SILRES® MSE 100

Liquid Polysiloxane

Characteristics

SILRES® MSE 100 is a methyl and methoxy group containing polysiloxane that is recommended as an ambient temperature curable binder for heat resistant paints.

Special characteristics

In combination with suitable catalysts and temperature stable pigments and fillers, SILRES® MSE 100 is the optimum binder for ambient curing, heat resistant paints. The presence of humidity and a catalyst is necessary for sufficient curing at ambient temperature. After paint application and paint drying, coatings based on SILRES® MSE 100 can withstand temperatures of up to 650°C (1200°F) without loosing adhesion.

Some specific properties of SILRES® MSE 100 are:

- liquid, solventfree silicone binder (solvent < 2 %)
- very high inorganic content
- curable at ambient temperature
- very low smoke generation at heating
- limited compatibility (preferably used as a sole binder)
- excellent hydrophobicity of the final coating
- excellent nonstick characteristics of the final coating

SILRES MSE 100 is the binder of choice for silver colored, aluminum pigmented paint formulations.

Black pigmented paints based on SILRES® MSE 100 are possible, but more difficult to formulate.

At temperatures higher than 250°C (480°F) the organic groups start to degrade. After all the organic parts of the silicone resin have been pyrolytically decomposed, the product that remains moves to an inorganic stoichiometric composition of $(SiO_2)_n$. It is this layer which firmly binds pigments and fillers to themselves and to the coated substrate.

Applications

Heat resistant coatings must withstand temperatures of between 200°C (400°F) and 600°C (1100°F) or even more without breaking down or seperating from the substrate.

Futhermore, such coatings can withstand extreme temperature fluctuations and must provide some corrosion resistance.

One important field where heat resistant coatings are being used in the automotive and aircraft industry, where paints have to meet exceptionally high standards. Here, such coatings are used for exhaust systems, mufflers and parts close to the engine.

Heat resistant coatings are also used in industrial applications, e.g. in coatings for chimneys, furnaces, gas boilers, heat exchangers, light bulbs and the like. Besides heat resistance, extremely good corrosion resistance can be additionally achieved with a zinc rich primer overcoated with a SILRES ® based heat resistant paint.

Some household appliances and their various parts are subjected to high temperatures as well. Ovens and oven inserts, stoves and barbecues are just some examples where heat resistant coatings are needed.

Product data

Properties	Test procedure	Unit	Value
Appearance			clear colorless liquid
Silicone content		[%]	> 98
Viscosity	DIN 51 562-1	[mm²/s]	25 - 35
Density at 25 °C (77°F)	DIN 51 757	[g/cm³]	1.14
Flash point	DIN 51 755	[°C]	alt least 30 (85°F)
Ignition temperature	DIN 51 794	[°C]	220 (428°F)

These figures are intended as a guide and should not be used in preparing specifications.

Processing

The most important operation in making a heat resistant paint according to a given formulation is the dispersion of pigments and fillers. Suitable machines used to achieve homogeneous products include mixer agitators and pearl mills.

Aluminum paints

SILRES® MSE 100, pigmented with aluminum pigments yield highly heat resistant, anticorrosive coatings that adhere well to sandblasted steel and resist temperatures of up to 650°C (1200°F). In presence of titantium butylate and humidity curing takes place at ambient temperatures.

Guide formulations are available on request.

Black pigmented paints

SILRES® MSE 100 pigmented with thermo stable black pigments (e. g. iron manganese oxides) yield highly heat-resistant, anticorrosive coatings with a temperature resistance of up to 500°C (930°F). In presence of titantium butylate and humidity curing takes place at ambient temperatures.

Guide formulations are available on request.

Paints with additional colors

Beside silver and black formulations, additional colors are possible as well. For example, colored inorganic spinels, titanium dioxide (Rutil type) enable the formulation of paints with a temperature resistance of up to 400°C (750°F).

Fillers

Fillers are widely used to make paint formulations more economic. Fore heat resistant paints, mica and talc are often used.

Platelet-like pigments and fillers can be very helpful to strengthen adhesion as they become aligned parallel to the surface as the paint dries. This does not only support the adhesion of the coating, but also improve the corrosion resistance by the numerous overlapping particles.

Adhesion

To get an optimum adhesion of the heat resistant coating, substrates have to be free from any dirt and rust. Sand-blasting to get a mechanically roughened surface and the complete removal of any oil and grease by suitable solvents is highly recommended.

Furthermore, coating thickness is a crucial condition for good adhesion at higher temperatures. The optimum film thickness is seen at 15 to 25 µm after curing.

Application

Heat resistant paints can be applied by any of the traditional methods such as spraying, dipping and brushing.

Film formation

Physical drying of the paint already begins during application, through evaporation of the solvent.

Heat resistant paints based on SILRES® MSE 100 normally dry within 30 to 60 minutes after application.

Curing

Different from standard silicone resins, SILRES® MSE 100 can be cured at ambient temperatures when used with a catalyst like titanium butylate. Humidity is neccessary as a reaction partner and methanol splits off at curing process.

Storage stability

SILRES® MSE 100 has shelf life of at least 12 months if stored in tightly closed original containers between 5°C (41°F) and 30°C (86°F). The „Best use before end“ date of each batch is shown on the product label.

If the material is kept beyond the shelf life recommended on the product label it is not necessarily unusable, but a quality control should be performed of the properties relevant to the application.

The management system has been certified according to DIN EN ISO 9001 and DIN EN ISO 14001

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