EVONIK INDUSTRIES

Types of Packaging for AEROSIL® & AEROXIDE®

Technical Information 1231

Evonik. Power to create.

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Introduction

This Technical Bulletin brochure provides an overview of the standard packaging types for AEROSIL® and AEROXIDE®. AEROXIDE® is not mentioned separately in this publication, as it can be handled in much the same way as AEROSIL®. In other words, the equipment and methods that may be used for AEROSIL® are also suitable for AEROXIDE®. The various packaging types all satisfy the following requirements:

- protect the product (quality) and preserve its various application properties
- easy to handle, from filling to emptying

Economic and ecological considerations play an essential role in packaging development.

Packaging types and shipping methods

AEROSIL® is used all over the world in a vast range of sectors such as the silicones, paints, coatings, and plastics industries, as well as in food, feed, and pharma applications. To maintain the product properties and ensure transportation safety, the packaging must meet the above requirements.

These days, the standard packaging is the multilayer paper bag, which is suitable for all modes of transportation, whether by road, rail, air, or water. AEROSIL® is also supplied in other packaging methods, allowing our customers to handle our product easily and, most importantly, in a dust-free way.

For AEROSIL® powder products, the following packaging methods are available:

- bags, shipped on pallets and secured for transportation
- semi-bulk, supplied in Flexible Containers (FIBC)
- bulk, supplied in silo trucks or containers

For AEROSIL® dispersions:

- AERODISP® in 60-liter pails, 220-liter drums, and 1,000-liter Intermediate Bulk Containers

Bag shipping

Multilayered paper bags are the standard. The product is packaged in multilayered paper bags to protect it from damages during transport and storage, and to ensure that it meets application-specific requirements. Paper layers with PE lining may be used for some product grades, particularly to protect against moisture.

The disposal of empty paper bags may be regulated differently from country to country. In Germany, disposal is done through the REPASACK system (www. repasck.de). If you have any further questions about disposal, please contact our sales or customer service departments.

Shrink-wrapping the bags on pallets secures them during transportation, protects them against the elements, and serves as an overall barrier shielding them against other external influences. An interlinking film between the pallet and the lowest layer of bags improves the protection against moisture by full shrink wrapping.

The volume of the bag, and therefore its weight, ranges anywhere from 10 to 20 kg, depending on the AEROSIL® grade and its tamped density (see **Table 1**). See our Technical Bulletin Fine Particles No. 28, "How to Handle Synthetic Silicas and Silicates," for information on emptying bagged products without generating dust.

Figure 1
Examples for AEROSIL® bag packaging

Table 1 Dimensions of bag packaging

Product name	Filling weight	Approximate dimensions (cm) of individual filled bags			No of bags per pallet	Productweight per pallet
	kg	Length	Width	Height		kg
AEROSIL® 90	10	114	55	19	20	200
AEROSIL® 130	10	114	56	20	18	180
AEROSIL® 130 V	20	114	56	20	20	400
AEROSIL® 150	10	114	56	21	18	180
AEROSIL® 150 V	20	114	56	21	20	400
AEROSIL® 200	10	114	55	21	18	180
AEROSIL® 200 V	20	114	57	21	20	400
AEROSIL® 300	10	114	54	21	18	180
AEROSIL® 300 V	20	114	55	22	20	400
AEROSIL® 380	10	114	56	22	18	180
AEROSIL® 380 V	20	114	56	22	18	360
AEROSIL® R 972	10	114	56	17	22	220
AEROSIL® R 972 V	15	114	56	17	22	330
AEROSIL® R 974	10	114	56	17	22	220
AEROSIL® R 974 V	15	114	56	17	22	330
AEROSIL® R 104	10	114	53	20	22	220
AEROSIL® R 106	10	114	53	20	22	220
AEROSIL® R 805	10	114	56	20	20	200
AEROSIL® R 816	10	114	56	20	20	200
AEROSIL® R 812	10	114	56	20	20	200
AEROSIL® R 812 S	10	114	56	20	20	200
AEROSIL® R 202	10	114	56	20	20	200
AEROSIL® R 208	10	114	56	20	20	200
AEROSIL® R 8200	15	70	48	20	32	480
AEROSIL® R 7200	15	70	48	20	32	480
AEROSIL® OX 50	15	114	56	17	20	300
AEROSIL® TT 600	10	114	57	20	22	220
AEROSIL® MOX 80	10	114	57	20	20	200
AEROSIL® MOX 170	10	114	57	20	20	200
AEROSIL® MOX 170 V	20	114	57	20	20	400
AEROXIDE® Alu C	10	114	57	20	20	200
AEROSIL® COK 84	10	123	60	20	20	200
AEROXIDE® TiO_2 P 25	10	100	50	25	40	400

Filling weight and bag dimensions from production plants in the EU.
Further products available on request. Information as of September 2012

Semi-bulk-shipping

The capacity of this packaging method lies somewhere between that of bags and of full bulk vehicles or containers (see **Figure 2**), hence the designation "semi-bulk." Semi-bulk packaging for AEROSIL® is an FIBC (flexible intermediate bulk container), also known as a Big Bag® or Super Sack®. The product is delivered upright on a wooden pallet. The FIBC is protected by a PE cover that is heat-sealed over the entire perimeter to a PE bottom film to obtain complete shrink wrapping. Since the PE wrapping for FIBCs effectively protects the product against moisture, it should thus not be removed until immediately before the container is emptied.

FIBCs consist of polypropylene (PP) flat yarn mesh, with an additional inner layer. At the four upper corners are loops for lashing the FIBC to an emptying station's hoister. In the middle of the base is a round discharge opening provided with appropriate spouts, which are sealed with Velcro or a B-lock system. For emptying the AEROSIL® FIBCs, we recommend a **P**owder **E**mptying **Sy**stem (PESy), which Evonik can provide (for the period that AEROSIL® is purchased). Further information is available in TI 1219: "Semi-Bulk Packaging for AEROSIL®".

According to the German TRBS 2153, Technische Regeln Betriebssicherheit: "Avoiding ignition hazards caused by electrostatic charges" (issued by the German Federal Ministry for Labour and Social Affaiers) plastic packages of this size that cannot dissipate electrostatic charge may not be used in an area designated as Ex Zone 1. For this reason, the FIBCs used by Evonik are of Type C, with a finish that dissipates electrostatic charge, and must be appropriately grounded before emptying (see **Figure 3**). Therefore, you can use and empty these FIBCs even in Ex Zone 1.

For quality reasons, the FIBCs are supplied only as disposable, single-use containers. Empty packaging may be disposed of in Germany through the RIGK system. More detailed information and a list of pick-up points are available at www.rigk.de. For inquiries in this regard, please contact our sales or customer service departments.

Figure 2 An example of a 2-cubic-meter AEROSIL® FIBC

Figure 3 Grounding of an FIBC

AEROSIL® customers enjoy a number of permanent advantages when they use FIBCs, for example:

- dust-free handling and emptying of FIBCs, and no contamination of the end-product with paper fibers
- low capital costs and maintenance costs
- the possibility of an employee attending to other work during the automatic emptying of FIBCs
- a high degree of flexibility through a mobile FIBC emptying unit if more than one mixer is present

Standard AEROSIL® grades and filling weights available in FIBCs are listed in **Table 2**.

You will find answers to questions on avoiding dust when emptying FIBCs in our Technical Information TI 1219, "Semi-Bulk Packaging for AEROSIL®", and our Technical Bulletin Fine Particles No. 28, "How to Handle Synthetic Silicas and Silicates".

Table 2 Dimensions of FIBCs

Product name	Approximate FIBC-dimensionens (cm) when filled (without pallet)			Filling weight (kg)
	Length	Width	Height	
AEROSIL® 150	105	105	200	180
AEROSIL® 200	105	105	200	180
AEROSIL® 300	105	105	200	180
AEROSIL® 380	105	105	200	180
AEROSIL® R 805 VV 90	100	100	200	180
AEROSIL® R 805 VV 90	100	100	100	90
AEROSIL® R 812	100	100	100	60
AEROSIL® R 202	100	100	200	150
AEROSIL® R 208	100	100	200	150
AEROSIL® R 202 VV 90	100	100	200	90
AEROSIL® R 972	105	105	200	200
AEROSIL® R 972 V	105	105	200	250
AEROSIL® R 974	105	105	200	200
AEROSIL® R 104	105	105	200	200
AEROSIL® R 106	105	105	200	200
AEROXIDE® TiO_2 P 25[1]	105	105	200	400

Filling weight and FIBC dimensions from production sites in the EU.
Further products available on request. Information valid as of November 2008.
The maximum height of the FIBC including pallet and shrink wrap is 220 cm.

[1] AEROXIDE® TiO_2 P 25: common gravity discharge of FIBC.

Full-bulk-shipping

A large proportion of AEROSIL® is now supplied in bulk silo trucks. The practically dust-free handling of AEROSIL® silo products during storage, conveying, and metering are considerable advantages for production. Shipping AEROSIL® in large containers should become even more significant in the future.

Silo deliveries offer the following advantages:

- handling large quantities with a minimum of staff
- good maintenance of product quality
- freeing up storage capacity for other purposes
- no manual preparing or handling of the raw material in production
- dust-free handling and emptying
- avoiding packaging materials, and
- no disposal of packaging or pallets

The silo trucks used have a capacity of approximately 66 cubic meters and have been specially adapted for hauling bulk AEROSIL® so as to ensure transportation of economically viable loads. Road silos can hold between 4.0 and 5.5 metric tons, depending on product type (see **Figure 4**). In addition to these silo vehicles, silo containers (**Figure 5**) may also be used.

Figure 4 Silo truck with trailer

Figure 5 Silocontainer for combined transport

To store silo products, the customer needs a stationary storage silo of adequate capacity for the quantities consumed. The smallest AEROSIL® storage silo has a net volume of 150 cubic meters. The size of the storage silo is determined by three important factors:

- the volume of the supply vehicle
- the increased volume (loosening) of the AEROSIL® during pneumatic emptying
  and
- the amount of AEROSIL® that must be maintained as a production reserve in the storage silo

During the emptying process, the silo trailer must be tipped, and the minimum clearance height required is 10 m for trucks and 12 m for silotainer deliveries. The emptying time alone takes about 90 minutes and depends on product type.
A coupling of nominal diameter 100 mm that complies with DIN 14323 or 14309 is used to connect the product line.

The following AEROSIL® grades can currently be supplied in silo trucks as "full bulk" products:

- AEROSIL® 150
- AEROSIL® 200
- AEROSIL® 300
- AEROSIL® R 972
- AEROSIL® R 974

Further products are available on request.

More details on emptying of silo vehicles and construction of silo plants for AEROSIL® storage can be found in our Technical Bulletin Fine Particles No. 28, "How to Handle Synthetic Silicas and Silicates."

Shipping of Dispersions

Evonik supplies AEROSIL® dispersions under the AERODISP® brand name. AEROSIL® dispersions are used in a very wide range of innovative applications, such as inkjet media. Apart from excellent performance properties, these dispersions offer our customers considerable handling advantages. Packaged mainly in 60-liter pails and 220-liter plastic disposable containers (see **Figure 6**), these dispersions can simplify and facilitate processing and handling. They generate no dust when used.

If larger quantities are needed, the dispersions can be supplied in 1-cubic-meter IBCs (see **Figure 7**).

Further information on AEROSIL® dispersions is available in our Technical Information 1278, "How to Handle AERODISP®."

If you have any other questions on AERODISP® dispersions, please contact our Technical Service department.

Figure 6 AERODISP® W 1836 in 60-liter packaging

Figure 7 AERODISP® – 1 -cubic-meter IBC

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