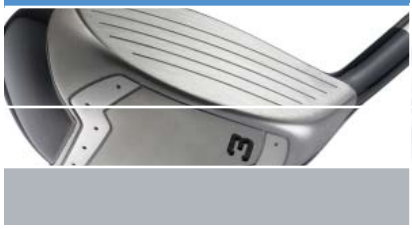
SILQUEST* Y-5997
silane

SILANES - TRADITIONAL



Momentive Performance Materials Silquest Y-5997 silane is a coupling agent for glass fiber and particulate filler reinforced composites. It is a 100% active methacrylamido functional silane that may be used to promote adhesion between a wide range of resins and substrates and reinforcements. It may also be useful as a monomer in the synthesis of organic polymers. It functions as a moisture- activated crosslinking agent.

Key Features and Typical Benefits

The chemical structure of Silquest Y-5597 silane offers a number of important benefits:

Features	Typical Benefits
100% Active Ingredient	■ Contains no flammable or combustible solvent. ■ Offers low VOC emissions
Methacrylamido Group	■ Reactive with a large number of resin systems, such unsaturated polyester, vinyl ester, acrylic, polybutylene and polyolefins ■ Compatible with many typical glass fiber size and coating ingredients, such as film formers, anti-static agents, surfactants, lubricants and other coupling agents ■ Improves hygrothermal aging properties of glass fiber and particulate filler-reinforced composites ■ Provides glass fiber protection ■ Improves strand integrity for better fiber processing and composite fabrication

Typical Physical Properties	
Physical Form	Liquid
Color	Clear and colorless
Active Ingredients, %	100
Specific Gravity, 25/25°C	1.0186
Boiling Point at 760 mmHg, °C	379
Flash Point, Pensky-Marten Closed Cup ASTM D 93, °C (°F)	101.7 (215)

Solubility

Silquest Y-5997 silane is soluble in methanol, ethanol, acetone, toluene, methyl Cellosolve® solvent (Dow Chemical Company) and water.

It reacts with water and alcoholic solvents. In water, a concentration of one weight percent is stable for greater than 72 hours.

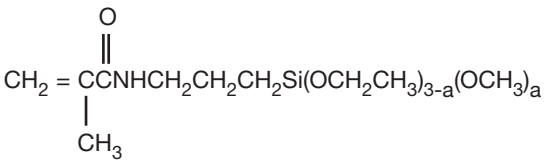
Potential Applications

Silquest Y-5997 silane may be an excellent candidate for evaluation in instances where inorganic surfaces such as glass fibers, particulate fillers or metals are combined with organic polymers, forexample, unsaturated polyester, vinyl ester, acrylic, polybutylene and polyolefins. This silane is often applied to the inorganic surface from an aqueous solution. The treating solution can be quite simple, consisting of only silane, water and a small amount of acid to adjust the pH. These solutions are used commonly in finishing of heat-cleaned woven glass fabrics or treating particulate fillers. More complex solutions often are used when treating glass fibers used for reinforcing organic resins. These treating solutions may contain (in addition to Silquest Y-5997 silane) water-soluble organic polymers or emulsions of organic polymers as film formers, lubricants, anti-static agents, wetting agents, water, acids or buffers and other silane coupling agents. A reference that contains lists of commercial products used in preparing glass fiber sizes is The Manufacturing Technology of Continuous Glass Fibres: Glass Science and Technology 6, second edition, K. L. Loewenstein, Elsevier, New York (1983).

The performance of Silquest Y-5997 silane in glass fiber-reinforced composites is illustrated in Table 1. The single-end, water sized glass fibers were finished with a 0.5 weight percent solution of Silquest Y-5997 silane in water. The pH of the solution was adjusted to 3.5 with glacial acetic acid. The sized single-end roving was then dried. Glass fibers were also treated with Silquest A-174* silane, 3-methacryloxypropyltrimethoxysilane, as a control. Pultruded glass rods were fabricated using these glass fibers and an unsaturated polyester resin (Aropol® 7241, Ashland Chemical Inc.).

Silquest Y-5997 silane may also be used as a monomer in the synthesis of organic polymers, such as acrylics, styrenics and vinyl acrylics. The silane is incorporated into the polymer backbone and functions as a crosslinking agent and adhesion promoter. Amide functionality provides different solubility and physical properties than ester functionality. The polymers may be useful in coatings, sealants and adhesives.

Chemical Structure



Silquest Y-5997 silane is a mixture of ethoxy and methoxy esters. The average value of a is 1.

Table 1: Performance of Silquest Y-5997 Silane and Silquest A-174 Silane in Glass Fiber Application

Property	Silquest A-174 Silane	Silquest Y-5997 Silane
Glass Flexural Strength 2.54 cm Span, grams	28	42
360° Twist Abrasion Test, minutes	1.3	1.2
As Molded Composite Flexural Strength, MPa	814	786
Composite Flexural Strength After 24 hr. Water Boil, MPa	717	717

*Silquest and Silquest A-174 are trademarks of Momentive Performance Materials Inc.

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 should review the latest Material Safety Data Sheet (MSDS) and label for product safety information, safe handling instructions, personal protective equipment if necessary, and any special storage conditions required for safety. MSDS are available at www.momentive.com or, upon request, from any Momentive Performance Materials (MPM) representative. For product storage and handling procedures to maintain the product quality within our stated specifications, please review Certificates of Analysis, which are available in the Order Center. Use of other materials in conjunction with MPM products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

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