

## PRODUCT DATA SHEET

## SikaFume® HR-E

## DENSIFIED SILICA FUME

**DESCRIPTION**

SikaFume® HR-E is silica fume with very high specific surface and high SiO<sub>2</sub> content, used for the production of concrete with very high mechanical properties and durability.

**USES**

- SikaFume® HR-E is used in all types of cementitious mixes for concrete constructions, precast applications, marine constructions, e.t.c.
- SikaFume® HR-E is especially used wherever there are demands for impermeable concrete and long term durability in mechanical and chemical attacks
- For use in shotcrete applications (low powder formation, lower rebound, increased resistance and watertightness)
- For concrete with high resistance to carbonation
- For concrete exposed to extremely aggressive environment (high sulphate concentrations, refineries, chemical industries, e.t.c.)
- For all types of cementitious and gypsum mortars

**CHARACTERISTICS / ADVANTAGES**

- SikaFume® HR-E contains very fine ( $\varnothing 0,1 \mu\text{m}$ ) particles of latent hydraulic silicon oxide. In contact with water these particles produce a pozzolanic pulp through reaction with the produced CaOH<sub>2</sub>, attributing enormous internal cohesion to concrete and producing a cement matrix with very dense structure. Concrete becomes extremely homogeneous and the pumping properties are significantly improved. When concrete hardens, these latent hydraulic particles create an additional crystalloid formation, which gives very high density and extremely reduced porosity to concrete.
- Increased resistance and durability
- Increased chemical resistance
- Increased abrasion resistance
- Increased watertightness
- Increased resistance to carbonation and gas penetration
- Very high reduction of chloride penetration
- Increased early and final strengths
- SikaFume® HR-E does not contain chloride or any other type of substances that might attack reinforcement. Therefore it can be used in reinforced and prestressed concrete.

**APPROVALS / CERTIFICATES**

Silica fume for concrete, according to EN 13263-1:2005

## PRODUCT INFORMATION

| Chemical base | Content (%)                    | Value  | Typical |
|---------------|--------------------------------|--------|---------|
|               | SiO <sub>2</sub>               | ≥ 85%  | 91%     |
|               | Al <sub>2</sub> O <sub>3</sub> | ≤ 1.5% | 0.7%    |
|               | Fe <sub>2</sub> O <sub>3</sub> | ≤ 4.0% | 2.0%    |
|               | CaO                            | ≤1.0%  | 0.4%    |
|               | MgO                            | ≤3.5%  |         |
|               | K <sub>2</sub> O               | ≤2.0%  |         |
|               | Na <sub>2</sub> O              | ≤1.6%  |         |
|               | SO <sub>3</sub>                | ≤1.3%  |         |

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|                            |   |
|----------------------------|---|
| <b>Packaging</b>           | Bulk or Big Bag   |
| <b>Appearance / Colour</b> | Very fine powder, grey  |
| <b>Shelf life</b>          | 36 months from date of production   |
| <b>Storage conditions</b>  | Properly in original, unopened and undamaged sealed packaging, in dry conditions, protected from direct sunlight and frost. |
| <b>Bulk Density</b>        | ≥ 0.60 kg/dm <sup>3</sup>   |

## TECHNICAL INFORMATION

|                            |   |
|----------------------------|---|
| <b>Concreting Guidance</b> | The standard rules of good concreting practice, concerning production as well as placing, are to be followed. Refer to relevant standards. Fresh concrete must be cured properly. |
|----------------------------|---|

## APPLICATION INFORMATION

|                           |  |
|---------------------------|--|
| <b>Recommended Dosage</b> | 5 - 10% by weight of cement  |
| <b>Compatibility</b>      | SikaFume® HR-E can be combined with the following Sika products:<br>- Sikament®/ SikaPlast® superplasticizers range<br>- Sika® ViscoCrete® superplasticizers<br>- SikaRapid®-2<br>- Sika® Ferrogard®-901 S<br>- Sika® Visco I-100<br>- Sika-Aer® Fine<br>- Sika® Antifreeze<br>- Sika® Sigunit® shotcrete accelerators<br>Trials are recommended before combining products.  |
| <b>Dispensing</b>         | SikaFume® HR-E is added to the dry aggregate and cement mix in the production unit, before water addition. Recommended mixing time of dry mix is 30 sec/m <sup>3</sup> of concrete prior to water addition. After water addition the mixing time should be at least 90 sec/m <sup>3</sup> of concrete.<br>For calculation of the proper water amount, the dosage of SikaFume® HR-E, the dosage of the superplasticizer and the final demanded concrete properties have to be taken into account.<br>In all cases before application, suitability tests must be performed.                                  |
| <b>Restrictions</b>       | <ul style="list-style-type: none"><li>▪ When using SikaFume® HR-E a suitable mix design must be taken into account and local material sources should be tested.</li><li>▪ Concrete produced with SikaFume® HR-E is very thixotropic, so sometimes gives the impression of having reduced slump, while in practical application the workability of the mix is sufficient. During slump test, leave the concrete to fall on its own weight, before measuring the slump. For more representative results, also conduct flow test.</li><li>▪ Before application suitability tests must be performed.</li></ul> |

## BASIS OF PRODUCT DATA

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

## ECOLOGY, HEALTH AND SAFETY

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Safety Data Sheet (SDS) containing physical, ecological, toxicological and other safety-related data.

## 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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