Technical Data Sheet

DOWSIL™ Z-6011 Silane

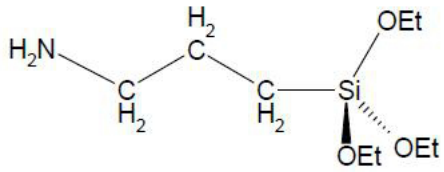
Amino functional alkoxysilane

Features & Benefits

- High purity
- Amino reactive group
- Triethoxy functional
- Improved adhesion
- Increased composite wet and dry tensile strength and modulus
- Increased composite wet and dry flexural strength and modulus
- Increased wet and dry compressive strength
- Increased transparency of fiberglass composites

Composition

- Aminopropyltriethoxysilane



Applications

- Coupling agent to improve adhesion of many plastics, resins and elastomers to inorganic materials and surfaces
- Useful for improving the properties of mineral filled rubber
- Additive for foundry resins

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Property	Unit	Result
Appearance		Colorless to very pale yellow liquid
Specific Gravity at 25°C (77°F)		0.946
Flash Point, Setaflash Closed Cup	°C (°F)	96 (205)
Purity by GC	%	> 98.5
Molecular Weight		221.37
CAS Number		919-30-2

Form No. 26-2705-01-0323 S2D

Description

DOWSIL™ Z-6011 Silane is a reactive chemical containing an aminopropyl organic group and a triethoxysilyl inorganic group. Chemically, DOWSIL™ Z-6011 Silane is designated gamma-minopropyltriethoxysilane (fw 221.4).

Possessing both organic and inorganic reactivity, DOWSIL™ Z-6011 Silane can react with organic resins and elastomers as well as with the surface of inorganic materials such as fiberglass and silica.

DOWSIL™ Z-6011 Silane is particularly recommended for fiberglass-reinforced phenolic, melamine, and epoxy thermoset composites, either as a fiberglass finish or as a resinous additive. Data suggests that this silane can also improve the performance of these types of thermoset resins when used as mineral binders in foundry and abrasive composite applications. When used as a resin additive, generally the silane is added at a level of 1 percent based on the weight of the resin solids. For each specific application, the optimum level of additive should be determined by testing several concentrations. When used as an additive to epoxy coating, DOWSIL™ Z-6011 Silane improves adhesion of the coating, particularly in very humid environments.

DOWSIL™ Z-6011 Silane has also been found to be an effective coupling agent for clay-reinforced elastomers such as natural and nitrile rubber. The silane-treated clay provides improvement in both physical and dynamic properties compared with similar cured elastomers containing untreated clay.

DOWSIL™ Z-6011 Silane will also improve the adhesion of many coatings urethanes, epoxies, phenolics, and others) to glass and metal surfaces. Best performance is realized when DOWSIL™ Z-6011 Silane is used as a primer, although addition to the coating can also give benefits.

How to Use

DOWSIL™ Z-6011 Silane can be applied to inorganic surfaces as a dilute aqueous solution (0.1 to 0.5 percent silane). Aqueous solutions can be prepared by simply adding the silane to water and stirring. (CAUTION: Poor agitation when adding DOWSIL™ Z-6011 Silane to water can result in locally high concentration that may form gel particles.)

Inorganic surfaces can be treated with the aqueous solution by any suitable method. In the case of siliceous mineral fillers, the mineral can be treated by slurrying in the aqueous solution or mixing with the silane at very high shear (with a high-intensity or professional blender) as a 10 percent solution in isopropanol or etherglycol.

After applying this silane, the glass or mineral surface can be air-dried or dried briefly at 105 to 121°C (220 to 250°F) to effect complete condensation of silanol groups at the surface and to remove water and/or traces of ethanol from hydrolysis. Optimum application and drying conditions, such as time and temperature, should be determined for each application before use in a commercial process.

For use as a primer, two methods are suggested:

Method 1
Dissolve 5 percent DOWSIL™ Z-6011 Silane in isopropyl alcohol; wipe onto the glass or metal substrate; dry at 75°C (167°F) for 15 minutes or at room temperature for 30 minutes; then apply coating.

How to Use (Cont.)

Method 2

To 40 percent DOWSIL™ Z-6011 Silane in isopropanol, add 5 percent water; allow to stand for 6 hours; dilute to 5 percent active with isopropyl alcohol; then apply as in the Method 1.

Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Health and Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

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