

# Silquest<sup>\*</sup> A-1170 Silane

adhesion promoter for sealants, adhesives and coatings

## Product Description

Silquest A-1170 silane, a secondary aminofunctional silane, is excellent in a broad range of applications to promote adhesion between inorganic substrates and organic polymers. It can function as a crosslinker for urethane, epoxy and other polymers that can be endcapped or otherwise modified with a secondary amine. Such modification provides a moisture-cure mechanism for these polymers.

In urethane systems with an isocyanate moisture-cure mechanism, Silquest A-1170 silane can reduce the amount of isocyanate required to yield a given level of crosslinking. Silquest A-1170 silane also will improve adhesion to plastic in many resin systems.

## Key Features and Typical Benefits

The chemical properties of Silquest A-1170 silane offer improved performance as an adhesion promoter and as a crosslinker for organic resins.

Structural Feature	Benefit
Hindered secondary amino group	<ul style="list-style-type: none"><li>• Controlled reactivity with isocyanates</li><li>• Stable pre-polymers</li><li>• Limited secondary reactions</li></ul>
Two silyl groups	<ul style="list-style-type: none"><li>• Enhanced adhesion to dry/moist surfaces</li><li>• Strong and weather resistant bonds</li><li>• Improved crosslinking efficiency in urethane polymer systems</li><li>• Potential to reduce system isocyanate requirements, leading to safer, easier to handle formulations</li></ul>
Methoxy silane ester	<ul style="list-style-type: none"><li>• Rapid attainment of bond strength</li></ul>

Momentive Performance Materials provides versatile materials as the starting point for our creative approach to ideas that help enable new developments across hundreds of industrial and consumer applications. We are helping customers

solve product, process, and performance problems; our silanes, fluids, elastomers, sealants, resins, adhesives, urethane additives, and other specialty products are delivering innovation in everything from car engines to biomedical devices.

From helping to develop safer tires and keeping electronics cooler, to improving the feel of lipstick and ensuring the reliability of adhesives, our technologies and enabling solutions are at the frontline of innovation.



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Potential Applications

Silquest A-1170 silane is an excellent material of choice for evaluation in adhesives, sealants and coatings to achieve weather- and moisture-resistant bonds to substrates with difficult adhesion properties such as glass, metal, concrete and plastic. Durable water-resistant bonds are generally achieved when the silyl portion of this aminosilane is condensed with an inorganic surface and is covalently bonded with the resin matrix of the paint, sealant or adhesive.

Because of its unique structure, Silquest A-1170 silane may be particularly useful in primerless, one-part, moisture-cured polyurethane systems. The secondary amino group reacts quantitatively and controllably with free isocyanate groups. This reaction with isocyanate-terminated prepolymers is feasible over a wide molar ratio from > 0 to 100% aminosilane, based on terminal isocyanate. The moisture-cure chemistry of A-1170 silane is a combination of isocyanate/water reactions and silane crosslinking reactions. The resulting bis-silyl endcapped prepolymer provides enhanced crosslinking for a given level of isocyanate, thus allowing the quantity of isocyanate to be reduced. Biuret-forming side reactions common with primary amino groups are minimized. This leads to improved product consistency and improved shelf life.

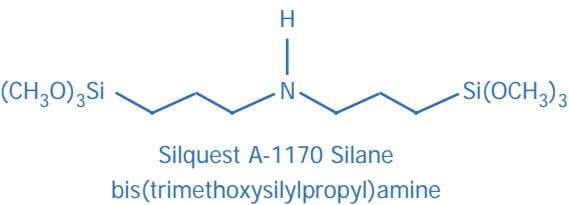
The bis-alkoxysilane structure of Silquest A-1170 silane results in the addition of two silyl groups to each isocyanate group, yielding more durable wet adhesion and more efficient bonding per mole of added silane. The methoxy groups provide rapid reaction with moisture and rapid attainment of substrate bonding.

Having both alkoxysilane and free isocyanate groups on the same polyurethane molecule, Silquest A-1170 silane facilitates the preparation of partially endcapped isocyanate prepolymers. This feature leads to improved formulating flexibility for tailoring mechanical properties and for wet adhesion.

This versatile silane can be used in several ways. It can be added directly to the urethane prepolymer or during system formulation, or it can be used independently as a primer.

When used in neutral-cure RTV silicone formulations, Silquest A-1170 silane can give exceptional adhesion to a variety of plastics.

Chemical Structure



Typical Physical Properties

Physical Form	Clear liquid
Color	Light straw
Percent Active Material	100
Specific Gravity, 25/25°C	1.0423
Molecular Weight, g/mole	341.5
Flash Point, Pensky-Martens Closed Cup, <sup>(1)</sup> °C (°F)	113 (235)
Boiling Point at 4.0 mm Hg, °C (°F)	152 (306)

(1) ASTM Method D93

Table 1: Effect of Silquest A-1170 Silane on Adhesion of Filled RTV Silicone to Plastic Substrates

Substrate	Adhesion, pli			
	With Silquest A-1170 Silane		Control	
	Wet	Dry	Wet	Dry
ABS	17	24	0.1	0.1
PVC	29	32	1.3	0.5
Styrene	31	31	1.1	0.5
Acrylic	26	36	0.5	0.5

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Patent Status

Silquest A-1170 silane and related compounds and their use to endcap urethane prepolymers are described in U.S. Patent 4,374,237.

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](http://www.momentive.com) or, upon request, from any Momentive Performance Materials representative. Use of other materials in conjunction with Momentive Performance Materials products (for example, primers) 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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