

## 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%
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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) 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

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### Limitations

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