

## Silcat™ VS-758-0

Silcat\* VS-758-0

### Description

Silcat VS-758/0 silane is a crosslinking system (silane, peroxide and catalyst) specially developed for the Monosil<sup>(1)</sup> one-step process manufacture of HDPE pressure pipes that meet food regulations.

This system allows for cost-effective production of moisture crosslinkable high-density polyethylene (HDPE) pipe.

(1) Maillefer SA and BICC Ltd.

### Key Features and Benefits

- Pipes manufactured using this technology show excellent mechanical properties, outstanding chemical resistance and can operate at temperatures up to 110°C
- Special stabilizers prevent premature polymerization of the grafting agent and provide excellent aging properties of cross-linked polyethylene
- High quality surface finish of pipes results from use of the fully quality-controlled Silcat system

### Typical Physical Properties

|  |                    |
|--|--------------------|
| Appearance                                   | Clear liquid       |
| Color  | Colorless to straw |
| Viscosity, mPa s (cP), @ 23°C <sup>(2)</sup> | 2.5                |
| Specific Gravity, g/cm <sup>3</sup> , @ 25°C | 0.969              |
| Flash Point, Tag Closed Cup, ASTM D56-79, °C | 23                 |

(2) Brookfield LV/60rpm

### Potential Applications

- Under-floor heating
- Hot water pipes for radiators
- Sanitary and drinking water distribution

### Processing Recommendations

High density polyethylene pipes crosslinked with Silcat VS-758/0 silane masterbatch can meet following specifications:

- DIN 16892 (Rohre aus vernetztem Polyethylen)
- EN (155 WI 023)

Moisture content of the PE resin must be less than 200 ppm. In hot and humid countries pre-drying of the resin at 70°C by means of an air desiccator is highly recommended.

Grafting: Optimum addition levels for a given application must be determined experimentally. Data collected on Nextrom extruders indicate that the dose levels are as follows:

|                        |             |
|------------------------|-------------|
| Silcat VS-758/0 silane | 1.8 to 2.2% |
|------------------------|-------------|

Temperature profile setting of the extruder:

|          |                           |
|----------|---------------------------|
| Barrel   | 170/180/185/195/210/220°C |
| Head/die | 220°C                     |
| Screw    | 140°C                     |

Crosslinking: The rate of cure is dependent upon time, temperature and thickness of the layer and available moisture. A crosslinking degree of 65% (gel content) can be achieved by any of the following methods:

- immersion in water at 80-90°C

- exposure to low pressure steam at 105°C
- exposure to steam at atmospheric pressure (i.e. a sauna at 100°C)

### Characteristics

The component is designed to be extruded with HDPE resin in a single step and consist of:

a) Silcat VS-758/0 silane is a proprietary crosslinking system providing a stable grafting process and high crosslink density of the cured pipe.

### Recommended Resins

| Type of HDPE resin                     | Recommended   | Best Performance |
|--|---------------|------------------|
| Melt index (190°C/2.16 kg)<br>g/10 min | 0.2 - 8       | 6-8              |
| Density g/cm <sup>3</sup>              | 0.945 - 0.955 | 0.950            |

### Food Contact Regulations

The silane component in Silcat VS-758/0 silane is listed with ref PM nr 26328 in the EU Directive 90/128/EEC on plastics for use as food contact, with a maximum permitted quantity of ‘residual’ silane of 5 mg/kg (QM = maximum permitted quantity of the ‘residual’ substance in the food product).

The peroxide initiators are not regulated on a EU level. They are regulated at the country level.

A European reference for the peroxide ingredients are the German BgVV, Section XLVI, that allows these ingredients for food-contact applications in X-linked PE, with the restriction that the total amount of decomposition products in the final resin/product does not exceed 0.2%.

The contained catalyst is allowed under the German KTW-recommendation 1.3.17 when the migration of the Sn in drinking water is lower than 5 microgram Sn/dm<sup>2</sup>. The max concentration of Sn in the PE should be > 0.08 %.

Therefore, all components of Silcat VS-758/0 silane are allowed as ingredients in

plastics for drinking water use in Germany.

**Patent Status**

Standard copy to come

**Product Safety, Handling and Storage**

Standard copy to come

**Limitations**

Standard copy to come

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