaning
Spraying

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

9.2.12 ES 9 - CS 12: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Remarks : Ad hoc manual application via trigger sprays, dipping, etc.
Rolling, Brushing

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 148(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Ad hoc manual application via trigger sprays, dipping, etc.
Rolling, Brushing
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Limit the substance content in the product to 25 %., Provide extract ventilation to points where emissions occur., Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., or
- Additional good practice advice : Limit the substance content in the product to 25 %., Avoid carrying out activities involving exposure for more than 1 hour per day., Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

9.2.13 ES 9 - CS 13: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

- Remarks : Application of cleaning products in closed systems
Outdoor use

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
- Vapour pressure : 5 - 100 hPa
- Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

- Outdoor / Indoor : Outdoor use

Risk Management Measures

- Type of Application (Use) : Application of cleaning products in closed systems
Outdoor use
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 149(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

9.2.14 ES 9 - CS 14: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : Cleaning of medical devices

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Cleaning of medical devices

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

9.3. ES 9 Exposure estimation and reference to its source

9.3.2 ES 9 - CS 2: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,2 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,26 |

PRAEPAGEN TQ

Page 150(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

9.3.3 ES 9 - CS 3: Worker exposure: Professional use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 20 ppm (ECETOC TRA worker V3) | 0,1 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,1 |

9.3.4 ES 9 - CS 4: Worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|-------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,1 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,12 |

9.3.5 ES 9 - CS 5: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Semi automated process. (e.g.: semi automatic application of floor care and maintenance products)) | 0,2 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Semi automated process. (e.g.: semi automatic application of floor care and maintenance products)) | < 0,1 |
| combined routes | Semi automated process. (e.g.: semi automatic application of floor care and maintenance products) | 0,25 |

9.3.6 ES 9 - CS 6: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,5 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,51 |

9.3.7 ES 9 - CS 7: Worker exposure: Professional use (Treatment of articles by

PRAEPAGEN TQ

Page 151(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,5 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,1 |
| combined routes | | 0,51 |

9.3.8 ES 9 - CS 8: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Cleaning with low-pressure washers, Rolling, Brushing, No spraying) | 0,5 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Cleaning with low-pressure washers, Rolling, Brushing, No spraying) | < 0,1 |
| combined routes | Cleaning with low-pressure washers, Rolling, Brushing, No spraying | 0,52 |

9.3.9 ES 9 - CS 9: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------|------|
| inhalative | 150 ppm (ECETOC TRA worker V3, Cleaning with high pressure washers, Spraying, Indoor use) | 0,7 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Cleaning with high pressure washers, Spraying, Indoor use) | 0,1 |
| combined routes | Cleaning with high pressure washers, Spraying, Indoor use | 0,86 |

9.3.10 ES 9 - CS 10: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------|------|
| inhalative | 35 ppm (ECETOC TRA worker V3, Cleaning with high pressure washers, Spraying, Outdoor use) | 0,2 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Cleaning with high pressure washers, Spraying, Outdoor use) | 0,1 |
| combined routes | Cleaning with high pressure washers, Spraying, Outdoor use | 0,29 |

PRAEPAGEN TQ

Page 152(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

9.3.11 ES 9 - CS 11: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Manual, Surface cleaning, Spraying) | 0,5 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Manual, Surface cleaning, Spraying) | < 0,1 |
| combined routes | Manual, Surface cleaning, Spraying | 0,52 |

9.3.12 ES 9 - CS 12: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Ad hoc manual application via trigger sprays, dipping, etc., Rolling, Brushing) | 0,5 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Ad hoc manual application via trigger sprays, dipping, etc., Rolling, Brushing) | < 0,1 |
| combined routes | Ad hoc manual application via trigger sprays, dipping, etc., Rolling, Brushing | 0,52 |

9.3.13 ES 9 - CS 13: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Application of cleaning products in closed systems, Outdoor use) | 0,2 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Application of cleaning products in closed systems, Outdoor use) | < 0,1 |
| combined routes | Application of cleaning products in closed systems, Outdoor use | 0,25 |

9.3.14 ES 9 - CS 14: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|-----|
| inhalative | 50 ppm (ECETOC TRA worker V3, Cleaning of medical | 0,2 |

PRAEPAGEN TQ

Page 153(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-----------------------------------------------------------------------|-------|
| | devices) | |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Cleaning of medical devices) | < 0,1 |
| combined routes | Cleaning of medical devices | 0,25 |

9.4. ES 9 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

10. ES 10: Consumer use; Use in cleaning agents

10.1. Title section

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Air care products (PC3) | |
| Anti-freeze and de-icing products (PC4) | |
| Biocidal products (PC8) | |
| Coatings and paints, thinners, paint removers (PC9a) | |
| Fillers, putties, plasters, modelling clay (PC9b) | |
| Finger paints (PC9c) | |
| Lubricants, greases, release products (PC24) | |
| Washing and cleaning products (PC35) | |
| Welding and soldering products, flux products (PC38) | |
| Environment | |
| CS1: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |
| Consumer | |
| CS2: Consumer use (Air care products) | PC3 |
| CS3: Consumer use (Air care products) | PC3 |
| CS4: Consumer use (Air care products) | PC3 |
| CS5: Consumer use (Air care products) | PC3 |
| CS6: Consumer use (Anti-freeze and de-icing products) | PC4 |
| CS7: Consumer use (Anti-freeze and de-icing products) | PC4 |
| CS8: Consumer use (Anti-freeze and de-icing products) | PC4 |
| CS9: Consumer use (Biocidal products) | PC8 |
| CS10: Consumer use (Biocidal products) | PC8 |
| CS11: Consumer use (Biocidal products) | PC8 |
| CS12: Consumer use (Welding and soldering products, flux products) | PC38 |
| CS13: Consumer use (Coatings and paints, thinners, paint removers) | PC9a |
| CS14: Consumer use (Coatings and paints, thinners, paint removers) | PC9a |
| CS15: Consumer use (Coatings and paints, thinners, paint removers) | PC9a |
| CS16: Consumer use (Coatings and paints, thinners, paint removers) | PC9a |
| CS17: Consumer use (Fillers, putties, plasters, modelling clay) | PC9b |

PRAEPAGEN TQ

Page 154(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|-----------------------------------------------------------------|------|
| CS18: Consumer use (Fillers, putties, plasters, modelling clay) | PC9b |
| CS19: Consumer use (Fillers, putties, plasters, modelling clay) | PC9b |
| CS20: Consumer use (Finger paints) | PC9c |
| CS21: Consumer use (Lubricants, greases, release products) | PC24 |
| CS22: Consumer use (Lubricants, greases, release products) | PC24 |
| CS23: Consumer use (Lubricants, greases, release products) | PC24 |
| CS24: Consumer use (Washing and cleaning products) | PC35 |
| CS25: Consumer use (Washing and cleaning products) | PC35 |
| CS26: Consumer use (Washing and cleaning products) | PC35 |

10.2. ES 10 Conditions of use affecting exposure

10.2.1 ES 10 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

10.2.2 ES 10 - CS 2: Control of consumer exposure: Consumer use (Air care products) (PC3)

Remarks : Air care, instant action (aerosol sprays)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 0,1 grams

Frequency and duration of use

Exposure duration : 0,25 h
Frequency of use : 4 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

PRAEPAGEN TQ

Page 155(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

10.2.3 ES 10 - CS 3: Control of consumer exposure: Consumer use (Air care products) (PC3)

Remarks : Air care, instant action (aerosol sprays)
Excipient only

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 0,1 grams

Frequency and duration of use

Exposure duration : 0,25 h
Frequency of use : 4 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.4 ES 10 - CS 4: Control of consumer exposure: Consumer use (Air care products) (PC3)

Remarks : Air care, continuous action (solid and liquid)
Excipient only

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 0,48 grams

Frequency and duration of use

Exposure duration : 8 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

PRAEPAGEN TQ

Page 156(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Human factors not influenced by risk management

Covers skin contact area up to : 35,70 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

10.2.5 ES 10 - CS 5: Control of consumer exposure: Consumer use (Air care products) (PC3)

Remarks : Air care, continuous action (solid and liquid)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 0,48 grams

Frequency and duration of use

Exposure duration : 8 h

Frequency of use : 1 uses per day

Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 35,70 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

10.2.6 ES 10 - CS 6: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : Washing car window

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

PRAEPAGEN TQ

Page 157(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Amount used

Amount per use : 0,5 grams

Frequency and duration of use

Exposure duration : 0,02 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

10.2.7 ES 10 - CS 7: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : Pouring into radiator

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 2000 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

10.2.8 ES 10 - CS 8: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : Lock de-icer

PRAEPAGEN TQ

Page 158(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 4 grams

Frequency and duration of use

Exposure duration : 0,25 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 214,40 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

10.2.9 ES 10 - CS 9: Control of consumer exposure: Consumer use (Biocidal products) (PC8)

Remarks : Excipient only
Laundry and dish washing products

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 15 grams

Frequency and duration of use

Exposure duration : 0,5 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

PRAEPAGEN TQ

Page 159(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.10 ES 10 - CS 10: Control of consumer exposure: Consumer use (Biocidal products) (PC8)

Remarks : Excipient only
Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 27 grams

Frequency and duration of use

Exposure duration : 0,33 h
Frequency of use : 1 uses per day
Frequency of use : 128 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.11 ES 10 - CS 11: Control of consumer exposure: Consumer use (Biocidal products) (PC8)

Remarks : Excipient only
Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

PRAEPAGEN TQ

Page 160(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Amount per use : 35 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 128 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.12 ES 10 - CS 12: Control of consumer exposure: Consumer use (Welding and soldering products, flux products) (PC38)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 12 grams

Frequency and duration of use

Exposure duration : 1 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.13 ES 10 - CS 13: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

Remarks : Waterborne latex wall paint

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

PRAEPAGEN TQ

Page 161(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 2760 grams

Frequency and duration of use

Exposure duration : 2,20 h
Frequency of use : 1 uses per day
Frequency of use : 4 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.14 ES 10 - CS 14: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

Remarks : Solvent rich, high solid, water borne paint

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 744 grams

Frequency and duration of use

Exposure duration : 2,20 h
Frequency of use : 1 uses per day
Frequency of use : 6 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.15 ES 10 - CS 15: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

PRAEPAGEN TQ

Page 162(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Aerosol spray can

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 215 grams

Frequency and duration of use

Exposure duration : 0,3 h
Frequency of use : 1 uses per day
Frequency of use : 2 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

10.2.16 ES 10 - CS 16: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

Remarks : Removers (paint-, glue-, wall paper-, sealant-remover)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 491 grams

Frequency and duration of use

Exposure duration : 2,00 h
Frequency of use : 1 uses per day
Frequency of use : 3 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

PRAEPAGEN TQ

Page 163(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.17 ES 10 - CS 17: Control of consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

Remarks : Fillers and putty

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 85 grams

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : 1 uses per day
Frequency of use : 12 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 35,73 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.18 ES 10 - CS 18: Control of consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

Remarks : Plasters and floor equalizers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 2 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 13800 grams

Frequency and duration of use

PRAEPAGEN TQ

Page 164(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Exposure duration : 2,00 h
Frequency of use : 1 uses per day
Frequency of use : 12 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.19 ES 10 - CS 19: Control of consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

Remarks : Modelling clay

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

For each use event, assumes swallowed amount of : 1 grams

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 254,40 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.20 ES 10 - CS 20: Control of consumer exposure: Consumer use (Finger paints) (PC9c)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 15 %

Concentration of the Substance in Mixture/Article : <= 15 %
Avoid using at a product concentration greater than

PRAEPAGEN TQ

Page 165(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

For each use event, assumes : 1,35 grams
swallowed amount of

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 254,40 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.21 ES 10 - CS 21: Control of consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

Remarks : Liquids

Product characteristics

Concentration of the Substance in : <= 100 %
Mixture/Article

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 2200 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 4 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 468,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

PRAEPAGEN TQ

Page 166(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

10.2.22 ES 10 - CS 22: Control of consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

Remarks : Pastes

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 34 grams

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : 1 uses per day
Frequency of use : 10 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 468,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

10.2.23 ES 10 - CS 23: Control of consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

Remarks : Sprays

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 73 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 6 days per year

PRAEPAGEN TQ

Page 167(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Human factors not influenced by risk management

Covers skin contact area up to : 428,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

10.2.24 ES 10 - CS 24: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks : Laundry and dish washing products

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 15 grams

Frequency and duration of use

Exposure duration : 0,5 h

Frequency of use : 1 uses per day

Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

10.2.25 ES 10 - CS 25: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks : Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

PRAEPAGEN TQ

Page 168(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Amount used

Amount per use : 27 grams

Frequency and duration of use

Exposure duration : 0,33 h
Frequency of use : 1 uses per day
Frequency of use : 128 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.2.26 ES 10 - CS 26: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks : Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 60,2 hPa

Amount used

Amount per use : 35 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 128 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

10.3. ES 10 Exposure estimation and reference to its source

PRAEPAGEN TQ

Page 169(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

10.3.2 ES 10 - CS 2: Consumer exposure: Consumer use (Air care products) (PC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------|--------|
| Dermal | 142,67 mg/kg bw/day (ECETOC TRA worker V3, Air care, instant action (aerosol sprays), Chronic effects) | 0,45 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Air care, instant action (aerosol sprays), Chronic effects) | < 0,01 |
| inhalative | 0,1 mg/m ³ (ECETOC TRA worker V3, Air care, instant action (aerosol sprays), Chronic effects) | < 0,01 |
| combined routes | Air care, instant action (aerosol sprays), Chronic effects | 0,45 |

10.3.3 ES 10 - CS 3: Consumer exposure: Consumer use (Air care products) (PC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 142,67 mg/kg bw/day (ECETOC TRA worker V3, Air care, instant action (aerosol sprays), Excipient only, Chronic effects) | 0,45 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Air care, instant action (aerosol sprays), Excipient only, Chronic effects) | < 0,01 |
| inhalative | 0,1 mg/m ³ (ECETOC TRA worker V3, Air care, instant action (aerosol sprays), Excipient only, Chronic effects) | < 0,01 |
| combined routes | Air care, instant action (aerosol sprays), Excipient only, Chronic effects | 0,45 |

10.3.4 ES 10 - CS 4: Consumer exposure: Consumer use (Air care products) (PC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Air care, continuous action (solid and liquid), Excipient only, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Air care, continuous action (solid and liquid), Excipient only, Chronic effects) | < 0,01 |
| inhalative | 0,83 mg/m ³ (ECETOC TRA worker V3, Air care, continuous action (solid and liquid), Excipient only, Chronic effects) | 0,01 |
| combined routes | Air care, continuous action (solid and liquid), Excipient only, Chronic effects | 0,01 |

10.3.5 ES 10 - CS 5: Consumer exposure: Consumer use (Air care products) (PC3)

| Route of exposure and type | Exposure estimate | RCR |
|----------------------------|-------------------|-----|
|----------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 170(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| of effects | | |
|-----------------|----------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Air care, continuous action (solid and liquid), Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Air care, continuous action (solid and liquid), Chronic effects) | < 0,01 |
| inhalative | 0,83 mg/m ³ (ECETOC TRA worker V3, Air care, continuous action (solid and liquid), Chronic effects) | 0,01 |
| combined routes | Air care, continuous action (solid and liquid), Chronic effects | 0,01 |

10.3.6 ES 10 - CS 6: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Washing car window, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Washing car window, Chronic effects) | < 0,01 |
| inhalative | 0,01 mg/m ³ (ECETOC TRA worker V3, Washing car window, Chronic effects) | < 0,01 |
| combined routes | Washing car window, Chronic effects | < 0,01 |

10.3.7 ES 10 - CS 7: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------|--------|
| Dermal | 35,67 mg/kg bw/day (ECETOC TRA worker V3, Pouring into radiator, Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Pouring into radiator, Chronic effects) | < 0,01 |
| inhalative | 9,04 mg/m ³ (ECETOC TRA worker V3, Pouring into radiator, Chronic effects) | 0,10 |
| combined routes | Pouring into radiator, Chronic effects | 0,21 |

10.3.8 ES 10 - CS 8: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| Dermal | 17,87 mg/kg bw/day (ECETOC TRA worker V3, Lock de-icer, Chronic effects) | 0,06 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Lock de-icer, Chronic effects) | < 0,01 |
| inhalative | 0,51 mg/m ³ (ECETOC TRA worker V3, Lock de-icer, Chronic effects) | 0,01 |

PRAEPAGEN TQ

Page 171(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-------------------------------|------|
| combined routes | Lock de-icer, Chronic effects | 0,06 |
|-----------------|-------------------------------|------|

10.3.9 ES 10 - CS 9: Consumer exposure: Consumer use (Biocidal products) (PC8)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,71 mg/kg bw/day (ECETOC TRA worker V3, Excipient only, Laundry and dish washing products, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Excipient only, Laundry and dish washing products, Chronic effects) | < 0,01 |
| inhalative | 6,75 mg/m ³ (ECETOC TRA worker V3, Excipient only, Laundry and dish washing products, Chronic effects) | 0,08 |
| combined routes | Excipient only, Laundry and dish washing products, Chronic effects | 0,08 |

10.3.10 ES 10 - CS 10: Consumer exposure: Consumer use (Biocidal products) (PC8)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 71,46 mg/kg bw/day (ECETOC TRA worker V3, Excipient only, Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects) | 0,22 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Excipient only, Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects) | < 0,01 |
| inhalative | 8,42 mg/m ³ (ECETOC TRA worker V3, Excipient only, Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects) | 0,09 |
| combined routes | Excipient only, Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects | 0,32 |

10.3.11 ES 10 - CS 11: Consumer exposure: Consumer use (Biocidal products) (PC8)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 35,67 mg/kg bw/day (ECETOC TRA worker V3, Excipient only, Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Excipient only, Cleaners, trigger sprays (all purpose cleaners, | < 0,01 |

PRAEPAGEN TQ

Page 172(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| | sanitary products, glass cleaners), Chronic effects) | |
| inhalative | 5,78 mg/m ³ (ECETOC TRA worker V3, Excipient only, Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects) | 0,06 |
| combined routes | Excipient only, Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects | 0,18 |

10.3.12 ES 10 - CS 12: Consumer exposure: Consumer use (Welding and soldering products, flux products) (PC38)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| inhalative | 9,40 mg/m ³ (ECETOC TRA worker V3, Chronic effects) | 0,11 |
| combined routes | Chronic effects | 0,11 |

10.3.13 ES 10 - CS 13: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------|--------|
| Dermal | 0,39 mg/kg bw/day (ECETOC TRA worker V3, Waterborne latex wall paint, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Waterborne latex wall paint, Chronic effects) | < 0,01 |
| inhalative | 38,63 mg/m ³ (ECETOC TRA worker V3, Waterborne latex wall paint, Chronic effects) | 0,43 |
| combined routes | Waterborne latex wall paint, Chronic effects | 0,44 |

10.3.14 ES 10 - CS 14: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,57 mg/kg bw/day (ECETOC TRA worker V3, Solvent rich, high solid, water borne paint, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Solvent rich, high solid, water borne paint, Chronic effects) | < 0,01 |
| inhalative | 15,15 mg/m ³ (ECETOC TRA worker V3, Solvent rich, high solid, water borne paint, Chronic effects) | 0,17 |
| combined routes | Solvent rich, high solid, water borne paint, Chronic effects | 0,17 |

PRAEPAGEN TQ

Page 173(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

10.3.15 ES 10 - CS 15: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Aerosol spray can, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Aerosol spray can, Chronic effects) | < 0,01 |
| inhalative | 34,29 mg/m ³ (ECETOC TRA worker V3, Aerosol spray can, Chronic effects) | 0,39 |
| combined routes | Aerosol spray can, Chronic effects | 0,39 |

10.3.16 ES 10 - CS 16: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers) (PC9a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,59 mg/kg bw/day (ECETOC TRA worker V3, Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects) | < 0,01 |
| inhalative | 4,90 mg/m ³ (ECETOC TRA worker V3, Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects) | 0,06 |
| combined routes | Removers (paint-, glue-, wall paper-, sealant-remover), Chronic effects | 0,06 |

10.3.17 ES 10 - CS 17: Consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------|--------|
| Dermal | 1,19 mg/kg bw/day (ECETOC TRA worker V3, Fillers and putty, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Fillers and putty, Chronic effects) | < 0,01 |
| inhalative | 53,67 mg/m ³ (ECETOC TRA worker V3, Fillers and putty, Chronic effects) | 0,60 |
| combined routes | Fillers and putty, Chronic effects | 0,61 |

10.3.18 ES 10 - CS 18: Consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

PRAEPAGEN TQ

Page 174(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,09 mg/kg bw/day (ECETOC TRA worker V3, Plasters and floor equalizers, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Plasters and floor equalizers, Chronic effects) | < 0,01 |
| inhalative | 22,02 mg/m ³ (ECETOC TRA worker V3, Plasters and floor equalizers, Chronic effects) | 0,25 |
| combined routes | Plasters and floor equalizers, Chronic effects | 0,25 |

10.3.19 ES 10 - CS 19: Consumer exposure: Consumer use (Fillers, putties, plasters, modelling clay) (PC9b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------|--------|
| Dermal | 2,54 mg/kg bw/day (ECETOC TRA worker V3, Modelling clay, Chronic effects) | 0,01 |
| Oral | 20 mg/kg bw/day (ECETOC TRA worker V3, Modelling clay, Chronic effects) | 0,77 |
| inhalative | 0 mg/m ³ (ECETOC TRA worker V3, Modelling clay, Chronic effects) | < 0,01 |
| combined routes | Modelling clay, Chronic effects | 0,78 |

10.3.20 ES 10 - CS 20: Consumer exposure: Consumer use (Finger paints) (PC9c)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|--------|
| Dermal | 38,16 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | 0,12 |
| Oral | 20,25 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | 0,78 |
| inhalative | 0 mg/m ³ (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| combined routes | Chronic effects | 0,90 |

10.3.21 ES 10 - CS 21: Consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------|--------|
| Dermal | 78,00 mg/kg bw/day (ECETOC TRA worker V3, Liquids, Chronic effects) | 0,24 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Liquids, Chronic effects) | < 0,01 |
| inhalative | 3,98 mg/m ³ (ECETOC TRA worker V3, Liquids, Chronic effects) | 0,04 |
| combined routes | Liquids, Chronic effects | 0,29 |

PRAEPAGEN TQ

Page 175(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

10.3.22 ES 10 - CS 22: Consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------|--------|
| Dermal | 15,6 mg/kg bw/day (ECETOC TRA worker V3, Pastes, Chronic effects) | 0,05 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Pastes, Chronic effects) | < 0,01 |
| inhalative | 0 mg/m ³ (ECETOC TRA worker V3, Pastes, Chronic effects) | < 0,01 |
| combined routes | Pastes, Chronic effects | 0,05 |

10.3.23 ES 10 - CS 23: Consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------|--------|
| Dermal | 35,73 mg/kg bw/day (ECETOC TRA worker V3, Sprays, Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Sprays, Chronic effects) | < 0,01 |
| inhalative | 12,06 mg/m ³ (ECETOC TRA worker V3, Sprays, Chronic effects) | 0,14 |
| combined routes | Sprays, Chronic effects | 0,25 |

10.3.24 ES 10 - CS 24: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,71 mg/kg bw/day (ECETOC TRA worker V3, Laundry and dish washing products, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Laundry and dish washing products, Chronic effects) | < 0,01 |
| inhalative | 6,75 mg/m ³ (ECETOC TRA worker V3, Laundry and dish washing products, Chronic effects) | 0,08 |
| combined routes | Laundry and dish washing products, Chronic effects | 0,08 |

10.3.25 ES 10 - CS 25: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------|------|
| Dermal | 71,46 mg/kg bw/day (ECETOC TRA worker V3, Cleaners, liquids (all purpose cleaners, sanitary products, | 0,22 |

PRAEPAGEN TQ

Page 176(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| | floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects) | |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects) | < 0,01 |
| inhalative | 8,42 mg/m ³ (ECETOC TRA worker V3, Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects) | 0,09 |
| combined routes | Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners), Chronic effects | 0,32 |

10.3.26 ES 10 - CS 26: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 35,67 mg/kg bw/day (ECETOC TRA worker V3, Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects) | < 0,01 |
| inhalative | 5,78 mg/m ³ (ECETOC TRA worker V3, Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects) | 0,06 |
| combined routes | Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners), Chronic effects | 0,18 |

10.4. ES 10 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

11. ES 11: Industrial use; Use in oil and gas field drilling and production operations

11.1. Title section

PRAEPAGEN TQ

Page 177(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Environment | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| CS1: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | ERC4 |
| Workers | |
| CS2: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS3: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS5: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS6: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS7: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS8: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS9: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS10: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS11: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |
| CS12: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS13: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS14: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS15: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

11.2. ES 11 Conditions of use affecting exposure

11.2.1 ES 11 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : No exposure assessment presented for the environment.

11.2.2 ES 11 - CS 2: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

PRAEPAGEN TQ

Page 178(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Bulk transfers from tote tanks and supply vessels

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers from tote tanks and supply vessels
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

11.2.3 ES 11 - CS 3: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Filling of equipment from drums or containers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

11.2.4 ES 11 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : Drilling mud (re-)formulation

PRAEPAGEN TQ

Page 179(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Drilling mud (re-)formulation
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

11.2.5 ES 11 - CS 5: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : Drill floor operations

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Drill floor operations
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

PRAEPAGEN TQ

Page 180(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

11.2.6 ES 11 - CS 6: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : Operation of solids filtering equipment - vapour exposures

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Operation of solids filtering equipment - vapour exposures
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 95 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

11.2.7 ES 11 - CS 7: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : Operation of solids filtering equipment - aerosol exposures

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Operation of solids filtering equipment - aerosol exposures
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Local exhaust ventilation

PRAEPAGEN TQ

Page 181(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

measures

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Formulate in enclosed or ventilated mixing vessels., Ensure material transfers are under containment or extract ventilation.

11.2.8 ES 11 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Cleaning of solids filtering equipment

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Cleaning of solids filtering equipment
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374., Avoid dip sampling.

11.2.9 ES 11 - CS 9: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : Treatment and disposal of filtered solids

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 182(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Treatment and disposal of filtered solids
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

11.2.10 ES 11 - CS 10: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

- Remarks : Process sampling

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Process sampling
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Clear spills immediately.
Remotely vent displaced vapours.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

11.2.11 ES 11 - CS 11: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

- Remarks : General exposures (closed systems)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid

PRAEPAGEN TQ

Page 183(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

11.2.12 ES 11 - CS 12: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Pouring from small containers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 15 min

Risk Management Measures

Type of Application (Use) : Pouring from small containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

11.2.13 ES 11 - CS 13: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : General exposures (open systems)

PRAEPAGEN TQ

Page 184(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Scale squeeze operations

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Use drum pumps., Wear suitable gloves tested to EN374.

11.2.14 ES 11 - CS 14: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Equipment cleaning and maintenance

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Equipment cleaning and maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

PRAEPAGEN TQ

Page 185(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Use drum pumps., Wear suitable gloves tested to EN374.

11.2.15 ES 11 - CS 15: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Use drum pumps., Wear suitable gloves tested to EN374.

11.3. ES 11 Exposure estimation and reference to its source

11.3.2 ES 11 - CS 2: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers from tote tanks and supply vessels) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers from tote tanks and supply vessels) | 0,01 |
| combined routes | Bulk transfers from tote tanks and supply vessels | 0,25 |

PRAEPAGEN TQ

Page 186(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

11.3.3 ES 11 - CS 3: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,01 |
| combined routes | Filling of equipment from drums or containers | 0,25 |

11.3.4 ES 11 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Drilling mud (re-)formulation) | 0,25 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Drilling mud (re-)formulation) | < 0,01 |
| combined routes | Drilling mud (re-)formulation | 0,25 |

11.3.5 ES 11 - CS 5: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Drill floor operations) | 0,10 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Drill floor operations) | < 0,01 |
| combined routes | Drill floor operations | 0,10 |

11.3.6 ES 11 - CS 6: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------|--------|
| inhalative | 5 ppm (ECETOC TRA worker V3, Operation of solids filtering equipment - vapour exposures) | 0,50 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Operation of solids filtering equipment - vapour exposures) | < 0,01 |
| combined routes | Operation of solids filtering equipment - vapour exposures | 0,51 |

PRAEPAGEN TQ

Page 187(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

11.3.7 ES 11 - CS 7: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------|--------|
| inhalative | 2,5 ppm (ECETOC TRA worker V3, Operation of solids filtering equipment - aerosol exposures) | 0,01 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Operation of solids filtering equipment - aerosol exposures) | < 0,01 |
| combined routes | Operation of solids filtering equipment - aerosol exposures | 0,01 |

11.3.8 ES 11 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Cleaning of solids filtering equipment) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Cleaning of solids filtering equipment) | 0,02 |
| combined routes | Cleaning of solids filtering equipment | 0,26 |

11.3.9 ES 11 - CS 9: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Treatment and disposal of filtered solids) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Treatment and disposal of filtered solids) | < 0,01 |
| combined routes | Treatment and disposal of filtered solids | 0,12 |

11.3.10 ES 11 - CS 10: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Process sampling) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Process sampling) | < 0,01 |

PRAEPAGEN TQ

Page 188(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|------------------|------|
| combined routes | Process sampling | 0,12 |
|-----------------|------------------|------|

11.3.11 ES 11 - CS 11: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | < 0,01 |

11.3.12 ES 11 - CS 12: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------|--------|
| inhalative | 5 ppm (ECETOC TRA worker V3, Pouring from small containers) | 0,50 |
| Dermal | 2,74 mg/kg bw/day (ECETOC TRA worker V3, Pouring from small containers) | < 0,01 |
| combined routes | Pouring from small containers | 0,5 |

11.3.13 ES 11 - CS 13: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, General exposures (open systems)) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems)) | < 0,01 |
| combined routes | General exposures (open systems) | 0,25 |

11.3.14 ES 11 - CS 14: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Equipment cleaning and maintenance) | 0,05 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Equipment cleaning and maintenance) | < 0,01 |

PRAEPAGEN TQ

Page 189(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|------------------------------------|------|
| combined routes | Equipment cleaning and maintenance | 0,05 |
|-----------------|------------------------------------|------|

11.3.15 ES 11 - CS 15: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

11.4. ES 11 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

12. ES 12: Industrial use; Use in lubricants

12.1. Title section

| Environment | | |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| CS1: | Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use of functional fluid at industrial site) | ERC4, ERC7 |
| Workers | | |
| CS2: | Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |
| CS3: | Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS4: | Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS5: | Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS6: | Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS7: | Industrial use (Transfer of substance or mixture (charging/discharging)) | PROC8a |

PRAEPAGEN TQ

Page 190(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| | at non dedicated-facilities) | |
| CS8: | Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS9: | Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS10: | Industrial use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS11: | Industrial use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS12: | Industrial use (General greasing/lubrication at high kinetic energy conditions) | PROC18 |
| CS13: | Industrial use (General greasing/lubrication at high kinetic energy conditions) | PROC18 |
| CS14: | Industrial use (Roller application or brushing) | PROC10 |
| CS15: | Industrial use (Treatment of articles by dipping and pouring) | PROC13 |
| CS16: | Industrial use (Industrial spraying) | PROC7 |
| CS17: | Industrial use (Industrial spraying) | PROC7 |
| CS18: | Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS19: | Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS20: | Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS21: | Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS22: | Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

12.2. ES 12 Conditions of use affecting exposure

12.2.1 ES 12 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use of functional fluid at industrial site) (ERC4, ERC7)

Remarks : No exposure assessment presented for the environment.

12.2.2 ES 12 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in : <= 100 %

PRAEPAGEN TQ

Page 191(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Mixture/Article

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

12.2.3 ES 12 - CS 3: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

12.2.4 ES 12 - CS 4: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : General exposures (open systems)

Product characteristics

PRAEPAGEN TQ

Page 192(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

12.2.5 ES 12 - CS 5: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract

PRAEPAGEN TQ

Page 193(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

ventilation., Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

12.2.6 ES 12 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Clear spills immediately.
Remotely vent displaced vapours.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.
Wear suitable gloves tested to EN374.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

12.2.7 ES 12 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Filling of equipment from drums or containers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : < 1 h

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers

PRAEPAGEN TQ

Page 194(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Transfer via enclosed lines., Use drum pumps., Wear suitable gloves tested to EN374.

12.2.8 ES 12 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Filling of equipment from drums or containers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : < 1 h

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Transfer via enclosed lines., Use drum pumps., Wear suitable gloves tested to EN374.

12.2.9 ES 12 - CS 9: Control of worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Remarks : Initial factory fill of equipment

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

PRAEPAGEN TQ

Page 195(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Initial factory fill of equipment
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

12.2.10 ES 12 - CS 10: Control of worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

Remarks : Operation and lubrication of high energy open equipment

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Operation and lubrication of high energy open equipment
Organisational measures to prevent /limit releases, dispersion and exposure : Restrict area of openings to equipment.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

12.2.11 ES 12 - CS 11: Control of worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

Remarks : Operation and lubrication of high energy open equipment
Aerosol

Product characteristics

Concentration of the Substance in : <= 100 %

PRAEPAGEN TQ

Page 196(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Mixture/Article

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Operation and lubrication of high energy open equipment
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Restrict area of openings to equipment.
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to points where emissions occur.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

12.2.12 ES 12 - CS 12: Control of worker exposure: Industrial use (General greasing/lubrication at high kinetic energy conditions) (PROC18)

Remarks : Operation and lubrication of high energy open equipment

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Operation and lubrication of high energy open equipment
Organisational measures to prevent /limit releases, dispersion and exposure : Restrict area of openings to equipment.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

12.2.13 ES 12 - CS 13: Control of worker exposure: Industrial use (General greasing/lubrication at high kinetic energy conditions) (PROC18)

PRAEPAGEN TQ

Page 197(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Operation and lubrication of high energy open equipment
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Operation and lubrication of high energy open equipment
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Restrict area of openings to equipment.
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to points where emissions occur.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

12.2.14 ES 12 - CS 14: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Manual
Rolling, Brushing
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.

PRAEPAGEN TQ

Page 198(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

measures

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide enhanced general ventilation by mechanical means.,
Wear suitable gloves tested to EN374.

12.2.15 ES 12 - CS 15: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Dipping, immersion and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Allow time for product to drain from workpiece., Automate activity where possible., Wear suitable gloves tested to EN374.

12.2.16 ES 12 - CS 16: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Remarks : Spraying

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 199(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Spraying
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Automate activity where possible.
Effectiveness (of a measure) : 95 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin., Use suitable eye protection., Wear a respirator conforming to EN140.

12.2.17 ES 12 - CS 17: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Remarks : Spraying
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Automate activity where possible.
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Effectiveness (of a measure) : 95 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin., Use suitable eye protection., Wear a respirator conforming to EN140.

PRAEPAGEN TQ

Page 200(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

12.2.18 ES 12 - CS 18: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Maintenance (of larger plant items) and machine set up

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Maintenance (of larger plant items) and machine set up
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Automate activity where possible.
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

12.2.19 ES 12 - CS 19: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Maintenance (of larger plant items) and machine set up
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Maintenance (of larger plant items) and machine set up
Elevated temperature

PRAEPAGEN TQ

Page 201(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Provide extract ventilation to emission points when contact with warm (>50oC) lubricant is likely., Clear transfer lines prior to de-coupling., Wear suitable gloves tested to EN374.

12.2.20 ES 12 - CS 20: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Maintenance of small items

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 60,2 hPa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Maintenance of small items
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Avoid manual contact with wet work pieces.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide enhanced general ventilation by mechanical means.

12.2.21 ES 12 - CS 21: Control of worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Remarks : Remanufacture of reject articles

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid

PRAEPAGEN TQ

Page 202(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 60,2 hPa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Remanufacture of reject articles
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide enhanced general ventilation by mechanical means., Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

12.2.22 ES 12 - CS 22: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 60,2 hPa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Technical conditions and measures : Avoid dip sampling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Transfer via enclosed lines.

PRAEPAGEN TQ

Page 203(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

12.3. ES 12 Exposure estimation and reference to its source

12.3.2 ES 12 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,05 |

12.3.3 ES 12 - CS 3: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

12.3.4 ES 12 - CS 4: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures (open systems)) | 0,10 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems)) | < 0,01 |
| combined routes | General exposures (open systems) | 0,10 |

12.3.5 ES 12 - CS 5: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type | Exposure estimate | RCR |
|----------------------------|-------------------|-----|
|----------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 204(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| of effects | | |
|-----------------|-------------------------------------------------------------------------------------|--------|
| inhalative | 5 ppm (ECETOC TRA worker V3, General exposures (open systems), Aerosol) | 0,50 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems), Aerosol) | < 0,01 |
| combined routes | General exposures (open systems), Aerosol | 0,50 |

12.3.6 ES 12 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | 0,01 |
| combined routes | Bulk transfers | 0,25 |

12.3.7 ES 12 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,01 |
| combined routes | Filling of equipment from drums or containers | 0,25 |

12.3.8 ES 12 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,01 |
| combined routes | Filling of equipment from drums or containers | 0,25 |

12.3.9 ES 12 - CS 9: Worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Initial factory fill of | 0,25 |

PRAEPAGEN TQ

Page 205(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-----------------------------------------------------------------------------|--------|
| | equipment) | |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, Initial factory fill of equipment) | < 0,01 |
| combined routes | Initial factory fill of equipment | 0,25 |

12.3.10 ES 12 - CS 10: Worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment) | 0,25 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment) | < 0,01 |
| combined routes | Operation and lubrication of high energy open equipment | 0,25 |

12.3.11 ES 12 - CS 11: Worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 4 ppm (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Aerosol) | 0,40 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Aerosol) | < 0,01 |
| combined routes | Operation and lubrication of high energy open equipment, Aerosol | 0,40 |

12.3.12 ES 12 - CS 12: Worker exposure: Industrial use (General greasing/lubrication at high kinetic energy conditions) (PROC18)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment) | 0,25 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment) | < 0,01 |
| combined routes | Operation and lubrication of high energy open equipment | 0,25 |

12.3.13 ES 12 - CS 13: Worker exposure: Industrial use (General greasing/lubrication at high kinetic energy conditions) (PROC18)

| Route of exposure and type | Exposure estimate | RCR |
|----------------------------|-------------------|-----|
|----------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 206(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| of effects | | |
|-----------------|------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 4 ppm (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Aerosol) | 0,40 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Aerosol) | < 0,01 |
| combined routes | Operation and lubrication of high energy open equipment, Aerosol | 0,40 |

12.3.14 ES 12 - CS 14: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | 0,03 |
| combined routes | | 0,28 |

12.3.15 ES 12 - CS 15: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

12.3.16 ES 12 - CS 16: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------|--------|
| inhalative | 12,5 ppm (ECETOC TRA worker V3, Spraying) | 0,06 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying) | < 0,01 |
| combined routes | Spraying | 0,06 |

12.3.17 ES 12 - CS 17: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|--------|
| inhalative | 1 ppm (ECETOC TRA worker V3, Spraying, Aerosol) | 0,10 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Aerosol) | < 0,01 |
| combined routes | Spraying, Aerosol | 0,10 |

12.3.18 ES 12 - CS 18: Worker exposure: Industrial use (Transfer of substance or

PRAEPAGEN TQ

Page 207(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Maintenance (of larger plant items) and machine set up) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Maintenance (of larger plant items) and machine set up) | 0,01 |
| combined routes | Maintenance (of larger plant items) and machine set up | 0,25 |

12.3.19 ES 12 - CS 19: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 150 ppm (ECETOC TRA worker V3, Maintenance (of larger plant items) and machine set up, Elevated temperature) | 0,74 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, Maintenance (of larger plant items) and machine set up, Elevated temperature) | < 0,01 |
| combined routes | Maintenance (of larger plant items) and machine set up, Elevated temperature | 0,74 |

12.3.20 ES 12 - CS 20: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Maintenance of small items) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Maintenance of small items) | 0,02 |
| combined routes | Maintenance of small items | 0,26 |

12.3.21 ES 12 - CS 21: Worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Remanufacture of reject articles) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Remanufacture of reject articles) | 0,01 |
| combined routes | Remanufacture of reject articles | 0,25 |

PRAEPAGEN TQ

Page 208(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

12.3.22 ES 12 - CS 22: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,08 |
| Dermal | 0,14 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

12.4. ES 12 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

13. ES 13: Professional use; Use in lubricants

13.1. Title section

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------|
| Environment | | |
| CS1: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) | | ERC8a, ERC8d, ERC9a, ERC9b |
| Workers | | |
| CS2: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | | PROC1, PROC2 |
| CS3: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | | PROC3 |
| CS4: Professional use (Use of functional fluids in small devices) | | PROC20 |
| CS5: Professional use (Chemical production where opportunity for exposure arises) | | PROC4 |
| CS6: Professional use (Chemical production where opportunity for exposure arises) | | PROC4 |

PRAEPAGEN TQ

Page 209(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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| CS7: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS8: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS9: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS10: Professional use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS11: Professional use (General greasing/lubrication at high kinetic energy conditions) | PROC18 |
| CS12: Professional use (Lubrication at high energy conditions in metal working operations, General greasing/lubrication at high kinetic energy conditions) | PROC17, PROC18 |
| CS13: Professional use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS14: Professional use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS15: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS16: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS17: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS18: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS19: Professional use (Roller application or brushing) | PROC10 |
| CS20: Professional use (Roller application or brushing) | PROC10 |
| CS21: Professional use (Non-industrial spraying) | PROC11 |
| CS22: Professional use (Non-industrial spraying) | PROC11 |
| CS23: Professional use (Non-industrial spraying) | PROC11 |
| CS24: Professional use (Non-industrial spraying) | PROC11 |
| CS25: Professional use (Treatment of articles by dipping and pouring) | PROC13 |
| CS26: Professional use (Treatment of articles by dipping and pouring) | PROC13 |
| CS27: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

13.2. ES 13 Conditions of use affecting exposure

13.2.1 ES 13 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) (ERC8a, ERC8d, ERC9a, ERC9b)

Remarks : No exposure assessment presented for the environment.

13.2.2 ES 13 - CS 2: Control of worker exposure: Professional use (Chemical

PRAEPAGEN TQ

Page 210(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
No other specific measures identified.

Technical conditions and measures : Handle substance within a closed system.

Personal protective measures : Use suitable eye protection.

13.2.3 ES 13 - CS 3: Control of worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)

PRAEPAGEN TQ

Page 211(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
No other specific measures identified.
- Technical conditions and measures : Handle substance within a closed system.
- Personal protective measures : Use suitable eye protection.

13.2.4 ES 13 - CS 4: Control of worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
- Vapour pressure : 5 - 100 hPa
- Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Operation of equipment containing engine oils and similar
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Handle substance within a closed system., Restrict area of openings to equipment.

13.2.5 ES 13 - CS 5: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

- Remarks : General exposures (open systems)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
- Vapour pressure : 5 - 100 hPa
- Remarks : Assumes use at not more than 20°C above ambient

PRAEPAGEN TQ

Page 212(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

13.2.6 ES 13 - CS 6: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : General exposures (open systems)
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 213(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

13.2.7 ES 13 - CS 7: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Exposure duration : 1 - 4 h

Risk Management Measures

Type of Application (Use) : Bulk transfers

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Ensure material transfers are under containment or extract ventilation., Clear transfer lines prior to de-coupling.

13.2.8 ES 13 - CS 8: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Filling of equipment from drums or containers
Dedicated facility

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

PRAEPAGEN TQ

Page 214(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Exposure duration : < 1 h

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Dedicated facility

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Use drum pumps., Wear suitable gloves tested to EN374.

13.2.9 ES 13 - CS 9: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Filling of equipment from drums or containers
Non-dedicated facility

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Non-dedicated facility

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 215(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Use drum pumps., Provide enhanced general ventilation by mechanical means., Avoid carrying out activities involving exposure for more than 1 hour per day., Wear suitable gloves tested to EN374.

13.2.10 ES 13 - CS 10: Control of worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

Remarks : Operation and lubrication of high energy open equipment
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Operation and lubrication of high energy open equipment
Indoor use

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Restrict area of openings to equipment.
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Provide extract ventilation to points where emissions occur.

Effectiveness (of a measure) : 80 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

13.2.11 ES 13 - CS 11: Control of worker exposure: Professional use (General greasing/lubrication at high kinetic energy conditions) (PROC18)

Remarks : Operation and lubrication of high energy open equipment
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 216(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Operation and lubrication of high energy open equipment
Indoor use
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Restrict area of openings to equipment.
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to points where emissions occur.
Effectiveness (of a measure) : 70 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

13.2.12 ES 13 - CS 12: Control of worker exposure: Professional use (Lubrication at high energy conditions in metal working operations, General greasing/lubrication at high kinetic energy conditions) (PROC17, PROC18)

Remarks : Operation and lubrication of high energy open equipment
Indoor use
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

PRAEPAGEN TQ

Page 217(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Operation and lubrication of high energy open equipment
Indoor use
Aerosol
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Restrict area of openings to equipment.
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : Provide extract ventilation to points where emissions occur.
- Effectiveness (of a measure) : 90 %
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear suitable gloves tested to EN374.

13.2.13 ES 13 - CS 13: Control of worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

- Remarks : Operation and lubrication of high energy open equipment
Outdoor use

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
- Vapour pressure : 5 - 100 hPa
- Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

- Outdoor / Indoor : Outdoor use

Risk Management Measures

- Type of Application (Use) : Operation and lubrication of high energy open equipment
Outdoor use
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Ensure operation is undertaken outdoors.
- Effectiveness (of a measure) : 30 %
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Avoid carrying out activities involving exposure for more than 4 hours per day., Limit the substance content in the product to

PRAEPAGEN TQ

Page 218(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

5 %.

13.2.14 ES 13 - CS 14: Control of worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

Remarks : Operation and lubrication of high energy open equipment
Outdoor use
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 5 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Exposure duration : 1 - 4 h

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Operation and lubrication of high energy open equipment
Outdoor use
Aerosol

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid carrying out activities involving exposure for more than 4 hours per day.
Limit the substance content in the product to 5 %.
Avoid direct eye contact with product, also via contamination on hands.
Ensure operation is undertaken outdoors.

Effectiveness (of a measure) : 30 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

13.2.15 ES 13 - CS 15: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Maintenance (of larger plant items) and machine set up

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature

PRAEPAGEN TQ

Page 219(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : and Pressure
: 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient
temperature.

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Maintenance (of larger plant items) and machine set up
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide enhanced general ventilation by mechanical means.,
Ensure material transfers are under containment or extract ventilation., Clear transfer lines prior to de-coupling., Wear suitable gloves tested to EN374.

13.2.16 ES 13 - CS 16: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Maintenance (of larger plant items) and machine set up
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Elevated temperature

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Maintenance (of larger plant items) and machine set up
Elevated temperature
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to emission points when contact

PRAEPAGEN TQ

Page 220(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

measures : with warm (>50oC) lubricant is likely.
Effectiveness (of a measure) : 90 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Clear transfer lines prior to de-coupling.

13.2.17 ES 13 - CS 17: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Maintenance of small items
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Maintenance of small items
Elevated temperature

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Personal protective measures : Use suitable eye protection.
Wear a respirator conforming to EN140.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Avoid carrying out activities involving exposure for more than 4 hours per day.

13.2.18 ES 13 - CS 18: Control of worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 221(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Engine lubricant service
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Use drum pumps., Avoid carrying out activities involving exposure for more than 4 hours per day.

13.2.19 ES 13 - CS 19: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Remarks : Manual
Rolling, Brushing
Local exhaust ventilation

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Manual
Rolling, Brushing
Organisational measures to prevent /limit releases, dispersion : Assumes a good basic standard of occupational hygiene is implemented

PRAEPAGEN TQ

Page 222(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Local exhaust ventilation
Provide extract ventilation to points where emissions occur.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

13.2.20 ES 13 - CS 20: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Remarks : Manual
Rolling, Brushing

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Exposure duration : 1 - 4 h

Remarks : Covers daily exposures up to 8 hours, Wear a respirator conforming to EN140.

Risk Management Measures

Type of Application (Use) : Manual
Rolling, Brushing

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Avoid carrying out activities involving exposure for more than 4 hours per day.

Technical conditions and measures : Provide enhanced general ventilation by mechanical means.

Personal protective measures : Use suitable eye protection.
If technical measures not practical:
Wear a respirator conforming to EN140.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

13.2.21 ES 13 - CS 21: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying

PRAEPAGEN TQ

Page 223(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Local exhaust ventilation

Does not cover:

Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Effectiveness (of a measure) : 80 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Avoid carrying out activities involving exposure for more than 1 hour per day., Wear suitable gloves tested to EN374.

13.2.22 ES 13 - CS 22: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying
Local exhaust ventilation
With potential for aerosol generation

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 224(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Spraying
With potential for aerosol generation
- Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
- Effectiveness (of a measure) : 80 %
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear suitable gloves tested to EN374.

13.2.23 ES 13 - CS 23: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

- Remarks : Spraying
Respiratory protection
Does not cover:
Aerosol

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
- Vapour pressure : 5 - 100 hPa
- Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Spraying
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Personal protective measures : Use suitable eye protection.
Wear a respirator conforming to EN140.
- Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

PRAEPAGEN TQ

Page 225(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

13.2.24 ES 13 - CS 24: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying
Respiratory protection
With potential for aerosol generation

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Personal protective measures : Use suitable eye protection.
Wear a respirator conforming to EN140.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Wear suitable gloves tested to EN374.

13.2.25 ES 13 - CS 25: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Remarks : Dipping, immersion and pouring

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 226(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Dipping, immersion and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Allow time for product to drain from workpiece.
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Effectiveness (of a measure) : 99 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

13.2.26 ES 13 - CS 26: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Remarks : Dipping, immersion and pouring
Respiratory protection

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Dipping, immersion and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Allow time for product to drain from workpiece.
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Effectiveness (of a measure) : 70 %
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 227(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Effectiveness (of a measure) : Wear a respirator conforming to EN140.
: 90 %

13.2.27 ES 13 - CS 27: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Storage

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Store substance within a closed system.

Avoid direct eye contact with product, also via contamination on hands.

Personal protective measures : Use suitable eye protection.

13.3. ES 13 Exposure estimation and reference to its source

13.3.2 ES 13 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures | 0,10 |

PRAEPAGEN TQ

Page 228(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|------------------------------------------------------------------------------|--------|
| | (closed systems) | |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,10 |

13.3.3 ES 13 - CS 3: Worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

13.3.4 ES 13 - CS 4: Worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3) | 0,10 |
| Dermal | 1,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,10 |

13.3.5 ES 13 - CS 5: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, General exposures (open systems)) | 0,25 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems)) | < 0,01 |
| combined routes | General exposures (open systems) | 0,25 |

13.3.6 ES 13 - CS 6: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------|--------|
| inhalative | 5 ppm (ECETOC TRA worker V3, General exposures (open systems), Aerosol) | 0,50 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems), Aerosol) | < 0,01 |
| combined routes | General exposures (open systems), Aerosol | 0,50 |

PRAEPAGEN TQ

Page 229(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

13.3.7 ES 13 - CS 7: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | 0,01 |
| combined routes | Bulk transfers | 0,25 |

13.3.8 ES 13 - CS 8: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers, Dedicated facility) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers, Dedicated facility) | 0,01 |
| combined routes | Filling of equipment from drums or containers, Dedicated facility | 0,25 |

13.3.9 ES 13 - CS 9: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers, Non-dedicated facility) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers, Non-dedicated facility) | 0,02 |
| combined routes | Filling of equipment from drums or containers, Non-dedicated facility | 0,51 |

13.3.10 ES 13 - CS 10: Worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------|--------|
| inhalative | 40 ppm (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Indoor use) | 0,20 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Indoor) | < 0,01 |

PRAEPAGEN TQ

Page 230(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|---------------------------------------------------------------------|------|
| | use) | |
| combined routes | Operation and lubrication of high energy open equipment, Indoor use | 0,20 |

13.3.11 ES 13 - CS 11: Worker exposure: Professional use (General greasing/lubrication at high kinetic energy conditions) (PROC18)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 60 ppm (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Indoor use) | 0,30 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Indoor use) | < 0,01 |
| combined routes | Operation and lubrication of high energy open equipment, Indoor use | 0,30 |

13.3.12 ES 13 - CS 12: Worker exposure: Professional use (Lubrication at high energy conditions in metal working operations, General greasing/lubrication at high kinetic energy conditions) (PROC17, PROC18)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 5 ppm (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Indoor use, Aerosol) | 0,50 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Indoor use, Aerosol) | < 0,01 |
| combined routes | Operation and lubrication of high energy open equipment, Indoor use, Aerosol | 0,50 |

13.3.13 ES 13 - CS 13: Worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 140 ppm (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Outdoor use) | 0,69 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Outdoor use) | < 0,01 |
| combined routes | Operation and lubrication of high energy open equipment, Outdoor use | 0,69 |

13.3.14 ES 13 - CS 14: Worker exposure: Professional use (Lubrication at high

PRAEPAGEN TQ

Page 231(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

energy conditions in metal working operations) (PROC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------|
| inhalative | 4,2 ppm (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Outdoor use, Aerosol) | 0,42 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Operation and lubrication of high energy open equipment, Outdoor use, Aerosol) | 0,03 |
| combined routes | Operation and lubrication of high energy open equipment, Outdoor use, Aerosol | 0,45 |

13.3.15 ES 13 - CS 15: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Maintenance (of larger plant items) and machine set up) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Maintenance (of larger plant items) and machine set up) | 0,01 |
| combined routes | Maintenance (of larger plant items) and machine set up | 0,25 |

13.3.16 ES 13 - CS 16: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Maintenance (of larger plant items) and machine set up, Elevated temperature) | 0,12 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3, Maintenance (of larger plant items) and machine set up, Elevated temperature) | < 0,01 |
| combined routes | Maintenance (of larger plant items) and machine set up, Elevated temperature | 0,12 |

13.3.17 ES 13 - CS 17: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Maintenance of small items, Elevated temperature) | 0,25 |

PRAEPAGEN TQ

Page 232(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|---------------------------------------------------------------------------------------------|------|
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Maintenance of small items, Elevated temperature) | 0,02 |
| combined routes | Maintenance of small items, Elevated temperature | 0,26 |

13.3.18 ES 13 - CS 18: Worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,50 |

13.3.19 ES 13 - CS 19: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Manual, Rolling, Brushing, Local exhaust ventilation) | 0,49 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Manual, Rolling, Brushing, Local exhaust ventilation) | < 0,01 |
| combined routes | Manual, Rolling, Brushing, Local exhaust ventilation | 0,49 |

13.3.20 ES 13 - CS 20: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 5 ppm (ECETOC TRA worker V3) | 0,02 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | 0,03 |
| combined routes | | 0,06 |

13.3.21 ES 13 - CS 21: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Spraying, Local exhaust ventilation) | 0,49 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Local exhaust ventilation) | < 0,01 |
| combined routes | Spraying, Local exhaust ventilation | 0,49 |

PRAEPAGEN TQ

Page 233(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

13.3.22 ES 13 - CS 22: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 4 ppm (ECETOC TRA worker V3, Spraying, Local exhaust ventilation, With potential for aerosol generation) | 0,4 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Local exhaust ventilation, With potential for aerosol generation) | < 0,01 |
| combined routes | Spraying, Local exhaust ventilation, With potential for aerosol generation | 0,40 |

13.3.23 ES 13 - CS 23: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Spraying, Respiratory protection) | 0,25 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Respiratory protection) | < 0,01 |
| combined routes | Spraying, Respiratory protection | 0,25 |

13.3.24 ES 13 - CS 24: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------|------|
| inhalative | 2 ppm (ECETOC TRA worker V3, Spraying, Respiratory protection, With potential for aerosol generation) | 0,2 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Respiratory protection, With potential for aerosol generation) | 0,12 |
| combined routes | Spraying, Respiratory protection, With potential for aerosol generation | 0,32 |

13.3.25 ES 13 - CS 25: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 1 ppm (ECETOC TRA worker V3) | 0,1 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,10 |

PRAEPAGEN TQ

Page 234(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

13.3.26 ES 13 - CS 26: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------|------|
| inhalative | 3 ppm (ECETOC TRA worker V3, Dipping, immersion and pouring, Respiratory protection) | 0,3 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Dipping, immersion and pouring, Respiratory protection) | 0,02 |
| combined routes | Dipping, immersion and pouring, Respiratory protection | 0,32 |

13.3.27 ES 13 - CS 27: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Storage) | 0,10 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,10 |

13.4. ES 13 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

14. ES 14: Consumer use; Use in lubricants

14.1. Title section

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Adhesives, sealants (PC1) | |
| Lubricants, greases, release products (PC24) | |
| Polishes and wax blends (PC31) | |
| Environment | |
| CS1: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |

PRAEPAGEN TQ

Page 235(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Consumer | | |
|----------|------------------------------------------------------|------|
| CS2: | Consumer use (Adhesives, sealants) | PC1 |
| CS3: | Consumer use (Adhesives, sealants) | PC1 |
| CS4: | Consumer use (Adhesives, sealants) | PC1 |
| CS5: | Consumer use (Adhesives, sealants) | PC1 |
| CS6: | Consumer use (Lubricants, greases, release products) | PC24 |
| CS7: | Consumer use (Lubricants, greases, release products) | PC24 |
| CS8: | Consumer use (Lubricants, greases, release products) | PC24 |
| CS9: | Consumer use (Polishes and wax blends) | PC31 |
| CS10: | Consumer use (Polishes and wax blends) | PC31 |

14.2. ES 14 Conditions of use affecting exposure

14.2.1 ES 14 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

14.2.2 ES 14 - CS 2: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks : Glues, hobby use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 30 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 9 grams

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 35,73 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

PRAEPAGEN TQ

Page 236(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

14.2.3 ES 14 - CS 3: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks : Glues DIY-use (carpet glue, tile glue, wood parquet glue)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 30 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 6390 grams

Frequency and duration of use

Exposure duration : 6 h
Frequency of use : 1 uses per day
Frequency of use : 1 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 110,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

14.2.4 ES 14 - CS 4: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks : Glue from spray

Product characteristics

Concentration of the Substance in Mixture/Article : <= 30 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 85,05 grams

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : 1 uses per day
Frequency of use : 6 days per year

PRAEPAGEN TQ

Page 237(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Human factors not influenced by risk management

Covers skin contact area up to : 35,73 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

14.2.5 ES 14 - CS 5: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks : Sealants

Product characteristics

Concentration of the Substance in Mixture/Article : <= 30 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 75 grams

Frequency and duration of use

Exposure duration : 1 h

Frequency of use : 1 uses per day

Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 35,73 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

14.2.6 ES 14 - CS 6: Control of consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

Remarks : Liquids

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

PRAEPAGEN TQ

Page 238(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Amount per use : 2200 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 4 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 468,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

14.2.7 ES 14 - CS 7: Control of consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

Remarks : Pastes

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 34 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 10 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 468,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

14.2.8 ES 14 - CS 8: Control of consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

Remarks : Sprays

Product characteristics

PRAEPAGEN TQ

Page 239(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 73 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 6 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,75 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

14.2.9 ES 14 - CS 9: Control of consumer exposure: Consumer use (Polishes and wax blends) (PC31)

Remarks : Polishes, wax / cream (floor, furniture, shoes)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 142 grams

Frequency and duration of use

Exposure duration : 1,23 h
Frequency of use : 1 uses per day
Frequency of use : 29 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 430,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

PRAEPAGEN TQ

Page 240(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

14.2.10 ES 14 - CS 10: Control of consumer exposure: Consumer use (Polishes and wax blends) (PC31)

Remarks : Polishes, spray (furniture, shoes)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 35 grams

Frequency and duration of use

Exposure duration : 0,33 h
Frequency of use : 1 uses per day
Frequency of use : 8 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 430,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

14.3. ES 14 Exposure estimation and reference to its source

14.3.2 ES 14 - CS 2: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------|--------|
| Dermal | 1,79 mg/kg bw/day (ECETOC TRA worker V3, Glues, hobby use, Chronic effects) | 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Glues, hobby use, Chronic effects) | < 0,01 |
| inhalative | 8,52 mg/m ³ (ECETOC TRA worker V3, Glues, hobby use, Chronic effects) | 0,10 |
| combined routes | Glues, hobby use, Chronic effects | 0,10 |

14.3.3 ES 14 - CS 3: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

PRAEPAGEN TQ

Page 241(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,01 mg/kg bw/day (ECETOC TRA worker V3, Glues DIY-use (carpet glue, tile glue, wood parquet glue), Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Glues DIY-use (carpet glue, tile glue, wood parquet glue), Chronic effects) | < 0,01 |
| inhalative | 17,48 mg/m ³ (ECETOC TRA worker V3, Glues DIY-use (carpet glue, tile glue, wood parquet glue), Chronic effects) | 0,20 |
| combined routes | Glues DIY-use (carpet glue, tile glue, wood parquet glue), Chronic effects | 0,20 |

14.3.4 ES 14 - CS 4: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------|--------|
| Dermal | 1,79 mg/kg bw/day (ECETOC TRA worker V3, Glue from spray, Chronic effects) | 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Glue from spray, Chronic effects) | < 0,01 |
| inhalative | 80,56 mg/m ³ (ECETOC TRA worker V3, Glue from spray, Chronic effects) | 0,91 |
| combined routes | Glue from spray, Chronic effects | 0,91 |

14.3.5 ES 14 - CS 5: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------|--------|
| Dermal | 1,79 mg/kg bw/day (ECETOC TRA worker V3, Sealants, Chronic effects) | 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Sealants, Chronic effects) | < 0,01 |
| inhalative | 35,25 mg/m ³ (ECETOC TRA worker V3, Sealants, Chronic effects) | 0,40 |
| combined routes | Sealants, Chronic effects | 0,40 |

14.3.6 ES 14 - CS 6: Consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------|--------|
| Dermal | 78,00 mg/kg bw/day (ECETOC TRA worker V3, Liquids, Chronic effects) | 0,24 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Liquids, | < 0,01 |

PRAEPAGEN TQ

Page 242(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-------------------------------------------------------------------------|------|
| | Chronic effects) | |
| inhalative | 3,98 mg/m ³ (ECETOC TRA worker V3, Liquids, Chronic effects) | 0,04 |
| combined routes | Liquids, Chronic effects | 0,29 |

14.3.7 ES 14 - CS 7: Consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------|--------|
| Dermal | 15,60 mg/kg bw/day (ECETOC TRA worker V3, Pastes, Chronic effects) | 0,05 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Pastes, Chronic effects) | < 0,01 |
| inhalative | 0 mg/m ³ (ECETOC TRA worker V3, Pastes, Chronic effects) | < 0,01 |
| combined routes | Pastes, Chronic effects | 0,05 |

14.3.8 ES 14 - CS 8: Consumer exposure: Consumer use (Lubricants, greases, release products) (PC24)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------|--------|
| Dermal | 35,73 mg/kg bw/day (ECETOC TRA worker V3, Sprays, Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Sprays, Chronic effects) | < 0,01 |
| inhalative | 12,06 mg/m ³ (ECETOC TRA worker V3, Sprays, Chronic effects) | 0,14 |
| combined routes | Sprays, Chronic effects | 0,25 |

14.3.9 ES 14 - CS 9: Consumer exposure: Consumer use (Polishes and wax blends) (PC31)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------|--------|
| Dermal | 2,87 mg/kg bw/day (ECETOC TRA worker V3, Polishes, wax / cream (floor, furniture, shoes), Chronic effects) | 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Polishes, wax / cream (floor, furniture, shoes), Chronic effects) | < 0,01 |
| inhalative | 10,31 mg/m ³ (ECETOC TRA worker V3, Polishes, wax / cream (floor, furniture, shoes), Chronic effects) | 0,12 |
| combined routes | Polishes, wax / cream (floor, furniture, shoes), Chronic effects | 0,12 |

14.3.10 ES 14 - CS 10: Consumer exposure: Consumer use (Polishes and wax

PRAEPAGEN TQ

Page 243(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

blends) (PC31)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------------------|--------|
| Dermal | 35,83 mg/kg bw/day (ECETOC TRA worker V3, Polishes, spray (furniture, shoes), Chronic effects) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Polishes, spray (furniture, shoes), Chronic effects) | < 0,01 |
| inhalative | 11,01 mg/m ³ (ECETOC TRA worker V3, Polishes, spray (furniture, shoes), Chronic effects) | 0,12 |
| combined routes | Polishes, spray (furniture, shoes), Chronic effects | 0,24 |

14.4. ES 14 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

15. ES 15: Industrial use; Metal working fluids

15.1. Title section

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------|
| Environment | | |
| CS1: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | | ERC4 |
| Workers | | |
| CS2: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | | PROC1, PROC2 |
| CS3: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | | PROC3 |
| CS4: Industrial use (Chemical production where opportunity for exposure arises) | | PROC4 |
| CS5: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | | PROC8b |
| CS6: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | | PROC8b |
| CS7: Industrial use (Mixing or blending in batch processes) | | PROC5 |
| CS8: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | | PROC9 |
| CS9: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | | PROC8b |

PRAEPAGEN TQ

Page 244(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| CS10: Industrial use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS11: Industrial use (Treatment of articles by dipping and pouring) | PROC13 |
| CS12: Industrial use (Industrial spraying) | PROC7 |
| CS13: Industrial use (Industrial spraying) | PROC7 |
| CS14: Industrial use (Roller application or brushing) | PROC10 |
| CS15: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS16: Industrial use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS17: Industrial use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS18: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS19: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS20: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS21: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

15.2. ES 15 Conditions of use affecting exposure

15.2.1 ES 15 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : No exposure assessment presented for the environment.

15.2.2 ES 15 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 245(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

15.2.3 ES 15 - CS 3: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

15.2.4 ES 15 - CS 4: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : General exposures (open systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 246(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

15.2.5 ES 15 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Clear spills immediately.
Remotely vent displaced vapours.
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

PRAEPAGEN TQ

Page 247(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice : Provide enhanced general ventilation by mechanical means., or, Ensure operation is undertaken outdoors., Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

15.2.6 ES 15 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Filling of equipment from drums or containers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Use drum pumps., Provide enhanced general ventilation by mechanical means., Wear suitable gloves tested to EN374.

15.2.7 ES 15 - CS 7: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

PRAEPAGEN TQ

Page 248(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Filling of equipment from drums or containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Use drum pumps., Provide enhanced general ventilation by mechanical means., Wear suitable gloves tested to EN374.

15.2.8 ES 15 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

- Outdoor / Indoor : Indoor use

Risk Management Measures

- Type of Application (Use) : Filling of equipment from drums or containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Use drum pumps., Provide enhanced general ventilation by mechanical means., Wear suitable gloves tested to EN374.

15.2.9 ES 15 - CS 9: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

- Remarks : Process sampling

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid

PRAEPAGEN TQ

Page 249(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Process sampling
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Dedicated equipment
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Avoid carrying out activities involving exposure for more than 1 hour per day., Wear suitable gloves tested to EN374.

15.2.10 ES 15 - CS 10: Control of worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

Remarks : Metal machining operations

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Metal machining operations
Organisational measures to prevent /limit releases, dispersion and exposure : Restrict area of openings to equipment.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

15.2.11 ES 15 - CS 11: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

PRAEPAGEN TQ

Page 250(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Dipping, immersion and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Allow time for product to drain from workpiece.
Technical conditions and measures : Automate activity where possible.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide enhanced general ventilation by mechanical means., Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

15.2.12 ES 15 - CS 12: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Remarks : Spraying

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Spraying
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Automate activity where possible.

PRAEPAGEN TQ

Page 251(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

measures : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear a respirator conforming to EN140., Wear suitable gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin., Use suitable eye protection.

15.2.13 ES 15 - CS 13: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Remarks : Spraying
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Spraying
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Automate activity where possible., Wear a respirator conforming to EN140., Wear suitable gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin., Use suitable eye protection.

15.2.14 ES 15 - CS 14: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 252(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Manual
Rolling, Brushing
Organisational measures to prevent /limit releases, dispersion and exposure : Prevent aerosol formation or splashes.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide enhanced general ventilation by mechanical means.,
Wear suitable gloves tested to EN374.

15.2.15 ES 15 - CS 15: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : Automated metal rolling/forming
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Automated metal rolling/forming
Elevated temperature
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 253(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Handle substance within a predominantly closed system provided with extract ventilation., Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

15.2.16 ES 15 - CS 16: Control of worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

Remarks : Semi-automated metal rolling/forming
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Semi-automated metal rolling/forming
Elevated temperature
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Automate activity where possible.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

15.2.17 ES 15 - CS 17: Control of worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

Remarks : Semi-automated metal rolling/forming
Aerosol
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid

PRAEPAGEN TQ

Page 254(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Semi-automated metal rolling/forming
Aerosol
Elevated temperature
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Automate activity where possible.
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Effectiveness (of a measure) : 90 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

15.2.18 ES 15 - CS 18: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : Semi-automated metal rolling/forming

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Semi-automated metal rolling/forming
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Automate activity where possible.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or

PRAEPAGEN TQ

Page 255(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

15.2.19 ES 15 - CS 19: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Equipment cleaning and maintenance
Dedicated facility

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Equipment cleaning and maintenance
Dedicated facility

Organisational measures to prevent /limit releases, dispersion and exposure : Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Avoid direct eye contact with product, also via contamination on hands.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide enhanced general ventilation by mechanical means., Drain or remove substance from equipment prior to break-in or maintenance., Wear suitable gloves tested to EN374.

15.2.20 ES 15 - CS 20: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

PRAEPAGEN TQ

Page 256(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Equipment cleaning and maintenance
Non-dedicated facility
- Organisational measures to prevent /limit releases, dispersion and exposure : Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Avoid direct eye contact with product, also via contamination on hands.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide enhanced general ventilation by mechanical means.,
Drain or remove substance from equipment prior to break-in or maintenance., Wear suitable gloves tested to EN374.

15.2.21 ES 15 - CS 21: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

- Remarks : Storage

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Storage
- Organisational measures to prevent /limit releases, dispersion and exposure : Store substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Transfer via enclosed lines., Avoid dip sampling.

15.3. ES 15 Exposure estimation and reference to its source

15.3.2 ES 15 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with

PRAEPAGEN TQ

Page 257(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,10 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,10 |

15.3.3 ES 15 - CS 3: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

15.3.4 ES 15 - CS 4: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures (open systems)) | 0,10 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems)) | 0,01 |
| combined routes | General exposures (open systems) | 0,11 |

15.3.5 ES 15 - CS 5: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | 0,01 |
| combined routes | Bulk transfers | 0,25 |

15.3.6 ES 15 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

PRAEPAGEN TQ

Page 258(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,01 |
| combined routes | Filling of equipment from drums or containers | 0,25 |

15.3.7 ES 15 - CS 7: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

15.3.8 ES 15 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

15.3.9 ES 15 - CS 9: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Process sampling) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Process sampling) | 0,01 |
| combined routes | Process sampling | 0,25 |

15.3.10 ES 15 - CS 10: Worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Metal machining operations) | 0,25 |
| Dermal | 1,371 mg/kg bw/day (ECETOC TRA worker V3, Metal | < 0,01 |

PRAEPAGEN TQ

Page 259(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|----------------------------|------|
| | machining operations) | |
| combined routes | Metal machining operations | 0,25 |

15.3.11 ES 15 - CS 11: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

15.3.12 ES 15 - CS 12: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Spraying) | 0,25 |
| Dermal | 42,86 mg/kg bw/day (ECETOC TRA worker V3, Spraying) | < 0,01 |
| combined routes | Spraying | 0,25 |

15.3.13 ES 15 - CS 13: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|--------|
| inhalative | 4 ppm (ECETOC TRA worker V3, Spraying, Aerosol) | 0,40 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Aerosol) | < 0,01 |
| combined routes | Spraying, Aerosol | 0,40 |

15.3.14 ES 15 - CS 14: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | 0,03 |
| combined routes | | 0,28 |

15.3.15 ES 15 - CS 15: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type | Exposure estimate | RCR |
|----------------------------|-------------------|-----|
|----------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 260(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| of effects | | |
|-----------------|---------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Automated metal rolling/forming) | 0,25 |
| Dermal | 0,14 mg/kg bw/day (ECETOC TRA worker V3, Automated metal rolling/forming) | < 0,01 |
| combined routes | Automated metal rolling/forming | 0,25 |

15.3.16 ES 15 - CS 16: Worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Semi-automated metal rolling/forming) | 0,49 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Semi-automated metal rolling/forming) | < 0,01 |
| combined routes | Semi-automated metal rolling/forming | 0,49 |

15.3.17 ES 15 - CS 17: Worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------|--------|
| inhalative | 2 ppm (ECETOC TRA worker V3, Semi-automated metal rolling/forming, Aerosol) | 0,20 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Semi-automated metal rolling/forming, Aerosol) | < 0,01 |
| combined routes | Semi-automated metal rolling/forming, Aerosol | 0,20 |

15.3.18 ES 15 - CS 18: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Semi-automated metal rolling/forming) | 0,49 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Semi-automated metal rolling/forming) | < 0,01 |
| combined routes | Semi-automated metal rolling/forming | 0,49 |

15.3.19 ES 15 - CS 19: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------|-----|
|---------------------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 261(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|--------------------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Equipment cleaning and maintenance, Dedicated facility) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Equipment cleaning and maintenance, Dedicated facility) | 0,01 |
| combined routes | Equipment cleaning and maintenance, Dedicated facility | 0,25 |

15.3.20 ES 15 - CS 20: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

15.3.21 ES 15 - CS 21: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,01 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,01 |

15.4. ES 15 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

16. ES 16: Professional use; Metal working fluids

16.1. Title section

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Environment | |
| CS1: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive | ERC8a, ERC8d |

PRAEPAGEN TQ

Page 262(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| processing aid (no inclusion into or onto article, outdoor)) | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Workers | |
| CS2: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |
| CS3: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS4: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS5: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS6: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS7: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS8: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS9: Professional use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS10: Professional use (Lubrication at high energy conditions in metal working operations) | PROC17 |
| CS11: Professional use (Roller application or brushing) | PROC10 |
| CS12: Professional use (Roller application or brushing) | PROC10 |
| CS13: Professional use (Non-industrial spraying) | PROC11 |
| CS14: Professional use (Non-industrial spraying) | PROC11 |
| CS15: Professional use (Non-industrial spraying) | PROC11 |
| CS16: Professional use (Non-industrial spraying) | PROC11 |
| CS17: Professional use (Treatment of articles by dipping and pouring) | PROC13 |
| CS18: Professional use (Treatment of articles by dipping and pouring) | PROC13 |
| CS19: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS20: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS21: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

16.2. ES 16 Conditions of use affecting exposure

16.2.1 ES 16 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

PRAEPAGEN TQ

Page 263(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

16.2.2 ES 16 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands. No other specific measures identified.
Personal protective measures : Use suitable eye protection.

16.2.3 ES 16 - CS 3: Control of worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands. No other specific measures identified.
Personal protective measures : Use suitable eye protection.

16.2.4 ES 16 - CS 4: Control of worker exposure: Professional use (Transfer of

PRAEPAGEN TQ

Page 264(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Ensure material transfers are under containment or extract ventilation.

16.2.5 ES 16 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Filling of equipment from drums or containers
Dedicated facility

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Dedicated facility
Organisational measures to prevent /limit releases, dispersion : Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 265(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Ensure material transfers are under containment or extract ventilation.

16.2.6 ES 16 - CS 6: Control of worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Dedicated facility
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Use drum pumps., Wear suitable gloves tested to EN374.

16.2.7 ES 16 - CS 7: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Filling of equipment from drums or containers
Non-dedicated facility

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid

PRAEPAGEN TQ

Page 266(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 2320 Pa

Frequency and duration of use

Exposure duration : 15 min - 1 h

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Non-dedicated facility

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.
Wear suitable gloves tested to EN374.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Wear a respirator conforming to EN140.

16.2.8 ES 16 - CS 8: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Process sampling

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Exposure duration : 15 min - 1 h

Risk Management Measures

Type of Application (Use) : Process sampling

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Ensure material transfers are under containment or extract ventilation., Clear transfer lines prior to de-coupling.

PRAEPAGEN TQ

Page 267(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

16.2.9 ES 16 - CS 9: Control of worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

Remarks : Metal machining operations

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Metal machining operations
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide enhanced general ventilation by mechanical means.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors.

16.2.10 ES 16 - CS 10: Control of worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

Remarks : Metal machining operations
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Metal machining operations
Aerosol
Organisational measures to prevent /limit releases, dispersion : Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 268(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure

Technical conditions and measures : Provide enhanced general ventilation by mechanical means.

Effectiveness (of a measure) : 80 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors.

16.2.11 ES 16 - CS 11: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Remarks : Manual
Rolling, Brushing
Local exhaust ventilation

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Manual
Rolling, Brushing
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Local exhaust ventilation
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

16.2.12 ES 16 - CS 12: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Remarks : Manual
Rolling, Brushing

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

PRAEPAGEN TQ

Page 269(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Exposure duration : 1 - 4 h
Remarks : or
Remarks : Covers daily exposures up to 8 hours, Wear suitable respiratory protection.

Risk Management Measures

Type of Application (Use) : Manual
Rolling, Brushing
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Avoid carrying out activities involving exposure for more than 4 hours per day.
Technical conditions and measures : Provide enhanced general ventilation by mechanical means.
Personal protective measures : Use suitable eye protection.
Organisational measures to prevent /limit releases, dispersion and exposure : or
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.
Wear suitable respiratory protection.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

16.2.13 ES 16 - CS 13: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying
Local exhaust ventilation

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 270(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Technical conditions and measures : Local exhaust ventilation
Provide enhanced general ventilation by mechanical means.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

16.2.14 ES 16 - CS 14: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying
Local exhaust ventilation
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Local exhaust ventilation
Provide enhanced general ventilation by mechanical means.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

16.2.15 ES 16 - CS 15: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 271(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide enhanced general ventilation by mechanical means.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

16.2.16 ES 16 - CS 16: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide enhanced general ventilation by mechanical means.
Effectiveness (of a measure) : 70 %
Personal protective measures : Use suitable eye protection.
Wear a respirator conforming to EN140.
Effectiveness (of a measure) : 90 %

PRAEPAGEN TQ

Page 272(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

16.2.17 ES 16 - CS 17: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Remarks : Treatment of articles by dipping and pouring
Local exhaust ventilation

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Dipping, immersion and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Allow time for product to drain from workpiece.
Technical conditions and measures : Local exhaust ventilation
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

16.2.18 ES 16 - CS 18: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Remarks : Treatment of articles by dipping and pouring

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 273(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Dipping, immersion and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Allow time for product to drain from workpiece.
Personal protective measures : Use suitable eye protection.
Wear suitable respiratory protection.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

16.2.19 ES 16 - CS 19: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

- Remarks : Equipment cleaning and maintenance
Non-dedicated facility

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Equipment cleaning and maintenance
Non-dedicated facility
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Ensure material transfers are under containment or extract ventilation.

16.2.20 ES 16 - CS 20: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

- Remarks : Equipment cleaning and maintenance
Dedicated facility

Product characteristics

PRAEPAGEN TQ

Page 274(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Equipment cleaning and maintenance
Dedicated facility

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Clear transfer lines prior to de-coupling.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan., Ensure material transfers are under containment or extract ventilation.

16.2.21 ES 16 - CS 21: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 2320 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
With sample collection

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No other specific measures identified.

Technical conditions and measures : Handle substance within a closed system.

PRAEPAGEN TQ

Page 275(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

measures

Personal protective measures : Use suitable eye protection.

16.3. ES 16 Exposure estimation and reference to its source

16.3.2 ES 16 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,10 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,10 |

16.3.3 ES 16 - CS 3: Worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

16.3.4 ES 16 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | 0,01 |
| combined routes | Bulk transfers | 0,25 |

16.3.5 ES 16 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

PRAEPAGEN TQ

Page 276(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers, Dedicated facility) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers, Dedicated facility) | 0,01 |
| combined routes | Filling of equipment from drums or containers, Dedicated facility | 0,25 |

16.3.6 ES 16 - CS 6: Worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,50 |

16.3.7 ES 16 - CS 7: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers, Non-dedicated facility) | 0,10 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers, Non-dedicated facility) | 0,02 |
| combined routes | Filling of equipment from drums or containers, Non-dedicated facility | 0,11 |

16.3.8 ES 16 - CS 8: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Process sampling) | 0,05 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Process sampling) | 0,02 |
| combined routes | Process sampling | 0,06 |

16.3.9 ES 16 - CS 9: Worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

| Route of exposure and type | Exposure estimate | RCR |
|----------------------------|-------------------|-----|
|----------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 277(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| of effects | | |
|-----------------|-----------------------------------------------------------------------|------|
| inhalative | 40 ppm (ECETOC TRA worker V3, Metal machining operations) | 0,20 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Metal machining operations) | 0,03 |
| combined routes | Metal machining operations | 0,23 |

16.3.10 ES 16 - CS 10: Worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------|--------|
| inhalative | 4 ppm (ECETOC TRA worker V3, Metal machining operations, Aerosol) | 0,40 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Metal machining operations, Aerosol) | < 0,01 |
| combined routes | Metal machining operations, Aerosol | 0,40 |

16.3.11 ES 16 - CS 11: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Manual, Rolling, Brushing, Local exhaust ventilation) | 0,49 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Manual, Rolling, Brushing, Local exhaust ventilation) | 0,03 |
| combined routes | Manual, Rolling, Brushing, Local exhaust ventilation | 0,52 |

16.3.12 ES 16 - CS 12: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | 0,03 |
| combined routes | | 0,52 |

16.3.13 ES 16 - CS 13: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Spraying, Local exhaust ventilation) | 0,49 |

PRAEPAGEN TQ

Page 278(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|---------------------------------------------------------------------------------|------|
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Local exhaust ventilation) | 0,12 |
| combined routes | Spraying, Local exhaust ventilation | 0,61 |

16.3.14 ES 16 - CS 14: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------|-------|
| inhalative | 4 ppm (ECETOC TRA worker V3, Spraying, Local exhaust ventilation, Aerosol) | 0,40 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Local exhaust ventilation, Aerosol) | < 0,1 |
| combined routes | Spraying, Local exhaust ventilation, Aerosol | 0,40 |

16.3.15 ES 16 - CS 15: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,49 |

16.3.16 ES 16 - CS 16: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------|------|
| inhalative | 6 ppm (ECETOC TRA worker V3) | 0,60 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3) | 0,12 |
| combined routes | | 0,72 |

16.3.17 ES 16 - CS 17: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Dipping, immersion and pouring, Local exhaust ventilation) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Dipping, immersion and pouring, Local exhaust ventilation) | 0,02 |
| combined routes | Dipping, immersion and pouring, Local exhaust ventilation | 0,51 |

PRAEPAGEN TQ

Page 279(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

16.3.18 ES 16 - CS 18: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | 0,05 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,06 |

16.3.19 ES 16 - CS 19: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Equipment cleaning and maintenance, Non-dedicated facility) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Equipment cleaning and maintenance, Non-dedicated facility) | 0,02 |
| combined routes | Equipment cleaning and maintenance, Non-dedicated facility | 0,51 |

16.3.20 ES 16 - CS 20: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Equipment cleaning and maintenance, Dedicated facility) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Equipment cleaning and maintenance, Dedicated facility) | 0,01 |
| combined routes | Equipment cleaning and maintenance, Dedicated facility | 0,25 |

16.3.21 ES 16 - CS 21: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Storage) | 0,10 |
| Dermal | 0,14 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,10 |

PRAEPAGEN TQ

Page 280(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

16.4. ES 16 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

17. ES 17: Industrial use; Use in blowing agents

17.1. Title section

| | | |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Environment | | |
| CS1: | Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | ERC4 |
| Workers | | |
| CS2: | Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS3: | Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |
| CS4: | Industrial use (Use of blowing agents in manufacture of foam) | PROC12 |
| CS5: | Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS6: | Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |

17.2. ES 17 Conditions of use affecting exposure

17.2.1 ES 17 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : No exposure assessment presented for the environment.

17.2.2 ES 17 - CS 2: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Product delivery

Product characteristics

Concentration of the Substance in : <= 100 %
Mixture/Article

PRAEPAGEN TQ

Page 281(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 15 min

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Product delivery
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Ensure operation is undertaken outdoors.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Vapour recovery system
Personal protective measures : Use suitable eye protection.

17.2.3 ES 17 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Personal protective measures : Use suitable eye protection.

17.2.4 ES 17 - CS 4: Control of worker exposure: Industrial use (Use of blowing agents in manufacture of foam) (PROC12)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Concentration of the Substance in : <= 20 %

PRAEPAGEN TQ

Page 283(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mixing
Material transfers
Centrifuging including discharging
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide enhanced general ventilation by mechanical means.
Effectiveness (of a measure) : 70 %
Personal protective measures : Use suitable eye protection.

17.2.6 ES 17 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Loading and unloading

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %
Substances in preparations / mixtures
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Loading and unloading
Product packaging
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to points where emissions occur.
Ensure control measures are regularly inspected and maintained.
Effectiveness (of a measure) : 97 %
Personal protective measures : Use suitable eye protection.

17.3. ES 17 Exposure estimation and reference to its source

PRAEPAGEN TQ

Page 284(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

17.3.2 ES 17 - CS 2: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|------|
| inhalative | 150 ppm (ECETOC TRA worker V3, Product delivery) | 0,74 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Product delivery) | 0,01 |
| combined routes | Product delivery | 0,75 |

17.3.3 ES 17 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

17.3.4 ES 17 - CS 4: Worker exposure: Industrial use (Use of blowing agents in manufacture of foam) (PROC12)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,49 |

17.3.5 ES 17 - CS 5: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,25 |

17.3.6 ES 17 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------|-----|
|---------------------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 285(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-----------------------------------------------------------------|------|
| inhalative | 150 ppm (ECETOC TRA worker V3, Loading and unloading) | 0,74 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Loading and unloading) | 0,01 |
| combined routes | Loading and unloading | 0,75 |

17.4. ES 17 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

18. ES 18: Industrial use; Use in binder and release agents

18.1. Title section

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------|
| Environment | | |
| CS1: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | | ERC4 |
| Workers | | |
| CS2: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | | PROC1, PROC2, PROC3 |
| CS3: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | | PROC8b |
| CS4: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | | PROC3 |
| CS5: Industrial use (Chemical production where opportunity for exposure arises) | | PROC4 |
| CS6: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) | | PROC14 |
| CS7: Industrial use (Calendering operations) | | PROC6 |
| CS8: Industrial use (Calendering operations) | | PROC6 |
| CS9: Industrial use (Industrial spraying) | | PROC7 |
| CS10: Industrial use (Industrial spraying) | | PROC7 |
| CS11: Industrial use (Roller application or brushing) | | PROC10 |
| CS12: Industrial use (Industrial spraying) | | PROC7 |
| CS13: Industrial use (Industrial spraying) | | PROC7 |
| CS14: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment | | PROC1, PROC2 |

PRAEPAGEN TQ

Page 286(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)

18.2. ES 18 Conditions of use affecting exposure

18.2.1 ES 18 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : No exposure assessment presented for the environment.

18.2.2 ES 18 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Remarks : Material transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Material transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Transfer via enclosed lines., Wear suitable gloves tested to EN374.

18.2.3 ES 18 - CS 3: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

PRAEPAGEN TQ

Page 287(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

18.2.4 ES 18 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : Mixing operations

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mixing operations
With sample collection
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

PRAEPAGEN TQ

Page 288(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice : Provide extract ventilation to points where emissions occur.

18.2.5 ES 18 - CS 5: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mixing operations (open systems)
With sample collection
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

18.2.6 ES 18 - CS 6: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mold forming
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 289(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

18.2.7 ES 18 - CS 7: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Casting operations
Open systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to points where emissions occur.
Effectiveness (of a measure) : 90 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Wear a respirator conforming to EN140.

18.2.8 ES 18 - CS 8: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Remarks : Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 290(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Casting operations
Open systems
Aerosol
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : Provide extract ventilation to points where emissions occur.
- Effectiveness (of a measure) : 90 %
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear suitable gloves tested to EN374.

18.2.9 ES 18 - CS 9: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

- Remarks : Spraying (automatic/robotic)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid
- Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Spraying (automatic/robotic)
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Automate activity where possible.
Provide enhanced general ventilation by mechanical means.
- Effectiveness (of a measure) : 30 %
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear suitable gloves tested to EN374.

18.2.10 ES 18 - CS 10: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

- Remarks : Spraying (automatic/robotic)
Aerosol

Product characteristics

PRAEPAGEN TQ

Page 291(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying (automatic/robotic)
Aerosol

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Automate activity where possible.
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Local exhaust ventilation

Effectiveness (of a measure) : 95 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

18.2.11 ES 18 - CS 11: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Manual
Rolling, Brushing

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,

PRAEPAGEN TQ

Page 292(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

18.2.12 ES 18 - CS 12: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Remarks : Spraying
Manual

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying
Manual

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Operate activity away from sources of substance emission or release.

Technical conditions and measures : Carry out in a vented booth or extracted enclosure.

Effectiveness (of a measure) : 90 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operatives are trained to minimise exposures., Wear suitable gloves tested to EN374.

18.2.13 ES 18 - CS 13: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Remarks : Spraying
Manual
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 293(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Spraying
Manual
Aerosol
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : Carry out in a vented booth or extracted enclosure.
- Effectiveness (of a measure) : 95 %
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Ensure operatives are trained to minimise exposures., Wear a respirator conforming to EN140., Wear suitable gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin., Use suitable eye protection., Operate activity away from sources of substance emission or release.

18.2.14 ES 18 - CS 14: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

- Remarks : Storage

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid
- Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

- Outdoor / Indoor : Outdoor use

Risk Management Measures

- Type of Application (Use) : Storage
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
- Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 294(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

18.3. ES 18 Exposure estimation and reference to its source

18.3.2 ES 18 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Material transfers) | 0,12 |
| Dermal | 0,14 mg/kg bw/day (ECETOC TRA worker V3, Material transfers) | < 0,01 |
| combined routes | Material transfers | 0,12 |

18.3.3 ES 18 - CS 3: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

18.3.4 ES 18 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Mixing operations) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Mixing operations) | < 0,01 |
| combined routes | Mixing operations | 0,12 |

18.3.5 ES 18 - CS 5: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3) | 0,10 |

PRAEPAGEN TQ

Page 295(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|------------------------------------------|------|
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,11 |

18.3.6 ES 18 - CS 6: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 3,43 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,25 |

18.3.7 ES 18 - CS 7: Worker exposure: Industrial use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | 0,03 |
| combined routes | | 0,15 |

18.3.8 ES 18 - CS 8: Worker exposure: Industrial use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 2,5 ppm (ECETOC TRA worker V3, Aerosol) | 0,25 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Aerosol) | < 0,01 |
| combined routes | | 0,25 |

18.3.9 ES 18 - CS 9: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------|------|
| inhalative | 175 ppm (ECETOC TRA worker V3, Spraying (automatic/robotic)) | 0,86 |
| Dermal | 42,86 mg/kg bw/day (ECETOC TRA worker V3, Spraying (automatic/robotic)) | 0,05 |
| combined routes | Spraying (automatic/robotic) | 0,91 |

18.3.10 ES 18 - CS 10: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------|-----|
|---------------------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 296(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|---------------------------------------------------------------------------------|--------|
| inhalative | 5 ppm (ECETOC TRA worker V3, Spraying (automatic/robotic), Aerosol) | 0,50 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying (automatic/robotic), Aerosol) | < 0,01 |
| combined routes | Spraying (automatic/robotic), Aerosol | 0,50 |

18.3.11 ES 18 - CS 11: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | 0,03 |
| combined routes | | 0,28 |

18.3.12 ES 18 - CS 12: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Spraying, Manual) | 0,12 |
| Dermal | 42,86 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Manual) | 0,05 |
| combined routes | Spraying, Manual | 0,17 |

18.3.13 ES 18 - CS 13: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------|--------|
| inhalative | 5 ppm (ECETOC TRA worker V3, Spraying, Manual, Aerosol) | 0,50 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Manual, Aerosol) | < 0,01 |
| combined routes | Spraying, Manual, Aerosol | 0,50 |

18.3.14 ES 18 - CS 14: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

PRAEPAGEN TQ

Page 297(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

18.4. ES 18 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

19. ES 19: Professional use; Use in binder and release agents

19.1. Title section

| | | |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Environment | | |
| CS1: | Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |
| Workers | | |
| CS2: | Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC1, PROC2, PROC3 |
| CS3: | Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: | Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS5: | Professional use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS6: | Professional use (Tabletting, compression, extrusion, pelettisation, granulation) | PROC14 |
| CS7: | Professional use (Calendering operations) | PROC6 |
| CS8: | Professional use (Calendering operations) | PROC6 |
| CS9: | Professional use (Non-industrial spraying) | PROC11 |
| CS10: | Professional use (Non-industrial spraying) | PROC11 |
| CS11: | Professional use (Roller application or brushing) | PROC10 |
| CS12: | Professional use (Non-industrial spraying) | PROC11 |
| CS13: | Professional use (Non-industrial spraying) | PROC11 |
| CS14: | Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

PRAEPAGEN TQ

Page 298(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

19.2. ES 19 Conditions of use affecting exposure

19.2.1 ES 19 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

19.2.2 ES 19 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Remarks : Material transfers
Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Material transfers
Closed systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Remotely vent displaced vapours.
Technical conditions and measures : Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Transfer via enclosed lines.

19.2.3 ES 19 - CS 3: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

PRAEPAGEN TQ

Page 299(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Drum/batch transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Use drum pumps., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

19.2.4 ES 19 - CS 4: Control of worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : Mixing operations (open systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mixing operations (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 300(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Handle substance within a closed system.

19.2.5 ES 19 - CS 5: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : Mixing operations

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mixing operations
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

19.2.6 ES 19 - CS 6: Control of worker exposure: Professional use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mold forming

PRAEPAGEN TQ

Page 301(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

19.2.7 ES 19 - CS 7: Control of worker exposure: Professional use (Calendering operations) (PROC6)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Casting operations
Open systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to points where emissions occur.
Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

19.2.8 ES 19 - CS 8: Control of worker exposure: Professional use (Calendering operations) (PROC6)

Remarks : Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 25 %

PRAEPAGEN TQ

Page 302(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Casting operations
Open systems
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Limit the substance content in the product to 25 %.
Technical conditions and measures : Provide extract ventilation to points where emissions occur.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

19.2.9 ES 19 - CS 9: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying (automatic/robotic)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying (automatic/robotic)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Minimise exposure by extracted full enclosure for the operation or equipment.
Effectiveness (of a measure) : 95 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

PRAEPAGEN TQ

Page 303(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice : Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Operate activity away from sources of substance emission or release.

19.2.10 ES 19 - CS 10: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying (automatic/robotic)
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying (automatic/robotic)
Aerosol

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Operate activity away from sources of substance emission or release.

Technical conditions and measures : Minimise exposure by extracted full enclosure for the operation or equipment.
Provide enhanced general ventilation by mechanical means.
Provide a good standard of controlled ventilation (10 to 15 air changes per hour).

Effectiveness (of a measure) : 95 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

19.2.11 ES 19 - CS 11: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

PRAEPAGEN TQ

Page 304(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Manual
Rolling, Brushing
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

19.2.12 ES 19 - CS 12: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

- Remarks : Spraying
Manual

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Spraying
Manual
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Operate activity away from sources of substance emission or release.
- Technical conditions and measures : Carry out in a vented booth or extracted enclosure.
- Effectiveness (of a measure) : 90 %
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Ensure operatives are trained to minimise exposures., Wear suitable gloves tested to EN374., Wear a respirator conforming to EN140.

19.2.13 ES 19 - CS 13: Control of worker exposure: Professional use (Non-industrial

PRAEPAGEN TQ

Page 305(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

spraying) (PROC11)

Remarks : Spraying
Manual
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying
Manual
Aerosol

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Operate activity away from sources of substance emission or release.

Technical conditions and measures : Carry out in a vented booth or extracted enclosure.

Effectiveness (of a measure) : 90 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operatives are trained to minimise exposures., Wear a respirator conforming to EN140., Wear suitable gloves tested to EN374.

19.2.14 ES 19 - CS 14: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Batch process

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 306(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Batch process
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands. Store substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

19.3. ES 19 Exposure estimation and reference to its source

19.3.2 ES 19 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Material transfers, Closed systems) | 0,12 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Material transfers, Closed systems) | < 0,01 |
| combined routes | Material transfers, Closed systems | 0,12 |

19.3.3 ES 19 - CS 3: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Drum/batch transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers) | 0,01 |
| combined routes | Drum/batch transfers | 0,25 |

19.3.4 ES 19 - CS 4: Worker exposure: Professional use (Manufacture or formulation

PRAEPAGEN TQ

Page 307(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Mixing operations (open systems)) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Mixing operations (open systems)) | < 0,01 |
| combined routes | Mixing operations (open systems) | 0,12 |

19.3.5 ES 19 - CS 5: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Mixing operations) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Mixing operations) | 0,01 |
| combined routes | Mixing operations | 0,25 |

19.3.6 ES 19 - CS 6: Worker exposure: Professional use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 3,43 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,50 |

19.3.7 ES 19 - CS 7: Worker exposure: Professional use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,49 |

19.3.8 ES 19 - CS 8: Worker exposure: Professional use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------|------|
| inhalative | 6 ppm (ECETOC TRA worker V3, Aerosol) | 0,60 |

PRAEPAGEN TQ

Page 308(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|---------------------------------------------------|--------|
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Aerosol) | < 0,01 |
| combined routes | Aerosol | 0,60 |

19.3.9 ES 19 - CS 9: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Spraying (automatic/robotic)) | 0,12 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying (automatic/robotic)) | < 0,01 |
| combined routes | Spraying (automatic/robotic) | 0,13 |

19.3.10 ES 19 - CS 10: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------|--------|
| inhalative | 3 ppm (ECETOC TRA worker V3, Spraying (automatic/robotic), Aerosol) | 0,30 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying (automatic/robotic), Aerosol) | < 0,01 |
| combined routes | Spraying (automatic/robotic), Aerosol | 0,30 |

19.3.11 ES 19 - CS 11: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | 0,03 |
| combined routes | | 0,52 |

19.3.12 ES 19 - CS 12: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Spraying, Manual) | 0,25 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Manual) | < 0,01 |
| combined routes | Spraying, Manual | 0,25 |

PRAEPAGEN TQ

Page 309(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

19.3.13 ES 19 - CS 13: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Spraying, Manual, Aerosol) | 0,10 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying, Manual, Aerosol) | < 0,01 |
| combined routes | Spraying, Manual, Aerosol | 0,10 |

19.3.14 ES 19 - CS 14: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Batch process) | 0,10 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Batch process) | < 0,01 |
| combined routes | Batch process | 0,10 |

19.4. ES 19 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

20. ES 20: Professional use; Use in agrochemicals

20.1. Title section

| | | |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Environment | | |
| CS1: | Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |
| Workers | | |
| CS2: | Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS3: | Professional use (Chemical production where opportunity for exposure | PROC4 |

PRAEPAGEN TQ

Page 310(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
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| arises) | |
| CS4: Professional use (Non-industrial spraying) | PROC11 |
| CS5: Professional use (Non-industrial spraying) | PROC11 |
| CS6: Professional use (Treatment of articles by dipping and pouring) | PROC13 |
| CS7: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS8: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS9: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

20.2. ES 20 Conditions of use affecting exposure

20.2.1 ES 20 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

20.2.2 ES 20 - CS 2: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Transfer from/pouring from containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Wear suitable gloves tested to EN374.

PRAEPAGEN TQ

Page 311(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

20.2.3 ES 20 - CS 3: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Mixing operations
Mixing operations (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Wear suitable gloves tested to EN374.

20.2.4 ES 20 - CS 4: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying or fogging

Product characteristics

Concentration of the Substance in Mixture/Article : <= 25 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Spraying or fogging
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid carrying out activities involving exposure for more than 4 hours per day.
Limit the substance content in the product to 25 %.
Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 312(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable coveralls to prevent exposure to the skin., Wear a full face respirator conforming to EN136.

20.2.5 ES 20 - CS 5: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying/ fogging by machine application

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Spraying/ fogging by machine application
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.
Effectiveness (of a measure) : 80 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Limit the substance content in the product to 25 %.

20.2.6 ES 20 - CS 6: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Ad hoc manual application via trigger sprays, dipping, etc.
Organisational measures to : Avoid direct eye contact with product, also via contamination

PRAEPAGEN TQ

Page 313(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

prevent /limit releases, dispersion and exposure on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

20.2.7 ES 20 - CS 7: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Operation of equipment containing engine oils and similar

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Operation of equipment containing engine oils and similar
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Drain down system prior to equipment break-in or maintenance.

20.2.8 ES 20 - CS 8: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Disposal of wastes

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

PRAEPAGEN TQ

Page 314(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Disposal of wastes
Organisational measures to prevent /limit releases, dispersion and exposure : Dispose of waste product or used containers according to local regulations.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Limit the substance content in the product to 5 %.

20.2.9 ES 20 - CS 9: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Store substance within a closed system.
Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection.

20.3. ES 20 Exposure estimation and reference to its source

PRAEPAGEN TQ

Page 315(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

20.3.2 ES 20 - CS 2: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

20.3.3 ES 20 - CS 3: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

20.3.4 ES 20 - CS 4: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------|------|
| inhalative | 180 ppm (ECETOC TRA worker V3, Spraying or fogging) | 0,89 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying or fogging) | 0,12 |
| combined routes | Spraying or fogging | 1,01 |

20.3.5 ES 20 - CS 5: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Spraying/ fogging by machine application) | 0,49 |
| Dermal | 2,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying/ fogging by machine application) | < 0,01 |
| combined routes | Spraying/ fogging by machine application | 0,50 |

20.3.6 ES 20 - CS 6: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------|-----|
| | | |

PRAEPAGEN TQ

Page 316(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,51 |

20.3.7 ES 20 - CS 7: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Operation of equipment containing engine oils and similar) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Operation of equipment containing engine oils and similar) | 0,02 |
| combined routes | Operation of equipment containing engine oils and similar | 0,51 |

20.3.8 ES 20 - CS 8: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Disposal of wastes) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Disposal of wastes) | 0,02 |
| combined routes | Disposal of wastes | 0,51 |

20.3.9 ES 20 - CS 9: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Storage) | 0,10 |
| Dermal | 0,14 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,10 |

20.4. ES 20 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

PRAEPAGEN TQ

Page 317(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

21. ES 21: Consumer use; Use in agrochemicals

21.1. Title section

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Fertilizers (PC12) | |
| Plant protection products (PC27) | |
| Environment | |
| CS1: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |
| Consumer | |
| CS2: Consumer use (Fertilizers) | PC12 |
| CS3: Consumer use (Plant protection products) | PC27 |

21.2. ES 21 Conditions of use affecting exposure

21.2.1 ES 21 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

21.2.2 ES 21 - CS 2: Control of consumer exposure: Consumer use (Fertilizers) (PC12)

Remarks : Lawn and garden preparations

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Amount used

Amount per use : 50 grams
For each use event, assumes swallowed amount of : 0,3 grams

Frequency and duration of use

Frequency of use : 1 uses per day

PRAEPAGEN TQ

Page 318(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

21.2.3 ES 21 - CS 3: Control of consumer exposure: Consumer use (Plant protection products) (PC27)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Amount used

Amount per use : 50 grams

For each use event, assumes swallowed amount of : 0,3 grams

Frequency and duration of use

Frequency of use : 1 uses per day

Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 857,50 cm²

Other given operational conditions affecting consumers exposure

Room size : 20 m³

Ventilation rate per hour : 0,6

Remarks : Covers use under typical household ventilation.

21.3. ES 21 Exposure estimation and reference to its source

21.3.2 ES 21 - CS 2: Consumer exposure: Consumer use (Fertilizers) (PC12)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|------|
| Dermal | 71,46 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | 0,22 |
| Oral | 15 mg/kg bw/day (ECETOC TRA worker V3, Chronic) | 0,58 |

PRAEPAGEN TQ

Page 319(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-------------------------------------------------------------|--------|
| | effects) | |
| inhalative | 0 mg/m ³ (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| combined routes | Chronic effects | 0,80 |

21.3.3 ES 21 - CS 3: Consumer exposure: Consumer use (Plant protection products) (PC27)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|--------|
| Dermal | 71,46 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | 0,22 |
| Oral | 15 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | 0,58 |
| inhalative | 0 mg/m ³ (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| combined routes | Chronic effects | 0,80 |

21.4. ES 21 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

22. ES 22: Industrial use; Use in fuel

22.1. Title section

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Environment | |
| CS1: Industrial use (Use of functional fluid at industrial site) | ERC7 |
| Workers | |
| CS2: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS3: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |
| CS5: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

PRAEPAGEN TQ

Page 320(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
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| CS6: Industrial use (Use of fuels) | PROC16 |
| CS7: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS8: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS9: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS10: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

22.2. ES 22 Conditions of use affecting exposure

22.2.1 ES 22 - CS 1: Control of environmental exposure: Industrial use (Use of functional fluid at industrial site) (ERC7)

Remarks : No exposure assessment presented for the environment.

22.2.2 ES 22 - CS 2: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374., Ensure operation is

PRAEPAGEN TQ

Page 321(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

undertaken outdoors.

22.2.3 ES 22 - CS 3: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Drum/batch transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Avoid spillage when withdrawing pump.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Use drum pumps., Wear suitable gloves tested to EN374.

22.2.4 ES 22 - CS 4: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : General exposures (closed systems)
Indoor use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)

PRAEPAGEN TQ

Page 322(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Indoor use
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

22.2.5 ES 22 - CS 5: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

22.2.6 ES 22 - CS 6: Control of worker exposure: Industrial use (Use of fuels) (PROC16)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)

PRAEPAGEN TQ

Page 323(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

22.2.7 ES 22 - CS 7: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Closed systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

22.2.8 ES 22 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Equipment cleaning and maintenance

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 324(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Equipment cleaning and maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Apply vessel entry procedures including use of forced supplied air.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Drain down and flush system prior to equipment break-in or maintenance., Transfer via enclosed lines., Wear suitable gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin.

22.2.9 ES 22 - CS 9: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

- Remarks : Vessel and container cleaning

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Vessel and container cleaning
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Apply vessel entry procedures including use of forced supplied air.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Drain down system prior to equipment break-in or maintenance., Transfer via enclosed lines., Wear suitable gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin.

22.2.10 ES 22 - CS 10: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed

PRAEPAGEN TQ

Page 325(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Avoid dip sampling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Transfer via enclosed lines.

22.3. ES 22 Exposure estimation and reference to its source

22.3.2 ES 22 - CS 2: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | 0,01 |
| combined routes | Bulk transfers | 0,25 |

22.3.3 ES 22 - CS 3: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type | Exposure estimate | RCR |
|----------------------------|-------------------|-----|
|----------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 326(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| of effects | | |
|-----------------|----------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Drum/batch transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers) | 0,01 |
| combined routes | Drum/batch transfers | 0,25 |

22.3.4 ES 22 - CS 4: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, General exposures (closed systems), Indoor use) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems), Indoor use) | < 0,01 |
| combined routes | General exposures (closed systems), Indoor use | 0,05 |

22.3.5 ES 22 - CS 5: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,05 |

22.3.6 ES 22 - CS 6: Worker exposure: Industrial use (Use of fuels) (PROC16)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 5 ppm (ECETOC TRA worker V3) | 0,02 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,03 |

22.3.7 ES 22 - CS 7: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

PRAEPAGEN TQ

Page 327(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

22.3.8 ES 22 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Equipment cleaning and maintenance) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Equipment cleaning and maintenance) | 0,02 |
| combined routes | Equipment cleaning and maintenance | 0,26 |

22.3.9 ES 22 - CS 9: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Vessel and container cleaning) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Vessel and container cleaning) | 0,02 |
| combined routes | Vessel and container cleaning | 0,26 |

22.3.10 ES 22 - CS 10: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

22.4. ES 22 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

PRAEPAGEN TQ

Page 328(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

23. ES 23: Professional use; Use in fuel

23.1. Title section

| Environment | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| CS1: Professional use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) | ERC9a, ERC9b |
| Workers | |
| CS2: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS3: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS5: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |
| CS6: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS7: Professional use (Use of fuels) | PROC16 |
| CS8: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS9: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS10: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |

23.2. ES 23 Conditions of use affecting exposure

23.2.1 ES 23 - CS 1: Control of environmental exposure: Professional use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) (ERC9a, ERC9b)

Remarks : No exposure assessment presented for the environment.

23.2.2 ES 23 - CS 2: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

PRAEPAGEN TQ

Page 329(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Handle substance within a closed system. Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Ensure operation is undertaken outdoors.

23.2.3 ES 23 - CS 3: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Drum/batch transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands. Avoid spillage when withdrawing pump.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Use drum pumps., Wear suitable gloves tested to EN374.

PRAEPAGEN TQ

Page 330(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

23.2.4 ES 23 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Refuelling

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Avoid spillage when withdrawing pump.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Use drum pumps., Wear suitable gloves tested to EN374.

23.2.5 ES 23 - CS 5: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
No other specific measures identified.
Technical conditions and measures : Handle substance within a closed system.

PRAEPAGEN TQ

Page 331(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Personal protective measures : Use suitable eye protection.

23.2.6 ES 23 - CS 6: Control of worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
No other specific measures identified.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

23.2.7 ES 23 - CS 7: Control of worker exposure: Professional use (Use of fuels) (PROC16)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours
Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
No other specific measures identified.
Technical conditions and measures : Handle substance within a closed system.

PRAEPAGEN TQ

Page 332(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

measures

Personal protective measures : Use suitable eye protection.

23.2.8 ES 23 - CS 8: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Equipment cleaning and maintenance

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Equipment cleaning and maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain down and flush system prior to equipment break-in or maintenance., Transfer via enclosed lines., Wear suitable gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin.

23.2.9 ES 23 - CS 9: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Vessel and container cleaning

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

PRAEPAGEN TQ

Page 333(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Covers daily exposures up to 8 hours
Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Vessel and container cleaning
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Technical conditions and measures : Apply vessel entry procedures including use of forced supplied air.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain down system prior to equipment break-in or maintenance., Wear suitable gloves tested to EN374., Wear suitable coveralls to prevent exposure to the skin.

23.2.10 ES 23 - CS 10: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours
Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Personal protective measures : Use suitable eye protection.

23.3. ES 23 Exposure estimation and reference to its source

PRAEPAGEN TQ

Page 334(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

23.3.2 ES 23 - CS 2: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | 0,01 |
| combined routes | Bulk transfers | 0,25 |

23.3.3 ES 23 - CS 3: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Drum/batch transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers) | 0,01 |
| combined routes | Drum/batch transfers | 0,25 |

23.3.4 ES 23 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Refuelling) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Refuelling) | 0,01 |
| combined routes | Refuelling | 0,25 |

23.3.5 ES 23 - CS 5: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,10 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,10 |

PRAEPAGEN TQ

Page 335(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

23.3.6 ES 23 - CS 6: Worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

23.3.7 ES 23 - CS 7: Worker exposure: Professional use (Use of fuels) (PROC16)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | 0,05 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,05 |

23.3.8 ES 23 - CS 8: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Equipment cleaning and maintenance) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Equipment cleaning and maintenance) | 0,02 |
| combined routes | Equipment cleaning and maintenance | 0,51 |

23.3.9 ES 23 - CS 9: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Vessel and container cleaning) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Vessel and container cleaning) | 0,02 |
| combined routes | Vessel and container cleaning | 0,51 |

23.3.10 ES 23 - CS 10: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

PRAEPAGEN TQ

Page 336(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3, Storage) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | < 0,01 |

23.4. ES 23 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

24. ES 24: Consumer use; Use in fuel

24.1. Title section

| | | |
|---------------------------------------------------------------------------------------------------------------|--------------|--|
| Fuels (PC13) | | |
| Environment | | |
| CS1: Consumer use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) | ERC9a, ERC9b | |
| Consumer | | |
| CS2: Consumer use (Fuels) | PC13 | |
| CS3: Consumer use (Fuels) | PC13 | |
| CS4: Consumer use (Fuels) | PC13 | |
| CS5: Consumer use (Fuels) | PC13 | |
| CS6: Consumer use (Fuels) | PC13 | |
| CS7: Consumer use (Fuels) | PC13 | |

24.2. ES 24 Conditions of use affecting exposure

24.2.1 ES 24 - CS 1: Control of environmental exposure: Consumer use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) (ERC9a, ERC9b)

Remarks : No exposure assessment presented for the environment.

24.2.2 ES 24 - CS 2: Control of consumer exposure: Consumer use (Fuels) (PC13)

Remarks : Liquid: automotive refuelling

PRAEPAGEN TQ

Page 337(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 37500 grams

Frequency and duration of use

Exposure duration : 0,05 h
Frequency of use : 1 uses per day
Frequency of use : 52 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 210,00 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor or outdoor use
Room size : 100 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

24.2.3 ES 24 - CS 3: Control of consumer exposure: Consumer use (Fuels) (PC13)

Remarks : Liquid: scooter refuelling

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 3750 grams

Frequency and duration of use

Exposure duration : 0,03 h
Frequency of use : 1 uses per day
Frequency of use : 52 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 210,00 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor or outdoor use
Room size : 100 m³

PRAEPAGEN TQ

Page 338(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

24.2.4 ES 24 - CS 4: Control of consumer exposure: Consumer use (Fuels) (PC13)

Remarks : Liquid: garden equipment - use

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 750 grams

Frequency and duration of use

Exposure duration : 2 h
Frequency of use : 1 uses per day
Frequency of use : 26 days per year

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor or outdoor use
Room size : 100 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

24.2.5 ES 24 - CS 5: Control of consumer exposure: Consumer use (Fuels) (PC13)

Remarks : Liquid: garden equipment - refuelling

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 750 grams

Frequency and duration of use

Exposure duration : 0,03 h
Frequency of use : 1 uses per day
Frequency of use : 26 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside

PRAEPAGEN TQ

Page 339(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Covers skin contact area up to : hands / one hand / palm of hands.
: 420,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

24.2.6 ES 24 - CS 6: Control of consumer exposure: Consumer use (Fuels) (PC13)

Remarks : Liquid: home space heater fuel

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 750 grams

Frequency and duration of use

Exposure duration : 8 h
Frequency of use : 1 uses per day
Frequency of use : 26 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 420,00 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor use
Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

24.2.7 ES 24 - CS 7: Control of consumer exposure: Consumer use (Fuels) (PC13)

Remarks : Liquid: lamp oil

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

PRAEPAGEN TQ

Page 340(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Amount used

Amount per use : 100 grams

Frequency and duration of use

Exposure duration : 0,01 h
Frequency of use : 1 uses per day
Frequency of use : 52 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 210,00 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor use
Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

24.3. ES 24 Exposure estimation and reference to its source

24.3.2 ES 24 - CS 2: Consumer exposure: Consumer use (Fuels) (PC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------------|--------|
| Dermal | 35,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: automotive refuelling) | 0,11 |
| Oral | 0,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: automotive refuelling) | < 0,01 |
| inhalative | 1,54 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Liquid: automotive refuelling) | 0,02 |
| combined routes | Chronic effects, Liquid: automotive refuelling | 0,13 |

24.3.3 ES 24 - CS 3: Consumer exposure: Consumer use (Fuels) (PC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------|--------|
| Dermal | 35,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: scooter refuelling) | 0,11 |
| Oral | 0,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: scooter refuelling) | < 0,01 |
| inhalative | 1,02 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Liquid: scooter refuelling) | 0,01 |
| combined routes | Chronic effects, Liquid: scooter refuelling | 0,12 |

PRAEPAGEN TQ

Page 341(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

24.3.4 ES 24 - CS 4: Consumer exposure: Consumer use (Fuels) (PC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------|--------|
| Dermal | 0,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: garden equipment - use) | < 0,01 |
| Oral | 0,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: garden equipment - use) | < 0,01 |
| inhalative | 7,28 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Liquid: garden equipment - use) | 0,08 |
| combined routes | Chronic effects, Liquid: garden equipment - use | 0,08 |

24.3.5 ES 24 - CS 5: Consumer exposure: Consumer use (Fuels) (PC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------------------------------|--------|
| Dermal | 70,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: garden equipment - refuelling) | 0,22 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: garden equipment - refuelling) | < 0,01 |
| inhalative | 0,81 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Liquid: garden equipment - refuelling) | 0,01 |
| combined routes | Chronic effects, Liquid: garden equipment - refuelling | 0,23 |

24.3.6 ES 24 - CS 6: Consumer exposure: Consumer use (Fuels) (PC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------|--------|
| Dermal | 4,90 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: home space heater fuel) | 0,02 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: home space heater fuel) | < 0,01 |
| inhalative | 9,04 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Liquid: home space heater fuel) | 0,10 |
| combined routes | Chronic effects, Liquid: home space heater fuel | 0,12 |

24.3.7 ES 24 - CS 7: Consumer exposure: Consumer use (Fuels) (PC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------|--------|
| Dermal | 35,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: lamp oil) | 0,11 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid: lamp oil) | < 0,01 |
| inhalative | 0,13 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Liquid: lamp oil) | < 0,01 |

PRAEPAGEN TQ

Page 342(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-----------------------------------|------|
| | Liquid: lamp oil) | |
| combined routes | Chronic effects, Liquid: lamp oil | 0,11 |

24.4. ES 24 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

25. ES 25: Industrial use; Use in functional fluids

25.1. Title section

| Environment | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| CS1: Industrial use (Use of functional fluid at industrial site) | ERC7 |
| Workers | |
| CS2: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |
| CS3: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS5: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS6: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS7: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS8: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS9: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS10: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS11: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS12: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

PRAEPAGEN TQ

Page 343(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

25.2. ES 25 Conditions of use affecting exposure

25.2.1 ES 25 - CS 1: Control of environmental exposure: Industrial use (Use of functional fluid at industrial site) (ERC7)

Remarks : No exposure assessment presented for the environment.

25.2.2 ES 25 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Bulk transfers
Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Closed systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Transfer via enclosed lines.
Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

25.2.3 ES 25 - CS 3: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Drum/batch transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 344(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

25.2.4 ES 25 - CS 4: Control of worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Remarks : Pelletizing
Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Pelletizing
Closed systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.

PRAEPAGEN TQ

Page 345(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

25.2.5 ES 25 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Filling of equipment from drums or containers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Carefully pour from containers.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to material transfer points and other openings., Wear suitable gloves tested to EN374.

25.2.6 ES 25 - CS 6: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 346(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Handle substance within a predominantly closed system provided with extract ventilation., Restrict area of openings to equipment.

25.2.7 ES 25 - CS 7: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : General exposures (open systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.

25.2.8 ES 25 - CS 8: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Remarks : General exposures (open systems)
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Process Temperature : 80 °C
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 347(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : General exposures (open systems)
Elevated temperature
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Restrict area of openings to equipment., Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

25.2.9 ES 25 - CS 9: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

- Remarks : General exposures (open systems)
Elevated temperature
Aerosol

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid
- Vapour pressure : 6020 Pa
- Process Temperature : 80 °C
- Remarks : Elevated temperature

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : General exposures (open systems)
Elevated temperature
Aerosol
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Restrict area of openings to equipment., Provide extract ventilation to points where emissions occur.

25.2.10 ES 25 - CS 10: Control of worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

PRAEPAGEN TQ

Page 348(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Remanufacture of reject articles

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Remanufacture of reject articles
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Drain down system prior to equipment break-in or maintenance., Wear suitable gloves tested to EN374.

25.2.11 ES 25 - CS 11: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Equipment maintenance

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Equipment maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 349(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain down system prior to equipment break-in or maintenance., Transfer via enclosed lines., Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

25.2.12 ES 25 - CS 12: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

25.3. ES 25 Exposure estimation and reference to its source

25.3.2 ES 25 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type | Exposure estimate | RCR |
|----------------------------|-------------------|-----|
|----------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 350(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| of effects | | |
|-----------------|--------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Bulk transfers, Closed systems) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Closed systems) | < 0,01 |
| combined routes | Bulk transfers, Closed systems | 0,05 |

25.3.3 ES 25 - CS 3: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Drum/batch transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers) | 0,01 |
| combined routes | Drum/batch transfers | 0,25 |

25.3.4 ES 25 - CS 4: Worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Pelletizing, Closed systems) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Pelletizing, Closed systems) | 0,01 |
| combined routes | Pelletizing, Closed systems | 0,25 |

25.3.5 ES 25 - CS 5: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,02 |
| combined routes | Filling of equipment from drums or containers | 0,26 |

25.3.6 ES 25 - CS 6: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------|-----|
|---------------------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 351(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,05 |

25.3.7 ES 25 - CS 7: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures (open systems)) | 0,10 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems)) | 0,01 |
| combined routes | General exposures (open systems) | 0,11 |

25.3.8 ES 25 - CS 8: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, General exposures (open systems), Elevated temperature) | 0,49 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems), Elevated temperature) | 0,01 |
| combined routes | General exposures (open systems), Elevated temperature | 0,50 |

25.3.9 ES 25 - CS 9: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, General exposures (open systems), Elevated temperature, Aerosol) | 0,12 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems), Elevated temperature, Aerosol) | 0,01 |
| combined routes | General exposures (open systems), Elevated temperature, Aerosol | 0,13 |

25.3.10 ES 25 - CS 10: Worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

PRAEPAGEN TQ

Page 352(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Remanufacture of reject articles) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Remanufacture of reject articles) | 0,01 |
| combined routes | Remanufacture of reject articles | 0,25 |

25.3.11 ES 25 - CS 11: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Equipment maintenance) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Equipment maintenance) | 0,02 |
| combined routes | Equipment maintenance | 0,26 |

25.3.12 ES 25 - CS 12: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

25.4. ES 25 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

26. ES 26: Professional use; Use in functional fluids

26.1. Title section

PRAEPAGEN TQ

Page 353(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Environment | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| CS1: Professional use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) | ERC9a, ERC9b |
| Workers | |
| CS2: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS3: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS4: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS5: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC1, PROC2, PROC3 |
| CS6: Professional use (Use of functional fluids in small devices) | PROC20 |
| CS7: Professional use (Use of functional fluids in small devices) | PROC20 |
| CS8: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS9: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS10: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

26.2. ES 26 Conditions of use affecting exposure

26.2.1 ES 26 - CS 1: Control of environmental exposure: Professional use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) (ERC9a, ERC9b)

Remarks : No exposure assessment presented for the environment.

26.2.2 ES 26 - CS 2: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Drum/batch transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

PRAEPAGEN TQ

Page 354(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374., Use drum pumps., Avoid spillage when withdrawing pump.

26.2.3 ES 26 - CS 3: Control of worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Remarks : Transfer from/pouring from containers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Transfer from/pouring from containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Avoid spillage when withdrawing pump.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374., Use drum pumps.

26.2.4 ES 26 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Remarks : Filling of equipment from drums or containers

PRAEPAGEN TQ

Page 355(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Filling of equipment from drums or containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374., Use drum pumps., Avoid spillage when withdrawing pump.

26.2.5 ES 26 - CS 5: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 356(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Handle substance within a predominantly closed system provided with extract ventilation., Restrict area of openings to equipment.

26.2.6 ES 26 - CS 6: Control of worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

Remarks : General exposures (open systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Handle substance within a predominantly closed system provided with extract ventilation., Restrict area of openings to equipment.

26.2.7 ES 26 - CS 7: Control of worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

Remarks : General exposures (open systems)
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Process Temperature : 80 °C
Remarks : Elevated temperature

PRAEPAGEN TQ

Page 357(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Elevated temperature
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Restrict area of openings to equipment., Provide extract ventilation to points where emissions occur.

26.2.8 ES 26 - CS 8: Control of worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Remarks : Remanufacture of reject articles

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Remanufacture of reject articles
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

26.2.9 ES 26 - CS 9: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Equipment maintenance

PRAEPAGEN TQ

Page 358(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Equipment maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374., Drain down system prior to equipment break-in or maintenance.

26.2.10 ES 26 - CS 10: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 359(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

26.3. ES 26 Exposure estimation and reference to its source

26.3.2 ES 26 - CS 2: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Drum/batch transfers) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers) | 0,02 |
| combined routes | Drum/batch transfers | 0,51 |

26.3.3 ES 26 - CS 3: Worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Transfer from/pouring from containers) | 0,49 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Transfer from/pouring from containers) | 0,01 |
| combined routes | Transfer from/pouring from containers | 0,50 |

26.3.4 ES 26 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,49 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Filling of equipment from drums or containers) | 0,01 |
| combined routes | Filling of equipment from drums or containers | 0,50 |

26.3.5 ES 26 - CS 5: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

PRAEPAGEN TQ

Page 360(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,12 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,12 |

26.3.6 ES 26 - CS 6: Worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, General exposures (open systems)) | 0,10 |
| Dermal | 1,71 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems)) | < 0,01 |
| combined routes | General exposures (open systems) | 0,10 |

26.3.7 ES 26 - CS 7: Worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, General exposures (open systems), Elevated temperature) | 0,25 |
| Dermal | 1,71 mg/kg bw/day (ECETOC TRA worker V3, General exposures (open systems), Elevated temperature) | < 0,01 |
| combined routes | General exposures (open systems), Elevated temperature | 0,25 |

26.3.8 ES 26 - CS 8: Worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Remanufacture of reject articles) | 0,49 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Remanufacture of reject articles) | 0,01 |
| combined routes | Remanufacture of reject articles | 0,50 |

26.3.9 ES 26 - CS 9: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

PRAEPAGEN TQ

Page 361(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Equipment maintenance) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Equipment maintenance) | 0,02 |
| combined routes | Equipment maintenance | 0,51 |

26.3.10 ES 26 - CS 10: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Storage) | 0,10 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,10 |

26.4. ES 26 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

27. ES 27: Consumer use; Fuels

27.1. Title section

| | | |
|---------------------------------------------------------------------------------------------------------------|--------------|--|
| Heat transfer fluids (PC16) | | |
| Hydraulic fluids (PC17) | | |
| Environment | | |
| CS1: Consumer use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) | ERC9a, ERC9b | |
| Consumer | | |
| CS2: Consumer use (Heat transfer fluids) | PC16 | |
| CS3: Consumer use (Hydraulic fluids) | PC17 | |

27.2. ES 27 Conditions of use affecting exposure

PRAEPAGEN TQ

Page 362(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

27.2.1 ES 27 - CS 1: Control of environmental exposure: Consumer use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) (ERC9a, ERC9b)

Remarks : No exposure assessment presented for the environment.

27.2.2 ES 27 - CS 2: Control of consumer exposure: Consumer use (Heat transfer fluids) (PC16)

Remarks : Liquids

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 2200 grams

Frequency and duration of use

Exposure duration : 0,17 h

Frequency of use : 1 uses per day

Frequency of use : 4 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 468,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³

Ventilation rate per hour : 1,5

Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

27.2.3 ES 27 - CS 3: Control of consumer exposure: Consumer use (Hydraulic fluids) (PC17)

Remarks : Liquids

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Remarks : Covers use at ambient temperatures.

PRAEPAGEN TQ

Page 363(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Amount used

Amount per use : 2200 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 4 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 468,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

27.3. ES 27 Exposure estimation and reference to its source

27.3.2 ES 27 - CS 2: Consumer exposure: Consumer use (Heat transfer fluids) (PC16)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------|--------|
| Dermal | 78,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid) | 0,24 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid) | < 0,01 |
| inhalative | 3,98 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Liquid) | 0,04 |
| combined routes | Chronic effects, Liquid | 0,29 |

27.3.3 ES 27 - CS 3: Consumer exposure: Consumer use (Hydraulic fluids) (PC17)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------|--------|
| Dermal | 78,00 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid) | 0,24 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Liquid) | < 0,01 |
| inhalative | 3,98 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Liquid) | 0,04 |
| combined routes | Chronic effects, Liquid | 0,29 |

PRAEPAGEN TQ

Page 364(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

27.4. ES 27 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

28. ES 28: Professional use; Anti-freeze and de-icing products

28.1. Title section

| Environment | | |
|-------------|---------------------------------------------------------------------------------------------------------------|--------|
| CS1: | Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8d |
| Workers | | |
| CS2: | Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS3: | Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: | Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS5: | Professional use (Non-industrial spraying) | PROC11 |
| CS6: | Professional use (Non-industrial spraying) | PROC11 |
| CS7: | Professional use (Roller application or brushing) | PROC10 |

28.2. ES 28 Conditions of use affecting exposure

28.2.1 ES 28 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8d)

Remarks : No exposure assessment presented for the environment.

28.2.2 ES 28 - CS 2: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 365(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

28.2.3 ES 28 - CS 3: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Material transfers
Concentrated solution

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Material transfers
Concentrated solution
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

PRAEPAGEN TQ

Page 366(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

28.2.4 ES 28 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Material transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Material transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

28.2.5 ES 28 - CS 5: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying/ fogging by machine application
Elevated temperature
Product sampling
Industrial use of quality control

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Process Temperature : 60 °C
Remarks : Elevated temperature

Frequency and duration of use

Exposure duration : 1 h

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

PRAEPAGEN TQ

Page 367(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Product sampling
Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Spraying/ fogging by machine application
Elevated temperature
Product sampling
Industrial use of quality control
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Stay upwind/keep distance from source.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure spraying away from persons., Wear suitable gloves tested to EN374.

28.2.6 ES 28 - CS 6: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying/ fogging by machine application
Application

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Spraying/ fogging by machine application
Application
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Stay upwind/keep distance from source.
Ensure operation is undertaken outdoors.
Ensure spraying away from persons.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

28.2.7 ES 28 - CS 7: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

PRAEPAGEN TQ

Page 368(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Type of Application (Use) : Operation of equipment containing engine oils and similar
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

28.3. ES 28 Exposure estimation and reference to its source

28.3.2 ES 28 - CS 2: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,2 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | < 0,1 |
| combined routes | Bulk transfers | 0,3 |

28.3.3 ES 28 - CS 3: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Material transfers, Concentrated solution) | 0,2 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Material) | < 0,1 |

PRAEPAGEN TQ

Page 369(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-------------------------------------------|-----|
| | transfers, Concentrated solution) | |
| combined routes | Material transfers, Concentrated solution | 0,3 |

28.3.4 ES 28 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------|-------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Material transfers) | 0,2 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Material transfers) | < 0,1 |
| combined routes | Material transfers | 0,3 |

28.3.5 ES 28 - CS 5: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------|-----|
| inhalative | 100 ppm (ECETOC TRA worker V3, Spraying/ fogging by machine application, Elevated temperature) | 0,5 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying/ fogging by machine application, Elevated temperature) | 0,1 |
| combined routes | Spraying/ fogging by machine application, Elevated temperature | 0,6 |

28.3.6 ES 28 - CS 6: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------------------|-----|
| inhalative | 70 ppm (ECETOC TRA worker V3, Spraying/ fogging by machine application, Application) | 0,3 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying/ fogging by machine application, Application) | 0,1 |
| combined routes | Spraying/ fogging by machine application, Application | 0,5 |

28.3.7 ES 28 - CS 7: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,1 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |

PRAEPAGEN TQ

Page 370(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|--|-----|
| combined routes | | 0,2 |
|-----------------|--|-----|

28.4. ES 28 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

29. ES 29: Consumer use; Anti-freeze and de-icing products

29.1. Title section

| | |
|----------------------------------------------------------------------------------------------------------------|-------|
| Anti-freeze and de-icing products (PC4) | |
| Environment | |
| CS1: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8d |
| Consumer | |
| CS2: Consumer use (Anti-freeze and de-icing products) | PC4 |
| CS3: Consumer use (Anti-freeze and de-icing products) | PC4 |
| CS4: Consumer use (Anti-freeze and de-icing products) | PC4 |

29.2. ES 29 Conditions of use affecting exposure

29.2.1 ES 29 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8d)

Remarks : No exposure assessment presented for the environment.

29.2.2 ES 29 - CS 2: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : Washing car window

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %

Physical Form (at time of use) : Liquid

PRAEPAGEN TQ

Page 371(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 0,5 grams

Frequency and duration of use

Exposure duration : 0,02 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 428,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

29.2.3 ES 29 - CS 3: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : Pouring into radiator

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 2000 grams

Frequency and duration of use

Exposure duration : 0,17 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 428,00 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

PRAEPAGEN TQ

Page 372(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

29.2.4 ES 29 - CS 4: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : Lock de-icer

Product characteristics

Concentration of the Substance in Mixture/Article : <= 50 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amount per use : 4 grams

Frequency and duration of use

Exposure duration : 0,25 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 214,40 cm²

Other given operational conditions affecting consumers exposure

Room size : 34 m³
Ventilation rate per hour : 1,5
Remarks : Covers use in a one car garage (>34 m³) under typical ventilation.

29.3. ES 29 Exposure estimation and reference to its source

29.3.2 ES 29 - CS 2: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Washing car window) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Washing car window) | < 0,01 |
| inhalative | 0,1 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Washing car window) | < 0,01 |
| combined routes | Chronic effects, Washing car window | < 0,01 |

PRAEPAGEN TQ

Page 373(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

29.3.3 ES 29 - CS 3: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------------------|--------|
| Dermal | 14,27 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Pouring into radiator) | 0,04 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Pouring into radiator) | < 0,01 |
| inhalative | 3,61 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Pouring into radiator) | 0,04 |
| combined routes | Chronic effects, Pouring into radiator | 0,09 |

29.3.4 ES 29 - CS 4: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| Dermal | 17,87 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Lock de-icer) | 0,06 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects, Lock de-icer) | < 0,01 |
| inhalative | 0,51 mg/m ³ (ECETOC TRA worker V3, Chronic effects, Lock de-icer) | 0,01 |
| combined routes | Chronic effects, Lock de-icer | 0,06 |

29.4. ES 29 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

30. ES 30: Professional use; Use in road and construction products

30.1. Title section

| Environment |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CS1: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor)) |

ERC8d, ERC8f

PRAEPAGEN TQ

Page 374(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Workers | |
|-------------------------------------------------------------------------------------------------------------|--------|
| CS2: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS3: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS5: Professional use (Roller application or brushing) | PROC10 |
| CS6: Professional use (Non-industrial spraying) | PROC11 |
| CS7: Professional use (Non-industrial spraying) | PROC11 |
| CS8: Professional use (Treatment of articles by dipping and pouring) | PROC13 |
| CS9: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |

30.2. ES 30 Conditions of use affecting exposure

30.2.1 ES 30 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor)) (ERC8d, ERC8f)

Remarks : No exposure assessment presented for the environment.

30.2.2 ES 30 - CS 2: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Drum/batch transfers
Non-dedicated facility

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Non-dedicated facility

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination

PRAEPAGEN TQ

Page 375(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Technical conditions and measures : on hands.
: No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors.

30.2.3 ES 30 - CS 3: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Drum/batch transfers
Dedicated facility

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Dedicated facility

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Dedicated equipment, Clear transfer lines prior to de-coupling., Wear suitable gloves tested to EN374.

30.2.4 ES 30 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Drum/batch transfers
Dedicated facility
Elevated temperature

Product characteristics

Concentration of the Substance in : <= 100 %

PRAEPAGEN TQ

Page 376(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Mixture/Article

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Dedicated facility

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Dedicated equipment
Clear transfer lines prior to de-coupling.

Personal protective measures : Use suitable eye protection.
Wear a respirator conforming to EN140.

Effectiveness (of a measure) : 90 %

30.2.5 ES 30 - CS 5: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Rolling, Brushing

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

PRAEPAGEN TQ

Page 377(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice : Wear a respirator conforming to EN140., Wear suitable gloves tested to EN374., Ensure operation is undertaken outdoors., Use long handled brushes and rollers.

30.2.6 ES 30 - CS 6: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying/ fogging by machine application
Elevated temperature

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying/ fogging by machine application
Elevated temperature

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Stay upwind/keep distance from source.

Technical conditions and measures : Automate activity where possible.

Personal protective measures : Use suitable eye protection.
Wear a respirator conforming to EN140.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Ensure operatives are trained to minimise exposures., Avoid carrying out activities involving exposure for more than 1 hour per day.

30.2.7 ES 30 - CS 7: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Remarks : Spraying/ fogging by machine application

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

PRAEPAGEN TQ

Page 378(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Spraying/ fogging by machine application
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Stay upwind/keep distance from source.
Technical conditions and measures : Automate activity where possible.
Personal protective measures : Use suitable eye protection.
Wear a respirator conforming to EN140.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Ensure operatives are trained to minimise exposures., Avoid carrying out activities involving exposure for more than 1 hour per day.

30.2.8 ES 30 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Dipping, immersion and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 379(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear a respirator conforming to EN140., Wear suitable gloves tested to EN374., Ensure operation is undertaken outdoors., Use long handled brushes and rollers.

30.2.9 ES 30 - CS 9: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Equipment cleaning and maintenance

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Equipment cleaning and maintenance

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented

Avoid direct eye contact with product, also via contamination on hands.

Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure operation is undertaken outdoors., Wear suitable gloves tested to EN374., Avoid carrying out activities involving exposure for more than 1 hour per day.

30.3. ES 30 Exposure estimation and reference to its source

30.3.2 ES 30 - CS 2: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------|-----|
|---------------------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 380(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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|-----------------|-----------------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Drum/batch transfers, Non-dedicated facility) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers, Non-dedicated facility) | 0,02 |
| combined routes | Drum/batch transfers, Non-dedicated facility | 0,51 |

30.3.3 ES 30 - CS 3: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Drum/batch transfers, Dedicated facility) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers, Dedicated facility) | 0,01 |
| combined routes | Drum/batch transfers, Dedicated facility | 0,25 |

30.3.4 ES 30 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Drum/batch transfers, Dedicated facility, Elevated temperature) | 0,12 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers, Dedicated facility, Elevated temperature) | 0,01 |
| combined routes | Drum/batch transfers, Dedicated facility, Elevated temperature | 0,13 |

30.3.5 ES 30 - CS 5: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | 0,03 |
| combined routes | | 0,52 |

30.3.6 ES 30 - CS 6: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Spraying/ fogging by | 0,25 |

PRAEPAGEN TQ

Page 381(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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|-----------------|------------------------------------------------------------------------------------------------------------|------|
| | machine application, Elevated temperature) | |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying/ fogging by machine application, Elevated temperature) | 0,12 |
| combined routes | Spraying/ fogging by machine application, Elevated temperature | 0,37 |

30.3.7 ES 30 - CS 7: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Spraying/ fogging by machine application) | 0,25 |
| Dermal | 107,14 mg/kg bw/day (ECETOC TRA worker V3, Spraying/ fogging by machine application) | 0,12 |
| combined routes | Spraying/ fogging by machine application | 0,37 |

30.3.8 ES 30 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,51 |

30.3.9 ES 30 - CS 9: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Equipment cleaning and maintenance) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Equipment cleaning and maintenance) | 0,02 |
| combined routes | Equipment cleaning and maintenance | 0,51 |

30.4. ES 30 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

PRAEPAGEN TQ

Page 382(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

31. ES 31: Consumer use; Cosmetics, personal care products

31.1. Title section

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Perfumes, fragrances (PC28) | |
| Cosmetics, personal care products (PC39) | |
| Environment | |
| CS1: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |
| Consumer | |
| CS2: Consumer use (Perfumes, fragrances, Cosmetics, personal care products) | PC28, PC39 |

31.2. ES 31 Conditions of use affecting exposure

31.2.1 ES 31 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

31.2.2 ES 31 - CS 2: Control of consumer exposure: Consumer use (Perfumes, fragrances, Cosmetics, personal care products) (PC28, PC39)

Remarks : In accordance to the Article 14 (5b) of the REACH Regulation (EC) No 1907/2006, exposure estimation and risk characterisation for human health does not need to be performed for end uses in cosmetic products within the scope of Directive 76/768/EEC.

31.3. ES 31 Exposure estimation and reference to its source

PRAEPAGEN TQ

Page 383(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

31.4. ES 31 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

32. ES 32: Industrial use; Use in laboratories

32.1. Title section

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Environment | |
| CS1: Industrial use (Formulation into mixture, Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | ERC2, ERC4 |
| Workers | |
| CS2: Industrial use (Use as laboratory reagent) | PROC15 |
| CS3: Industrial use (Roller application or brushing) | PROC10 |

32.2. ES 32 Conditions of use affecting exposure

32.2.1 ES 32 - CS 1: Control of environmental exposure: Industrial use (Formulation into mixture, Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC2, ERC4)

Remarks : No exposure assessment presented for the environment.

32.2.2 ES 32 - CS 2: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Remarks : Avoid carrying out activities involving exposure for more than 4 hours per day.
General ventilation
Automated task

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

PRAEPAGEN TQ

Page 384(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Other operational conditions affecting workers exposure

Ventilation rate per hour : 10

Risk Management Measures

Type of Application (Use) : Laboratory activities
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Avoid carrying out activities involving exposure for more than 4 hours per day.
Technical conditions and measures : Automate activity where possible.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear a respirator conforming to EN140.

32.2.3 ES 32 - CS 3: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Remarks : Avoid carrying out activities involving exposure for more than 1 hour per day.
General ventilation

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Other operational conditions affecting workers exposure

Ventilation rate per hour : 10

Risk Management Measures

Type of Application (Use) : Cleaning
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Automate activity where possible.
Effectiveness (of a measure) : 66 %
Personal protective measures : Use suitable eye protection.
Wear suitable gloves tested to EN374.

PRAEPAGEN TQ

Page 385(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

32.3. ES 32 Exposure estimation and reference to its source

32.3.2 ES 32 - CS 2: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 6 ppm (ECETOC TRA worker V3, Avoid carrying out activities involving exposure for more than 4 hours per day., General ventilation, Automated task) | 0,60 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Avoid carrying out activities involving exposure for more than 4 hours per day., General ventilation, Automated task) | < 0,01 |
| combined routes | Avoid carrying out activities involving exposure for more than 4 hours per day., General ventilation, Automated task | 0,60 |

32.3.3 ES 32 - CS 3: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------|
| inhalative | 8,5 ppm (ECETOC TRA worker V3, Avoid carrying out activities involving exposure for more than 1 hour per day., General ventilation) | 0,85 |
| Dermal | 5,5 mg/kg bw/day (ECETOC TRA worker V3, Avoid carrying out activities involving exposure for more than 1 hour per day., General ventilation) | 0,01 |
| combined routes | Avoid carrying out activities involving exposure for more than 1 hour per day., General ventilation | 0,86 |

32.4. ES 32 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

33. ES 33: Professional use; Use as laboratory reagent

33.1. Title section

PRAEPAGEN TQ

Page 386(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|-------------------------------------------------------------------------------------------------------------------|--------|
| Environment | |
| CS1: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)) | ERC8a |
| Workers | |
| CS2: Professional use (Use as laboratory reagent) | PROC15 |
| CS3: Professional use (Roller application or brushing) | PROC10 |

33.2. ES 33 Conditions of use affecting exposure

33.2.1 ES 33 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)) (ERC8a)

Remarks : No exposure assessment presented for the environment.

33.2.2 ES 33 - CS 2: Control of worker exposure: Professional use (Use as laboratory reagent) (PROC15)

Remarks : Avoid carrying out activities involving exposure for more than 4 hours per day.
General ventilation
Automated task

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Other operational conditions affecting workers exposure

Ventilation rate per hour : 10

Risk Management Measures

Type of Application (Use) : Laboratory activities
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Avoid carrying out activities involving exposure for more than 4 hours per day.
Technical conditions and measures : Automate activity where possible.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or

PRAEPAGEN TQ

Page 387(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

equipment and provide extract ventilation at openings., Wear a respirator conforming to EN140.

33.2.3 ES 33 - CS 3: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Remarks : Avoid carrying out activities involving exposure for more than 1 hour per day.
General ventilation

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Other operational conditions affecting workers exposure

Ventilation rate per hour : 10

Risk Management Measures

Type of Application (Use) : Cleaning
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Automate activity where possible.
Effectiveness (of a measure) : 66 %
Personal protective measures : Use suitable eye protection.
Wear suitable gloves tested to EN374.

33.3. ES 33 Exposure estimation and reference to its source

33.3.2 ES 33 - CS 2: Worker exposure: Professional use (Use as laboratory reagent) (PROC15)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------|
| inhalative | 6 ppm (ECETOC TRA worker V3, Avoid carrying out activities involving exposure for more than 4 hours per day., General ventilation) | 0,60 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Avoid carrying out activities involving exposure for more than 4 | < 0,01 |

PRAEPAGEN TQ

Page 388(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|------------------------------------------------------------------------------------------------------|------|
| | hours per day., General ventilation) | |
| combined routes | Avoid carrying out activities involving exposure for more than 4 hours per day., General ventilation | 0,60 |

33.3.3 ES 33 - CS 3: Worker exposure: Professional use (Roller application or brushing) (PROC10)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------|
| inhalative | 8,5 ppm (ECETOC TRA worker V3, Avoid carrying out activities involving exposure for more than 1 hour per day., General ventilation) | 0,85 |
| Dermal | 5,5 mg/kg bw/day (ECETOC TRA worker V3, Avoid carrying out activities involving exposure for more than 1 hour per day., General ventilation) | 0,01 |
| combined routes | Avoid carrying out activities involving exposure for more than 1 hour per day., General ventilation | 0,86 |

33.4. ES 33 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

34. ES 34: Professional use; Use in explosives

34.1. Title section

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|
| Environment | | |
| CS1: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | | ERC8d |
| Workers | | |
| CS2: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | | PROC3 |
| CS3: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | | PROC8a |
| CS4: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | | PROC3 |
| CS5: Professional use (Mixing or blending in batch processes) | | PROC5 |
| CS6: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | | PROC8a |

PRAEPAGEN TQ

Page 389(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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| CS7: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS8: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS9: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS10: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

34.2. ES 34 Conditions of use affecting exposure

34.2.1 ES 34 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8d)

Remarks : No exposure assessment presented for the environment.

34.2.2 ES 34 - CS 2: Control of worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Remotely vent displaced vapours.
Technical conditions and measures : Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

34.2.3 ES 34 - CS 3: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

PRAEPAGEN TQ

Page 390(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Drum/batch transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Use drum pumps.

34.2.4 ES 34 - CS 4: Control of worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : Mixing operations

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Mixing operations
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 391(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Local exhaust ventilation, or, Ensure operation is undertaken outdoors.

34.2.5 ES 34 - CS 5: Control of worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Mixing operations (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

34.2.6 ES 34 - CS 6: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Material transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Material transfers
Organisational measures to prevent /limit releases, dispersion : Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 392(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

34.2.7 ES 34 - CS 7: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Remarks : Transfer from/pouring from containers
Non-dedicated facility

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Transfer from/pouring from containers
Non-dedicated facility
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Avoid spillage when withdrawing pump.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Use drum pumps.

34.2.8 ES 34 - CS 8: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

PRAEPAGEN TQ

Page 393(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Operation of equipment containing engine oils and similar
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear suitable gloves tested to EN374., Drain down system prior to equipment break-in or maintenance., Retain drain downs in sealed storage pending disposal or for subsequent recycle.

34.2.9 ES 34 - CS 9: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

- Remarks : Equipment maintenance

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Exposure duration : 4 h

Risk Management Measures

- Type of Application (Use) : Equipment maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Drain down system prior to equipment break-in or maintenance., Retain drain downs in sealed storage pending disposal or for subsequent recycle.

34.2.10 ES 34 - CS 10: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

PRAEPAGEN TQ

Page 394(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Personal protective measures : Use suitable eye protection.

34.3. ES 34 Exposure estimation and reference to its source

34.3.2 ES 34 - CS 2: Worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | < 0,01 |
| combined routes | Bulk transfers | 0,12 |

34.3.3 ES 34 - CS 3: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Drum/batch transfers) | 0,12 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Drum/batch transfers) | 0,02 |
| combined routes | Drum/batch transfers | 0,14 |

PRAEPAGEN TQ

Page 395(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

34.3.4 ES 34 - CS 4: Worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Mixing operations) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Mixing operations) | < 0,01 |
| combined routes | Mixing operations | 0,12 |

34.3.5 ES 34 - CS 5: Worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,51 |

34.3.6 ES 34 - CS 6: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3, Material transfers) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Material transfers) | 0,02 |
| combined routes | Material transfers | 0,51 |

34.3.7 ES 34 - CS 7: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Transfer from/pouring from containers, Non-dedicated facility) | 0,12 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Transfer from/pouring from containers, Non-dedicated facility) | 0,02 |
| combined routes | Transfer from/pouring from containers, Non-dedicated facility | 0,14 |

34.3.8 ES 34 - CS 8: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

PRAEPAGEN TQ

Page 396(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | 0,05 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,06 |

34.3.9 ES 34 - CS 9: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Equipment maintenance) | 0,12 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3, Equipment maintenance) | 0,02 |
| combined routes | Equipment maintenance | 0,14 |

34.3.10 ES 34 - CS 10: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Storage) | 0,10 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,10 |

34.4. ES 34 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

35. ES 35: Industrial use; Use in rubber production and processing

35.1. Title section

PRAEPAGEN TQ

Page 397(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Environment | | |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| CS1: | Industrial use (Manufacture of the substance, Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)) | ERC1, ERC4, ERC6d |
| Workers | | |
| CS2: | Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |
| CS3: | Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: | Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |
| CS5: | Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS6: | Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) | PROC3, PROC4 |
| CS7: | Industrial use (Mixing or blending in batch processes) | PROC5 |
| CS8: | Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC8b, PROC9 |
| CS9: | Industrial use (Calendering operations) | PROC6 |
| CS10: | Industrial use (Calendering operations) | PROC6 |
| CS11: | Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) | PROC14 |
| CS12: | Industrial use (Industrial spraying) | PROC7 |
| CS13: | Industrial use (Calendering operations) | PROC6 |
| CS14: | Industrial use (Calendering operations) | PROC6 |
| CS15: | Industrial use (Calendering operations) | PROC6 |
| CS16: | Industrial use (Calendering operations) | PROC6 |
| CS17: | Industrial use (Calendering operations) | PROC6 |
| CS18: | Industrial use (Treatment of articles by dipping and pouring) | PROC13 |
| CS19: | Industrial use (Low energy manipulation and handling of substances bound in/on materials and/or articles) | PROC21 |
| CS20: | Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS21: | Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

35.2. ES 35 Conditions of use affecting exposure

PRAEPAGEN TQ

Page 398(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

35.2.1 ES 35 - CS 1: Control of environmental exposure: Industrial use (Manufacture of the substance, Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)) (ERC1, ERC4, ERC6d)

Remarks : No exposure assessment presented for the environment.

35.2.2 ES 35 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Material transfers
Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Material transfers
Closed systems

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to material transfer points and other openings., Remotely vent displaced vapours.

35.2.3 ES 35 - CS 3: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Material transfers

Product characteristics

PRAEPAGEN TQ

Page 399(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Material transfers

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Handle substance within a closed system.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

35.2.4 ES 35 - CS 4: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Bulk weighing

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk weighing

Organisational measures to : Assumes a good basic standard of occupational hygiene is

PRAEPAGEN TQ

Page 400(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

prevent /limit releases, dispersion and exposure : implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

35.2.5 ES 35 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Remarks : Small scale weighing

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Small scale weighing

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374., Carefully handle the substance to minimise releases.

35.2.6 ES 35 - CS 6: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

PRAEPAGEN TQ

Page 401(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Additive premixing

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented

Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374., Carefully handle the substance to minimise releases.

35.2.7 ES 35 - CS 7: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Additive premixing

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented

Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

PRAEPAGEN TQ

Page 402(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

measures

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374., Carefully handle the substance to minimise releases.

35.2.8 ES 35 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Remarks : Material transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Material transfers

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

35.2.9 ES 35 - CS 9: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Remarks : Calendering (including Banburys)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Elevated temperature

PRAEPAGEN TQ

Page 403(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Calendering (including Banburys)
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Minimise exposure by extracted full enclosure for the operation or equipment.
Effectiveness (of a measure) : 90 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Provide enhanced general ventilation by mechanical means.

35.2.10 ES 35 - CS 10: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Remarks : Calendering (including Banburys)
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Calendering (including Banburys)
Aerosol
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Use dry break couplings for material transfer., Wear suitable

PRAEPAGEN TQ

Page 404(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

gloves tested to EN374., Provide enhanced general ventilation by mechanical means.

35.2.11 ES 35 - CS 11: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Pressing uncured rubber blanks

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide enhanced general ventilation by mechanical means.,
Wear suitable gloves tested to EN374.

35.2.12 ES 35 - CS 12: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

PRAEPAGEN TQ

Page 405(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of Application (Use) | : Tyre build up |
| Organisational measures to prevent /limit releases, dispersion and exposure | : Assumes a good basic standard of occupational hygiene is implemented Avoid direct eye contact with product, also via contamination on hands. |
| Technical conditions and measures | : Carry out in a vented booth or extracted enclosure. |
| Effectiveness (of a measure) | : 90 % |
| Personal protective measures | : Use suitable eye protection. |

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Ensure operatives are trained to minimise exposures.

35.2.13 ES 35 - CS 13: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Remarks : Vulcanisation
Automated task
Semi-automated task

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

| | |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of Application (Use) | : Vulcanisation Automated task Semi-automated task |
| Organisational measures to prevent /limit releases, dispersion and exposure | : Assumes a good basic standard of occupational hygiene is implemented Avoid direct eye contact with product, also via contamination on hands. |
| Technical conditions and measures | : Minimise exposure by extracted full enclosure for the operation or equipment. |
| Effectiveness (of a measure) | : 90 % |
| Personal protective measures | : Use suitable eye protection. |

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

35.2.14 ES 35 - CS 14: Control of worker exposure: Industrial use (Calendering

PRAEPAGEN TQ

Page 406(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

operations) (PROC6)

Remarks : Vulcanisation
Aerosol
Automated task
Semi-automated task

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Vulcanisation
Aerosol
Automated task
Semi-automated task

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to material transfer points and other openings., Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

35.2.15 ES 35 - CS 15: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Remarks : Vulcanisation
Manual

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Elevated temperature

PRAEPAGEN TQ

Page 407(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Vulcanisation
Manual
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Minimise exposure by extracted full enclosure for the operation or equipment.
Effectiveness (of a measure) : 90 %
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Provide enhanced general ventilation by mechanical means.

35.2.16 ES 35 - CS 16: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Remarks : Vulcanisation
Aerosol
Manual

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Vulcanisation
Aerosol
Manual
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Provide extract ventilation to material transfer points and other openings.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 408(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

35.2.17 ES 35 - CS 17: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Remarks : Cooling cured articles

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Cooling cured articles

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : Minimise exposure by extracted full enclosure for the operation or equipment.

Effectiveness (of a measure) : 90 %

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

35.2.18 ES 35 - CS 18: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

PRAEPAGEN TQ

Page 409(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Production of articles by dipping and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

35.2.19 ES 35 - CS 19: Control of worker exposure: Industrial use (Low energy manipulation and handling of substances bound in/on materials and/or articles) (PROC21)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Vapour pressure : 5 - 100 hPa
Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Finishing operations
Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

35.2.20 ES 35 - CS 20: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

PRAEPAGEN TQ

Page 410(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Equipment maintenance

Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented

Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain or remove substance from equipment prior to break-in or maintenance., Wear suitable gloves tested to EN374.

35.2.21 ES 35 - CS 21: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Vapour pressure : 5 - 100 hPa

Remarks : Assumes use at not more than 20°C above ambient temperature.

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

PRAEPAGEN TQ

Page 411(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Type of Application (Use) : Storage
 Organisational measures to prevent /limit releases, dispersion and exposure : Assumes a good basic standard of occupational hygiene is implemented
 Avoid direct eye contact with product, also via contamination on hands.
 Store substance within a closed system.
 Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

35.3. ES 35 Exposure estimation and reference to its source

35.3.2 ES 35 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Material transfers, Closed systems) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Material transfers, Closed systems) | < 0,01 |
| combined routes | Material transfers, Closed systems | 0,05 |

35.3.3 ES 35 - CS 3: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Material transfers) | 0,12 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Material transfers) | 0,01 |
| combined routes | Material transfers | 0,13 |

35.3.4 ES 35 - CS 4: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

PRAEPAGEN TQ

Page 412(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Bulk weighing) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Bulk weighing) | < 0,01 |
| combined routes | Bulk weighing | 0,05 |

35.3.5 ES 35 - CS 5: Worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Small scale weighing) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Small scale weighing) | 0,01 |
| combined routes | Small scale weighing | 0,25 |

35.3.6 ES 35 - CS 6: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

35.3.7 ES 35 - CS 7: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

35.3.8 ES 35 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Material transfers) | 0,25 |

PRAEPAGEN TQ

Page 413(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|--------------------------------------------------------------|------|
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Material transfers) | 0,01 |
| combined routes | Material transfers | 0,25 |

35.3.9 ES 35 - CS 9: Worker exposure: Industrial use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Calendering (including Banburys)) | 0,12 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Calendering (including Banburys)) | 0,03 |
| combined routes | Calendering (including Banburys) | 0,15 |

35.3.10 ES 35 - CS 10: Worker exposure: Industrial use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Calendering (including Banburys), Aerosol) | 0,12 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Calendering (including Banburys), Aerosol) | 0,03 |
| combined routes | Calendering (including Banburys), Aerosol | 0,15 |

35.3.11 ES 35 - CS 11: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 3,43 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,25 |

35.3.12 ES 35 - CS 12: Worker exposure: Industrial use (Industrial spraying) (PROC7)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 42,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,05 |
| combined routes | | 0,17 |

35.3.13 ES 35 - CS 13: Worker exposure: Industrial use (Calendering operations)

PRAEPAGEN TQ

Page 414(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

(PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Vulcanisation, Automated task, Semi-automated task) | 0,12 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Vulcanisation, Automated task, Semi-automated task) | < 0,01 |
| combined routes | Vulcanisation, Automated task, Semi-automated task | 0,12 |

35.3.14 ES 35 - CS 14: Worker exposure: Industrial use (Calendering operations)

(PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Vulcanisation, Aerosol, Automated task, Semi-automated task) | 0,12 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Vulcanisation, Aerosol, Automated task, Semi-automated task) | < 0,01 |
| combined routes | Vulcanisation, Aerosol, Automated task, Semi-automated task | 0,12 |

35.3.15 ES 35 - CS 15: Worker exposure: Industrial use (Calendering operations)

(PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Vulcanisation, Manual) | 0,12 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Vulcanisation, Manual) | 0,03 |
| combined routes | Vulcanisation, Manual | 0,15 |

35.3.16 ES 35 - CS 16: Worker exposure: Industrial use (Calendering operations)

(PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Vulcanisation, Aerosol, Manual) | 0,12 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Vulcanisation, Aerosol, Manual) | 0,03 |
| combined routes | Vulcanisation, Aerosol, Manual | 0,15 |

PRAEPAGEN TQ

Page 415(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

35.3.17 ES 35 - CS 17: Worker exposure: Industrial use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Cooling cured articles) | 0,12 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Cooling cured articles) | 0,03 |
| combined routes | Cooling cured articles | 0,15 |

35.3.18 ES 35 - CS 18: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

35.3.19 ES 35 - CS 19: Worker exposure: Industrial use (Low energy manipulation and handling of substances bound in/on materials and/or articles) (PROC21)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 2,83 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

35.3.20 ES 35 - CS 20: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

35.3.21 ES 35 - CS 21: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

PRAEPAGEN TQ

Page 416(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 0,14 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

35.4. ES 35 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

36. ES 36: Industrial use; Use in polymer processing

36.1. Title section

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------|
| Environment | | |
| CS1: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | | ERC4 |
| Workers | | |
| CS2: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | | PROC1, PROC2 |
| CS3: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | | PROC8b |
| CS4: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | | PROC1, PROC2 |
| CS5: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | | PROC9 |
| CS6: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) | | PROC3, PROC4 |
| CS7: Industrial use (Mixing or blending in batch processes) | | PROC5 |
| CS8: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | | PROC8b, PROC9 |
| CS9: Industrial use (Calendering operations) | | PROC6 |
| CS10: Industrial use (Calendering operations) | | PROC6 |
| CS11: Industrial use (Treatment of articles by dipping and pouring) | | PROC13 |

PRAEPAGEN TQ

Page 417(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

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| CS12: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) | PROC14 |
| CS13: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) | PROC14 |
| CS14: Industrial use (Low energy manipulation and handling of substances bound in/on materials and/or articles) | PROC21 |
| CS15: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS16: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

36.2. ES 36 Conditions of use affecting exposure

36.2.1 ES 36 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : No exposure assessment presented for the environment.

36.2.2 ES 36 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Bulk transfers
Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Closed systems

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

PRAEPAGEN TQ

Page 418(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide extract ventilation to material transfer points and other openings., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

36.2.3 ES 36 - CS 3: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

36.2.4 ES 36 - CS 4: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Bulk weighing

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

PRAEPAGEN TQ

Page 419(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk weighing
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

36.2.5 ES 36 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Remarks : Small scale weighing

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Small scale weighing
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Carefully handle the substance to minimise releases.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

36.2.6 ES 36 - CS 6: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

PRAEPAGEN TQ

Page 420(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Additive premixing
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Carefully handle the substance to minimise releases.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

36.2.7 ES 36 - CS 7: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Additive premixing
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Carefully handle the substance to minimise releases.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

36.2.8 ES 36 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

PRAEPAGEN TQ

Page 421(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Transfer via enclosed lines.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Ensure material transfers are under containment or extract ventilation.

36.2.9 ES 36 - CS 9: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Remarks : Calendering (including Banburys)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Calendering (including Banburys)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.

PRAEPAGEN TQ

Page 422(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

36.2.10 ES 36 - CS 10: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Remarks : Calendering (including Banburys)
Aerosol

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Elevated temperature

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Calendering (including Banburys)
Aerosol

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.

Technical conditions and measures : No specific measures identified.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

36.2.11 ES 36 - CS 11: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 423(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Production of articles by dipping and pouring
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

36.2.12 ES 36 - CS 12: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

- Remarks : Tabletting, compression, extrusion, pelettisation, granulation

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Tabletting, compression, extrusion, pelettisation, granulation
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

36.2.13 ES 36 - CS 13: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

- Remarks : Injection moulding of articles

Product characteristics

- Concentration of the Substance in : <= 100 %

PRAEPAGEN TQ

Page 424(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Mixture/Article

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Injection moulding of articles
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Wear suitable gloves tested to EN374.

36.2.14 ES 36 - CS 14: Control of worker exposure: Industrial use (Low energy manipulation and handling of substances bound in/on materials and/or articles) (PROC21)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Finishing operations
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

36.2.15 ES 36 - CS 15: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

PRAEPAGEN TQ

Page 425(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Equipment maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Clear up spills immediately and dispose of waste safely.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain or remove substance from equipment prior to break-in or maintenance., Wear suitable gloves tested to EN374.

36.2.16 ES 36 - CS 16: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

PRAEPAGEN TQ

Page 426(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

36.3. ES 36 Exposure estimation and reference to its source

36.3.2 ES 36 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Bulk transfers, Closed systems) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Closed systems) | < 0,01 |
| combined routes | Bulk transfers, Closed systems | 0,05 |

36.3.3 ES 36 - CS 3: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | 0,01 |
| combined routes | Bulk transfers | 0,25 |

36.3.4 ES 36 - CS 4: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Bulk weighing) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Bulk weighing) | < 0,01 |
| combined routes | Bulk weighing | 0,05 |

36.3.5 ES 36 - CS 5: Worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

PRAEPAGEN TQ

Page 427(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Small scale weighing) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Small scale weighing) | 0,01 |
| combined routes | Small scale weighing | 0,25 |

36.3.6 ES 36 - CS 6: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,13 |

36.3.7 ES 36 - CS 7: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

36.3.8 ES 36 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | 0,01 |
| combined routes | Bulk transfers | 0,25 |

36.3.9 ES 36 - CS 9: Worker exposure: Industrial use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------|-----|
|---------------------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 428(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|-----------------------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Calendering (including Banburys)) | 0,25 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Calendering (including Banburys)) | 0,03 |
| combined routes | Calendering (including Banburys) | 0,28 |

36.3.10 ES 36 - CS 10: Worker exposure: Industrial use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------------------------------------------------------|------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Calendering (including Banburys), Aerosol) | 0,12 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3, Calendering (including Banburys), Aerosol) | 0,03 |
| combined routes | Calendering (including Banburys), Aerosol | 0,15 |

36.3.11 ES 36 - CS 11: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

36.3.12 ES 36 - CS 12: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Tabletting, compression, extrusion, pelettisation, granulation) | 0,25 |
| Dermal | 3,43 mg/kg bw/day (ECETOC TRA worker V3, Tabletting, compression, extrusion, pelettisation, granulation) | < 0,01 |
| combined routes | Tabletting, compression, extrusion, pelettisation, granulation | 0,25 |

36.3.13 ES 36 - CS 13: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3, Injection moulding of articles) | 0,25 |

PRAEPAGEN TQ

Page 429(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|--------------------------------------------------------------------------|--------|
| Dermal | 3,43 mg/kg bw/day (ECETOC TRA worker V3, Injection moulding of articles) | < 0,01 |
| combined routes | Injection moulding of articles | 0,25 |

36.3.14 ES 36 - CS 14: Worker exposure: Industrial use (Low energy manipulation and handling of substances bound in/on materials and/or articles) (PROC21)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 2,83 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

36.3.15 ES 36 - CS 15: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

36.3.16 ES 36 - CS 16: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Storage) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,05 |

36.4. ES 36 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

PRAEPAGEN TQ

Page 430(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

37. ES 37: Professional use; Use in polymer processing

37.1. Title section

| Environment | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| CS1: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) | ERC8a, ERC8d |
| Workers | |
| CS2: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |
| CS3: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: Professional use (Calendering operations) | PROC6 |
| CS5: Professional use (Tabletting, compression, extrusion, pelettisation, granulation) | PROC14 |
| CS6: Professional use (Low energy manipulation and handling of substances bound in/on materials and/or articles) | PROC21 |
| CS7: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS8: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC1, PROC2 |

37.2. ES 37 Conditions of use affecting exposure

37.2.1 ES 37 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : No exposure assessment presented for the environment.

37.2.2 ES 37 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Bulk transfers
Closed systems

Product characteristics

PRAEPAGEN TQ

Page 431(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Closed systems
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation.

37.2.3 ES 37 - CS 3: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Material transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Use bulk or semi-bulk handling systems.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Transfer via enclosed lines., Provide extract ventilation to material transfer points and other openings.

37.2.4 ES 37 - CS 4: Control of worker exposure: Professional use (Calendering

PRAEPAGEN TQ

Page 432(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

operations) (PROC6)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Injection moulding of articles
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Minimise exposure by extracted full enclosure for the operation or equipment., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

37.2.5 ES 37 - CS 5: Control of worker exposure: Professional use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Injection moulding of articles
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

PRAEPAGEN TQ

Page 433(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Additional good practice advice : Minimise exposure by extracted full enclosure for the operation or equipment., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

37.2.6 ES 37 - CS 6: Control of worker exposure: Professional use (Low energy manipulation and handling of substances bound in/on materials and/or articles) (PROC21)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Rework of articles
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

37.2.7 ES 37 - CS 7: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Equipment maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.

PRAEPAGEN TQ

Page 434(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

measures

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain or remove substance from equipment prior to break-in or maintenance., Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

37.2.8 ES 37 - CS 8: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Personal protective measures : Use suitable eye protection.

37.3. ES 37 Exposure estimation and reference to its source

37.3.2 ES 37 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Bulk transfers, Closed systems) | 0,10 |

PRAEPAGEN TQ

Page 435(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| | | |
|-----------------|--------------------------------------------------------------------------|--------|
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers, Closed systems) | < 0,01 |
| combined routes | Bulk transfers, Closed systems | 0,10 |

37.3.3 ES 37 - CS 3: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

37.3.4 ES 37 - CS 4: Worker exposure: Professional use (Calendering operations) (PROC6)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 27,43 mg/kg bw/day (ECETOC TRA worker V3) | 0,03 |
| combined routes | | 0,52 |

37.3.5 ES 37 - CS 5: Worker exposure: Professional use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 3,43 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,50 |

37.3.6 ES 37 - CS 6: Worker exposure: Professional use (Low energy manipulation and handling of substances bound in/on materials and/or articles) (PROC21)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 2,83 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

37.3.7 ES 37 - CS 7: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type | Exposure estimate | RCR |
|----------------------------|-------------------|-----|
|----------------------------|-------------------|-----|

PRAEPAGEN TQ

Page 436(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| of effects | | |
|-----------------|-------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,50 |

37.3.8 ES 37 - CS 8: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 20 ppm (ECETOC TRA worker V3, Storage) | 0,10 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | 0,10 |

37.4. ES 37 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

38. ES 38: Industrial use; Use in water treatment agents

38.1. Title section

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Environment | |
| CS1: Industrial use (Formulation into solid matrix) | ERC3 |
| Workers | |
| CS2: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS3: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS5: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS6: Industrial use (Treatment of articles by dipping and pouring) | PROC13 |
| CS7: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |

PRAEPAGEN TQ

Page 437(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

| |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CS8: Industrial use (Chemical production or refinery in closed process without PROC1 likelihood of exposure or processes with equivalent containment conditions) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|

38.2. ES 38 Conditions of use affecting exposure

38.2.1 ES 38 - CS 1: Control of environmental exposure: Industrial use (Formulation into solid matrix) (ERC3)

Remarks : No exposure assessment presented for the environment.

38.2.2 ES 38 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Automated metal rolling/forming
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Personal protective measures : Clear transfer lines prior to de-coupling.
Use suitable eye protection.

38.2.3 ES 38 - CS 3: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

PRAEPAGEN TQ

Page 438(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Personal protective measures : Use suitable eye protection. Avoid spillage when withdrawing pump.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Use drum pumps., Wear suitable gloves tested to EN374.

38.2.4 ES 38 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

38.2.5 ES 38 - CS 5: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 439(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Restrict area of openings to equipment.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Wear suitable gloves tested to EN374.

38.2.6 ES 38 - CS 6: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Exposure duration : 1 h

Risk Management Measures

- Type of Application (Use) : Pouring from small containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Carefully pour from containers.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide extract ventilation to points where emissions occur.,
Wear suitable gloves tested to EN374.

38.2.7 ES 38 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

- Exposure duration : 1 h

Risk Management Measures

- Type of Application (Use) : Equipment maintenance
Organisational measures to : Avoid direct eye contact with product, also via contamination

PRAEPAGEN TQ

Page 440(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

prevent /limit releases, dispersion and exposure : on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain or remove substance from equipment prior to break-in or maintenance., Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

38.2.8 ES 38 - CS 8: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid

Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage

Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.

Personal protective measures : Use suitable eye protection.

38.3. ES 38 Exposure estimation and reference to its source

38.3.2 ES 38 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,05 |

38.3.3 ES 38 - CS 3: Worker exposure: Industrial use (Transfer of substance or

PRAEPAGEN TQ

Page 441(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

38.3.4 ES 38 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

38.3.5 ES 38 - CS 5: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3) | 0,10 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,11 |

38.3.6 ES 38 - CS 6: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

38.3.7 ES 38 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

PRAEPAGEN TQ

Page 442(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

38.3.8 ES 38 - CS 8: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

38.4. ES 38 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

39. ES 39: Professional use; Use in water treatment agents

39.1. Title section

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|
| Environment | | |
| CS1: Professional use (Widespread use leading to inclusion into/onto article (outdoor)) | | ERC8f |
| Workers | | |
| CS2: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | | PROC8b |
| CS3: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | | PROC3 |
| CS4: Professional use (Chemical production where opportunity for exposure arises) | | PROC4 |
| CS5: Professional use (Treatment of articles by dipping and pouring) | | PROC13 |
| CS6: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | | PROC8a |
| CS7: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | | PROC1 |

39.2. ES 39 Conditions of use affecting exposure

39.2.1 ES 39 - CS 1: Control of environmental exposure: Professional use

PRAEPAGEN TQ

Page 443(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

(Widespread use leading to inclusion into/onto article (outdoor)) (ERC8f)

Remarks : No exposure assessment presented for the environment.

39.2.2 ES 39 - CS 2: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 4 h

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Avoid spillage when withdrawing pump.
Technical conditions and measures : Use drum pumps.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374.

39.2.3 ES 39 - CS 3: Control of worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.

PRAEPAGEN TQ

Page 444(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

measures

Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

39.2.4 ES 39 - CS 4: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Restrict area of openings to equipment.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Wear suitable gloves tested to EN374.

39.2.5 ES 39 - CS 5: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Pouring from small containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Carefully pour from containers.

PRAEPAGEN TQ

Page 445(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Personal protective measures : Avoid spillage when withdrawing pump.
: Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure material transfers are under containment or extract ventilation., Wear suitable gloves tested to EN374.

39.2.6 ES 39 - CS 6: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Equipment maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Drain or remove substance from equipment prior to break-in or maintenance., Wear suitable gloves tested to EN374.

39.2.7 ES 39 - CS 7: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion : Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 446(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure

Store substance within a closed system.

Personal protective measures

: Use suitable eye protection.

39.3. ES 39 Exposure estimation and reference to its source

39.3.2 ES 39 - CS 2: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

39.3.3 ES 39 - CS 3: Worker exposure: Professional use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,12 |

39.3.4 ES 39 - CS 4: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,25 |

39.3.5 ES 39 - CS 5: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 0,69 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | 0,49 |

PRAEPAGEN TQ

Page 447(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

39.3.6 ES 39 - CS 6: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 100 ppm (ECETOC TRA worker V3) | 0,49 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,51 |

39.3.7 ES 39 - CS 7: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3) | < 0,01 |
| combined routes | | < 0,01 |

39.4. ES 39 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

40. ES 40: Consumer use; Use in water treatment agents

40.1. Title section

| | |
|-------------------------------------------------------------------------------------|-------|
| Water softeners (PC36) | |
| Water treatment chemicals (PC37) | |
| Environment | |
| CS1: Consumer use (Widespread use leading to inclusion into/onto article (outdoor)) | ERC8f |
| Consumer | |
| CS2: Consumer use (Water softeners) | PC36 |
| CS3: Consumer use (Water treatment chemicals) | PC37 |

40.2. ES 40 Conditions of use affecting exposure

PRAEPAGEN TQ

Page 448(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

40.2.1 ES 40 - CS 1: Control of environmental exposure: Consumer use (Widespread use leading to inclusion into/onto article (outdoor)) (ERC8f)

Remarks : No exposure assessment presented for the environment.

40.2.2 ES 40 - CS 2: Control of consumer exposure: Consumer use (Water softeners) (PC36)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amounts used : 10 grams
For each use event, assumes swallowed amount of : 0,00002 grams

Frequency and duration of use

Exposure duration : 8 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 6600,00 cm²
Remarks : Worst case assumption

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

40.2.3 ES 40 - CS 3: Control of consumer exposure: Consumer use (Water treatment chemicals) (PC37)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa
Remarks : Covers use at ambient temperatures.

Amount used

Amounts used : 10 grams
For each use event, assumes : 0,0002 grams

PRAEPAGEN TQ

Page 449(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

swallowed amount of

Frequency and duration of use

Exposure duration : 8 h
Frequency of use : 1 uses per day
Frequency of use : 365 days per year

Human factors not influenced by risk management

Covers skin contact area up to : 6600,00 cm²
Remarks : Worst case assumption

Other given operational conditions affecting consumers exposure

Room size : 20 m³
Ventilation rate per hour : 0,6
Remarks : Covers use under typical household ventilation.

40.3. ES 40 Exposure estimation and reference to its source

40.3.2 ES 40 - CS 2: Consumer exposure: Consumer use (Water softeners) (PC36)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|--------|
| Dermal | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| inhalative | 6,89 mg/m ³ (ECETOC TRA worker V3, Chronic effects) | 0,08 |
| combined routes | Chronic effects | 0,08 |

40.3.3 ES 40 - CS 3: Consumer exposure: Consumer use (Water treatment chemicals) (PC37)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------|--------|
| Dermal | 0,01 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| Oral | 0 mg/kg bw/day (ECETOC TRA worker V3, Chronic effects) | < 0,01 |
| inhalative | 6,89 mg/m ³ (ECETOC TRA worker V3, Chronic effects) | 0,08 |
| combined routes | Chronic effects | 0,08 |

40.4. ES 40 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

PRAEPAGEN TQ

Page 450(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

ECHA guidance for downstream users

Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

41. ES 41: Industrial use; Use in mining chemicals

41.1. Title section

| Environment | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| CS1: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) | ERC4 |
| Workers | |
| CS2: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS3: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) | PROC8b |
| CS4: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) | PROC9 |
| CS5: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS6: Industrial use (Mixing or blending in batch processes) | PROC5 |
| CS7: Industrial use (Chemical production where opportunity for exposure arises) | PROC4 |
| CS8: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) | PROC2 |
| CS9: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) | PROC3 |
| CS10: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |
| CS11: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) | PROC8a |
| CS12: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) | PROC1 |

41.2. ES 41 Conditions of use affecting exposure

41.2.1 ES 41 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

PRAEPAGEN TQ

Page 451(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Remarks : No exposure assessment presented for the environment.

41.2.2 ES 41 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Remarks : Bulk transfers

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Bulk transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Personal protective measures : Use suitable eye protection.

41.2.3 ES 41 - CS 3: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Drum/batch transfers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Avoid spillage when withdrawing pump.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Use drum pumps., Wear suitable gloves tested to EN374.,

PRAEPAGEN TQ

Page 452(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

41.2.4 ES 41 - CS 4: Control of worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Pouring from small containers
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Carefully handle the substance to minimise releases.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

41.2.5 ES 41 - CS 5: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

Remarks : General exposures (closed systems)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (closed systems)
Organisational measures to prevent /limit releases, dispersion : Avoid direct eye contact with product, also via contamination on hands.

PRAEPAGEN TQ

Page 453(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

and exposure
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure samples are obtained under containment or extract ventilation.

41.2.6 ES 41 - CS 6: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : General exposures (open systems)
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Restrict area of openings to equipment., Provide extract ventilation to points where emissions occur., Wear suitable gloves tested to EN374.

41.2.7 ES 41 - CS 7: Control of worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

PRAEPAGEN TQ

Page 454(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Risk Management Measures

- Type of Application (Use) : Phase separation
Closed systems
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide extract ventilation to material transfer points and other openings.

41.2.8 ES 41 - CS 8: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

- Remarks : Ion exchange processes
Closed systems

Product characteristics

- Concentration of the Substance in Mixture/Article : <= 100 %
- Physical Form (at time of use) : Liquid
- Vapour pressure : 6020 Pa

Frequency and duration of use

- Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

- Type of Application (Use) : Ion exchange processes
Closed systems
- Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
- Technical conditions and measures : No specific measures identified.
- Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

- Additional good practice advice : Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).

41.2.9 ES 41 - CS 9: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

- Remarks : Process sampling

PRAEPAGEN TQ

Page 455(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Process sampling
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure samples are obtained under containment or extract ventilation., Wear suitable gloves tested to EN374.

41.2.10 ES 41 - CS 10: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Remarks : Mixing operations

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Risk Management Measures

Type of Application (Use) : Mixing operations
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Technical conditions and measures : No specific measures identified.
Personal protective measures : Use suitable eye protection.

41.2.11 ES 41 - CS 11: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

PRAEPAGEN TQ

Page 456(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Exposure duration : 1 h

Risk Management Measures

Type of Application (Use) : Equipment cleaning and maintenance
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Personal protective measures : Use suitable eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear suitable gloves tested to EN374., Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour)., Drain or remove substance from equipment prior to break-in or maintenance.

41.2.12 ES 41 - CS 12: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Remarks : Storage

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 6020 Pa

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours

Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

Risk Management Measures

Type of Application (Use) : Storage
Organisational measures to prevent /limit releases, dispersion and exposure : Avoid direct eye contact with product, also via contamination on hands.
Store substance within a closed system.
Personal protective measures : Use suitable eye protection.

PRAEPAGEN TQ

Page 457(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

41.3. ES 41 Exposure estimation and reference to its source

41.3.2 ES 41 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Bulk transfers) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Bulk transfers) | < 0,01 |
| combined routes | Bulk transfers | 0,05 |

41.3.3 ES 41 - CS 3: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

41.3.4 ES 41 - CS 4: Worker exposure: Industrial use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,25 |

41.3.5 ES 41 - CS 5: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, General exposures (closed systems)) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, General exposures (closed systems)) | < 0,01 |
| combined routes | General exposures (closed systems) | 0,12 |

PRAEPAGEN TQ

Page 458(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

41.3.6 ES 41 - CS 6: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

41.3.7 ES 41 - CS 7: Worker exposure: Industrial use (Chemical production where opportunity for exposure arises) (PROC4)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------|------|
| inhalative | 20 ppm (ECETOC TRA worker V3) | 0,10 |
| Dermal | 6,86 mg/kg bw/day (ECETOC TRA worker V3) | 0,01 |
| combined routes | | 0,11 |

41.3.8 ES 41 - CS 8: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|----------------------------------------------------------------------------------|--------|
| inhalative | 10 ppm (ECETOC TRA worker V3, Ion exchange processes, Closed systems) | 0,05 |
| Dermal | 1,37 mg/kg bw/day (ECETOC TRA worker V3, Ion exchange processes, Closed systems) | < 0,01 |
| combined routes | Ion exchange processes, Closed systems | 0,05 |

41.3.9 ES 41 - CS 9: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC3)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|------------------------------------------------------------|--------|
| inhalative | 25 ppm (ECETOC TRA worker V3, Process sampling) | 0,12 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Process sampling) | < 0,01 |
| combined routes | Process sampling | 0,12 |

41.3.10 ES 41 - CS 10: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with

PRAEPAGEN TQ

Page 459(459)

Substance key: 000000103061

Revision Date: 07.06.2017

Version : 8 - 1 / EU

Date of printing : 17.09.2018

equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3, Mixing operations) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Mixing operations) | < 0,01 |
| combined routes | Mixing operations | < 0,01 |

41.3.11 ES 41 - CS 11: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-------------------------------------------|------|
| inhalative | 50 ppm (ECETOC TRA worker V3) | 0,25 |
| Dermal | 13,71 mg/kg bw/day (ECETOC TRA worker V3) | 0,02 |
| combined routes | | 0,26 |

41.3.12 ES 41 - CS 12: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|---------------------------------------------------|--------|
| inhalative | 0,01 ppm (ECETOC TRA worker V3, Storage) | < 0,01 |
| Dermal | 0,34 mg/kg bw/day (ECETOC TRA worker V3, Storage) | < 0,01 |
| combined routes | Storage | < 0,01 |

41.4. ES 41 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.