Silquest silane Y-9669 combines phenyl and amino functionality in the same molecule. It is an extremely effective adhesion promoter for many filled and reinforced resin systems.

Silquest silane Y-9669 is a versatile adhesion promoter, particularly for resin systems that will react with a secondary amino group, such as isocyanates, acrylates, epoxies, phenolics and silicones. This silane is especially useful when the resulting material must withstand higher temperatures; e.g., in phenolic resin/fiberglass composites. Silquest silane Y-9669 has the following chemical structure:

\[
\text{N-Phenyl-gamma-aminopropyltrimethoxy Silane}
\]

Key Features and Typical Benefits

- Secondary phenyl amino group reacts with such resin systems as isocyanates, acrylates, epoxies, phenolics and silicones
- Methoxy silane ester for fast hydrolysis time
- Aromatic amino group for increased stability of resin/silane bond at elevated temperature
- Phenyl group for good resin wet-out

Potential Applications

Silquest silane Y-9669 significantly improves adhesion between inorganic surfaces and polymers that react with a secondary amine. Evaluation is recommended for such polymers as urethanes, epoxies, acrylates and phenolics that must adhere to inorganic substrates; e.g., glass, metals, fiberglass and particulate fillers. Applications include adhesives and sealants, coatings, glass fiber sizes and finishes, primers and foundry sand binders.

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>Straw-to-amber</td>
</tr>
<tr>
<td>Specific Gravity at 25/25°C</td>
<td>1.07</td>
</tr>
<tr>
<td>Boiling Point, °C (°F)</td>
<td>310 (590)</td>
</tr>
<tr>
<td>Flash Point, Pensky-Martens Closed Cup(1), °C (°F)</td>
<td>146 (295)</td>
</tr>
</tbody>
</table>

(1) ASTM Method D 93

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Potential Applications (continued)

The excellent high-temperature performance of silane Y-9669 is demonstrated by the improvement in durability of a glass fiber reinforced phenolic resin laminate. As shown in Table 1, composites prepared with silane Y-9669 better maintained the superior flexural strength of the laminate, even after prolonged exposure to high temperature and moisture, as compared to similar composites prepared with Silquest A-1100 silane.

Table 1: Effect of Silanes on High-Temperature Flexural Strength Properties of Phenolic/Fiberglass Composites

<table>
<thead>
<tr>
<th>Silane</th>
<th>Flexural Strength, psi x 10⁻³</th>
<th>Initial</th>
<th>96 hr at 500°F (260°C)</th>
<th>192 hr at 500°F (260°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dry/Wet</td>
<td>Dry/Wet</td>
<td>Dry/Wet</td>
</tr>
<tr>
<td>Silquest A-1100</td>
<td>64/62</td>
<td>47/41</td>
<td>22/13</td>
<td></td>
</tr>
<tr>
<td>Silquest Y-9669</td>
<td>65/66</td>
<td>58/48</td>
<td>41/34</td>
<td></td>
</tr>
</tbody>
</table>

These data confirm that silane Silquest silane Y-9669 offers superior high-temperature aging characteristics in GFR composites. Consequently, it is a likely candidate for other resin systems and applications that involve high-temperature exposure.

Formulation and Use

Silquest silane Y-9669 may be added directly to the matrix resin or during formulation, or used independently as a primer. For waterborne applications, the silane can be diluted in acidified water. When properly diluted, these aqueous solutions are stable for up to 72 hours. A typical solution is prepared by adding 1 gram of Silquest silane Y-9669 to 99 grams of water acidified to pH 2.9 with glacial acetic acid.
SILQUEST® Silane Y-9669 phenylaminosilane adhesion promoter

**Patent Status**
Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

**Product Safety, Handling and Storage**
Customers considering the use of this product should review the latest Material Safety Data Sheet and label for product safety information, handling instructions, personal protective equipment if necessary, and any special storage conditions required. Material Safety Data Sheets are available at www.momentive.com or, upon request, from any Momentive Performance Materials representative. Use of other materials in conjunction with Momentive Performance Materials products may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

**Limitations**
Customers must evaluate Momentive Performance Materials products and make their own determination as to fitness of use in their particular applications.

---

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Momentive Performance Materials maintains an around-the-clock emergency service for its products. The American Chemistry Council (CHEMTREC) and CareChem24 International also maintain an around-the-clock emergency service for all chemical products:

<table>
<thead>
<tr>
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<th>Momentive Performance Materials Products</th>
<th>All Chemical Products</th>
</tr>
</thead>
<tbody>
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<td>CHEMTREC: 800.424.9300</td>
</tr>
<tr>
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<td>518.233.2500</td>
<td>CHEMTREC: 800.424.9300</td>
</tr>
<tr>
<td>Canada</td>
<td>518.233.2500</td>
<td>CHEMTREC: 800.424.9300</td>
</tr>
<tr>
<td>Europe</td>
<td>+518.233.2500</td>
<td>+44.(0)208.762.8322 (UK)</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
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<td>+518.233.2500</td>
<td>+961.3.487.287 (Lebanon)</td>
</tr>
<tr>
<td>All countries, except Israel</td>
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</tr>
<tr>
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<td>CHEMTREC: +1-703.527.3887 (collect)</td>
</tr>
<tr>
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<td>+518.233.2500</td>
<td></td>
</tr>
<tr>
<td>At sea</td>
<td>Radio U.S. Coast Guard, which can directly contact Momentive Performance Materials at 518.233.2500 or CHEMTREC at 800.424.9300.</td>
<td></td>
</tr>
</tbody>
</table>

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