Adhesion Promoters

CoatOSil® additives and Silquest® silanes are versatile products that can react with a wide variety of organic and inorganic materials. These products can be considered for use as coupling agents, crosslinking agents, and surface modifiers in such applications as paints, coatings, adhesives, and sealants.

Key Features and Typical Benefits:
- Improved scrub resistance
- Enhanced dry and wet adhesion on multiple substrates
- Increased corrosion and chemical resistance
- Expanded hardness and mechanical strength

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**Flow and Leveling Additives**

CoatOSil* silicone-polyether additives are used in a wide variety of applications including waterborne and solventborne coatings, high solids, powder, and UV coatings and inks.

**Key Features and Typical Benefits:**

- **Enhanced flow and leveling** (eliminate defects like craters, orange peel, etc.)
- **Improved slip** (reduced coefficient of friction)
- **Increased mar resistance**
- **Control of foam and enhanced air release**
- **Improved substrate wetting**
- **Increased gloss**
- **Anti-blocking (release)**

The effect of silicone additives on a coating strongly depends on their mutual compatibility. Compatibility is controlled by the amount of polyethylene oxide (EO), polypropylene oxide (PO), and polydimethylsiloxanes (PDMS) in a molecule.

Each vertex of the triangle respectively represents a) 100% PDMS (silicone), b) polyethylene oxide (EO), and c) polypropylene oxide (PO).

The base of the triangle represents polyalkylene oxide (no silicone).

Depending on its locus relative to the corners of the triangle, each CoatOSil additive offers varying properties.

- Additives near the EO vertex are water soluble and are good flow and leveling agents to consider for waterborne systems.
- Additives near the PO vertex are oil soluble to consider for solventborne and high solids coatings and inks.
- Additives at the top of triangle have more silicone properties, such as defoaming, anti-blocking, release, and slip.

**Prepolymers**

Silane-terminated polyurethanes have become increasingly attractive to manufacturers of adhesives, sealants, and coatings. This high-performance hybrid technology is a result of the synergy between the silane-curing mechanism and polyurethane backbone properties.

Formulations based on SPUR* prepolymer offer fast room-temperature cure and good durability, as the sealants or adhesives are free of unreacted isocyanate. Typical benefits also include freedom from bubbling during cure and a broadening of the formulation latitude compared to conventional polyurethane technologies.

**Key Features and Typical Benefits:**

- **Moisture cure at room temperature**
- **Primerless adhesion to many substrates**
- **Excellent chemical resistance and weatherability**
- **Excellent elongation and elastic recovery**
- **Isocyanate free formulation**
- **Minimal shrinkage**
- **Formulation flexibility with 1K and 2K systems**
- **Easy application**

**Key Products**

<table>
<thead>
<tr>
<th>Key Products</th>
<th>Typical Viscosity at 25 °C (mPas)</th>
<th>Typical Characteristics</th>
<th>Potential Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPUR+ 1012 prepolymer</td>
<td>~50000</td>
<td>Ultra Low modulus</td>
<td>Co Binder for 25LM class sealants (ISO 11600)</td>
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<tr>
<td>SPUR+ 1015 prepolymer</td>
<td>~50000</td>
<td>Low modulus</td>
<td>Construction sealants</td>
</tr>
<tr>
<td>SPUR+ 1050 prepolymer</td>
<td>~35000</td>
<td>Balanced mechanical properties</td>
<td>Adhesives</td>
</tr>
<tr>
<td>SPUR+ 1060 prepolymer</td>
<td>~17000</td>
<td>Medium modulus</td>
<td>Construction sealants</td>
</tr>
<tr>
<td>SPUR+ 3030 prepolymer</td>
<td>~2500</td>
<td>Low viscosity</td>
<td>High hydrophobicity</td>
</tr>
<tr>
<td>SPUR+ 3040 prepolymer</td>
<td>~7000</td>
<td>Low viscosity</td>
<td>High strength</td>
</tr>
<tr>
<td>SPUR+ 3060 prepolymer</td>
<td>~22500</td>
<td>Balanced strength, flexibility and toughness</td>
<td>High strength adhesives requiring adhesion to a variety of substrates</td>
</tr>
</tbody>
</table>

Typical properties are average data and are not to be used as or to develop specifications.

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*SPUR+ is a trademark of Momentive Performance Materials Inc.*

*ADDITIVES PREPOLYMERS RESINS*
Silicone Emulsions

In the coatings market, silicone emulsions are known for their durability, water repellency, lower VOC, and resistance to other environmental elements. Momentive’s silicone emulsions can help create longer-lasting, protective coatings that maintain aesthetics in interior and exterior architectural applications.

Silicone resins are key technologies in high-temperature performance coatings, corrosion protection coatings, weather-resistant coatings, and electrical insulating varnishes. They offer a variety of typical benefits such as high heat resistance, UV and oxidation resistance, gloss and color retention and good adhesion to aluminum or steel. Methyl silicone resins are excellent candidates to consider for applications requiring long-term heat resistance at 200 °C, whereas methyl-phenyl resins can be considered for applications requiring heat resistance up to 250 °C. For higher heat resistance performance, the use of inorganic color pigments such as titanium dioxide can enable heat resistance to 350 °C, while the use of aluminum and micaceous iron oxides has been shown to enable heat resistance up to 600 °C.

**Key Features and Typical Benefits:**

- Improved UV resistance
- Enhanced water resistance
- Increased efflorescence resistance

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**Key Features and Typical Benefits:**

- Heat resistance up to 600 °C in certain formulations
- Electrical insulation
- Anti-corrosiveness
- Thermal shock resistance

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**Potential Applications:**

- High heat performance paints for industrial use
- High heat performance paints for consumer use
- Electrical insulating varnishes
- Weather-resistant coatings
- Thermo-set molded parts

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**Product Type Solution Solution Solution Solution Solution Solution**

<table>
<thead>
<tr>
<th>Active Substance Content (%)</th>
<th>50</th>
<th>50</th>
<th>50</th>
<th>75</th>
<th>60</th>
<th>50</th>
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</thead>
<tbody>
<tr>
<td>Type of Siliciumsilicon</td>
<td>Xylene/butanol</td>
<td>Xylene/cyclohexanone</td>
<td>Xylene/cyclohexanone</td>
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<td>Xylene</td>
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<tr>
<td>Viscosity at 23 °C</td>
<td>40-60 mPas</td>
<td>220-300 mPas</td>
<td>60-100 mPas</td>
<td>600-1300 mPas</td>
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<td>150 mPas</td>
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<tr>
<td>Phenyls Containing</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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