Silcat® VS-758-0

Description
Silcat VS-758/0 silane is a crosslinking system (silane, peroxide and catalyst) specially developed for the Monosil^\(^1\) 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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless to straw</td>
</tr>
<tr>
<td>Viscosity, mPa s (cP), @ 23°C(^2)</td>
<td>2.5</td>
</tr>
<tr>
<td>Specific Gravity, g/cm(^3), @ 25°C</td>
<td>0.969</td>
</tr>
<tr>
<td>Flash Point, Tag Closed Cup, ASTM D56-79, °C</td>
<td>23</td>
</tr>
</tbody>
</table>

^\(^*\)Silcat is a trademark of Momentive Performance Materials Inc.
(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:

<table>
<thead>
<tr>
<th>Silcat VS-758/0 silane</th>
<th>1.8 to 2.2%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature profile setting of the extruder:</td>
<td></td>
</tr>
<tr>
<td>Barrel</td>
<td>170/180/185/195/210/220°C</td>
</tr>
<tr>
<td>Head/die</td>
<td>220°C</td>
</tr>
<tr>
<td>Screw</td>
<td>140°C</td>
</tr>
</tbody>
</table>

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

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• 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**

<table>
<thead>
<tr>
<th>Type of HDPE resin</th>
<th>Recommended</th>
<th>Best Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melt index (190°C/2.16 kg) g/10 min</td>
<td>0.2 - 8</td>
<td>6-8</td>
</tr>
<tr>
<td>Density g/cm³</td>
<td>0.945 - 0.955</td>
<td>0.950</td>
</tr>
</tbody>
</table>

**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/dm². 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

**Contact Information**
For product prices, availability, or order placement, contact our customer service at Momentive.com/CustomerService/

For literature and technical assistance, visit our website at: www.momentive.com

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