

# Sika® Fume

## Silica-Fume Densified Powder

### Positioning Description

Sika® Fume is a dry powder silica fume additive for concrete and mortars.  
Sika® Fume meets the requirements of ASTM C-1240 and AS/NZ 3582.3/2002

### Uses

Sika® Fume is a pozzolanic material that consists primarily of fine silicon dioxide particles in a non-crystalline form. Silica fume particles have a diameter of less than 1µm; about 100 times smaller than the average cement particle.

**Pozzolanic action:** A chemical reaction takes place between the free lime Ca (OH)<sub>2</sub> in the cement paste and the Sika® Fume particles which results in the formation of additional calcium silicate hydrate (CSH) gel, the glue that holds the concrete constituents together. The formation of this extra binding force within the gel increases the compressive and flexural strength of the concrete.

**Void Reduction:** The fine particles of Sika® Fume fill the tiny voids and capillary pores within the cement matrix and significantly reduce porosity to produce an extremely dense and impermeable concrete.

Sika® Fume is recommended for all high performance, high strength applications; concrete required to resist water and chemical ingress and concrete required to resist mechanical abrasion.

### Advantages

Sika® Fume produces concrete that has dramatically increased compressive and flexural strength, which allows greater design flexibility and structural design economies, combined with reduced permeability to increase the service life of the concrete.

- Compressive strengths are dramatically increased for high performance concrete.
- Excellent abrasion and erosion resistance increases concrete durability in high-traffic areas.
- Permeability is dramatically reduced, which makes Sika® Fume ideal for applications where concrete will be required to resist chemical attack.
- Resistance to corrosion is increased because concrete is more resistant to water ingress and therefore also to corrosion caused by sulfates and water-borne chlorides such as deicing salts.
- Decreased permeability gives Sika® Fume concrete excellent freeze-thaw resistance because less water is trapped inside the cement paste.

Sika® Fume does not contain calcium chloride nor any other intentionally added chloride containing ingredients.

### Product Data

**Form/Colour:** Grey Powder.  
**Packaging:** Sika® Fume is available in 10kg bags and 900kg bulk bags.  
**Storage & Shelf Life:** Eighteen (18) months shelf life when stored in dry conditions.



## Technical Data

### Dosage:

Dosage rates are typically specified between 5 and 15% by weight of cement. Sika strongly recommends that trial batches be performed using project materials in order to determine the optimum dosage for specified project requirements.

### Compatibility with other

#### Sika admixtures:

YES

## Standards

Table 1

### SPECIFIED PROPERTIES OF AMORPHOUS SILICA FOR USE IN CONCRETE, MORTAR AND GROUT

| Property                              | Specification Limits | Sika Fume | Reference Method |
|---------------------------------------|----------------------|-----------|------------------|
| Moisture content                      | ≤ 3.0%               | 0.6%      | AS 3585.2        |
| Loss on ignition                      | ≤ 6.0%               | 3.4%      | As 3583.3        |
| Sulfuric anhydride                    | ≤ 3.0%               | 0.3%      | AS 3583.8        |
| Total silica content SiO <sub>2</sub> | ≥ 85.0%              | 94.7%     | AS 2350.2        |

Table 2

### REPORTABLE PROPERTIES OF AMORPHOUS SILICA

| Property          | Sika Fume            | Reference Method |
|-------------------|----------------------|------------------|
| Surface area      | 27.3246              | AS 2879.4        |
| Available alkali  | 0.1%                 | AS 3583.12       |
| Chloride ion      | 0.055%               | AS 3583.13       |
| Relative strength | 116%                 | ASTM C1240       |
| Bulk density      | 660kg/m <sup>3</sup> |                  |

Test reports are available upon request

Table 3

Chloride Ion diffusion coefficient of concrete

| Test Method                          | Average Diffusion Coefficient |
|--------------------------------------|-------------------------------|
| Nordtest Method NT Build 443 1995-11 | 2.08E-12 m <sup>2</sup> /sec  |

## Application Conditions

### Mixing

Sika® Fume may be batched in a central or truck mixer.

Please contact your local Sika representative for more information and assistance.

The low water cement ratios typically specified for concrete containing Sika® Fume make the use of a high range water reducer, such as a Sika® ViscoCrete® product, essential in most applications. Sika recommends the use of Sika air entraining admixtures where air entrained concrete is required.

### Workability / Finishing

Sika® Fume may affect the finishing characteristics of the concrete, particularly where warmer ambient conditions are encountered. The amount of bleed water from the concrete also may be reduced and Sika recommends the use of a finishing aid and evaporation retarder such as Sika Film to aid finishing.

### Handling

Avoid direct contact. Wear personal protective equipment (chemical resistant goggles/ gloves/clothing) to prevent direct contact with skin and eyes. Use only in well ventilated areas. Wash thoroughly with soap and water after use. Remove contaminated clothing and launder before reuse.

### Caution

Contains amorphous silica. Avoid breathing dust. Use only with proper ventilation. Eye, skin and respiratory irritant. The use of an approved respirator, safety goggles and rubber gloves is recommended. Remove contaminated clothing.

### Clean Up

Use personal protective equipment (chemical resistant goggles/gloves/clothing). Without direct contact, remove spilled or excess product and place in suitable sealed container. Dispose of excess product and container in accordance with applicable environmental regulations.



**Notes** All technical data stated in this Product Data Sheet are based on tests. Actual measured data may vary due to circumstances beyond our control.

**Local Restrictions** Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

### Health & Safety Information

**Protective Measures**

- To avoid allergic reactions, we recommend the use of protective gloves. Change soiled work clothes and wash hands before breaks and after finishing work.
- Local regulations as well as health and safety advice on packaging labels must be observed.
- For further information refer to the Sika Material Safety Data Sheet which is available on [www.sika.co.nz](http://www.sika.co.nz), or on request.
- If in doubt always follow the directions given on the pack or label.

**First Aid:** **Eyes:** Hold eyelids apart and flush thoroughly with water for 15 minutes. **Skin:** Remove contaminated clothing. Wash skin thoroughly for 15 minutes with soap and water. **Inhalation:** Remove person to fresh air.

**Ingestion:** Do not induce vomiting. Dilute with water. Contact a physician.

**In all cases, contact a physician immediately if symptoms persist.**

### Legal Notes

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.



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