Product Information

Organofunctional Silanes

DOW CORNING

Dow Corning® Z-6124 Silane

FEATURES

- Inorganic reactivity

COMPOSITION

- Arylalkoxy silane supplied as a low-viscosity liquid

Arylalkoxy silane used to make inorganic surfaces hydrophobic

APPLICATIONS

- Making inorganic surfaces hydrophobic
- Pigment treatment
- Silane coupling agent blends

TYPICAL PROPERTIES

Specification Writers: Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on this product.

Method	Test	Unit	Result
CTM[1] 0005	Color, APHA, maximum		100
CTM 0087	Purity, minimum	percent	94
CTM 0001	Specific Gravity		1.05
CTM 0002	Refractive Index		1.4734
CTM 0090A	Flash Point, closed cup	°C (°F)	29 (85)

[1]CTMs (Corporate Test Methods) correspond to ASTM standard tests in most instances. Copies of CTMs are available upon request.

DESCRIPTION

Dow Corning® Z-6124 Silane has the chemical formula:

and is designated phenyltrimethoxy silane.

Dow Corning Z-6124 Silane is a chemical monomer that reacts with water to form a silanetriol and methanol. Following hydrolysis, reactive silanol groups are formed, which can condense with other silanol groups, i.e., those on the surface of siliceous fillers, to form siloxane linkages.

Stable condensation products are also formed with other oxides such as those of aluminum, zirconium, tin, titanium and nickel. Less stable bonds are formed with oxides of boron, iron and carbon. Alkali metal oxides and carbonate do not form stable bonds with Si-O. Sufficient water for hydrolysis may be available from atmospheric moisture, or on the substrate surface. In some cases, it may be necessary to add water to increase the degree of hydrolysis.

The tendency toward self-condensation can be controlled by using fresh solutions, alcoholic solvents, dilution and careful selection of pH ranges. Silanetriols are most stable at pH 3-4, but condense rapidly at pH 7-9.

HOW TO USE

There are three basic methods of utilizing *Dow Corning* Z-6124 Silane in a coatings application: 1) Surface treatment, which includes treatment of particles, e.g., pigments and fillers, or formulation into primers and water repellents; 2) Additive into paints, inks and adhesives; 3) Reactive intermediate for silicone resin synthesis or organic resin modification. Each of these methods requires special consideration. For pigment and filler treatment, the typical concentration is 0.5 to 1.0 percent.

Surface Treatment

The most straightforward method of silylating a surface with *Dow Corning*

Z-6124 Silane is from an alcohol solution. A 2 percent silane solution can be prepared in the alcohol of choice (methanol, ethanol or isopropanol are typical choices). The solution can be wiped, dipped or sprayed onto the surface. When dipping a large object, e.g., a glass plate, allow 1 to 2 minutes of submersion to allow silane migration to the surface. After the surface dries, excess material can be gently wiped or briefly rinsed with alcohol. Particles, e.g., pigments and fillers, can be silylated by stirring them in a solution for 2 to 3 minutes and then decanting the solution. The particles can then be rinsed with alcohol. Cure of the silane layer occurs in 5 to 10 minutes at 110°C (230°F) or 24 hours at ambient conditions.

As a coating primer, improved flow and adhesion performance have been noted by applying silanes from aqueous alcohol solutions. A 95 percent ethanol-5 percent water solution is adjusted to pH 3.5 to 4.0 with acetic acid. Add the *Dow Corning* Z-6124 Silane with stirring to yield a 0.5 to 2.0 percent final concentration. Generally, 6 hours should be allowed for hydrolysis, silanol formation and equilibration.

Low-VOC aqueous solutions can be prepared by dissolving 0.5 to 2.0 percent of *Dow Corning* Z-6124 Silane in pH-adjusted water (3.5 to 4.0 pH with acetic or formic acid).

Filler and pigment treatment is usually accomplished by a spray-on method. It assumes that the total amount of silane needed is known and that sufficient hydroxyl moieties are present on the filler to allow reaction with the silane. The powder is placed in a high intensity solids mixer, e.g., a twin-cone mixer with intensifier. *Dow Corning* Z-6124 Silane is pumped into the agitated powder as a fine spray. Dynamic drying methods are the most effective.

Additive

Dow Corning Z-6124 Silane or blends with other silanes can also be utilized as an additive (0.1 to 3.0 weight percent solids). The silane becomes a component of a coating from which it diffuses or migrates to inorganic substrates and reacts. Benefits include improved pigment dispersion, decreased pigment floating, improved adhesion and film hardness.

Reactive Intermediate

Owing to the highly reactive methoxy sites, organic compatibility and unique silicone chemistry, *Dow Corning* Z-6124 Silane provides the coating formulator with a myriad of straightforward synthesis solutions to high-performance application requirements.

Silicon-organic blends or 100 percent novel silicone resin polymers can easily be synthesized by hydrolysis of silane blends in slightly acidic solution. Low-VOC materials can be produced by balancing the composition linearity, the degree of hydrolysis and the removal of the methanol produced during hydrolysis.

Materials of this type may be utilized in paints, primers, inks and adhesives where excellent adhesion, weathering resistance and high-temperature stability are required.

HANDLING PRECAUTIONS

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET IS AVAILABLE FROM YOUR DOW CORNING REPRESENTATIVE, OR DISTRIBUTOR, OR BY CALLING YOUR GLOBAL DOW CORNING CONNECTION.

USABLE LIFE AND STORAGE

When stored in original, unopened containers at or below 25°C (77°F), *Dow Corning* Z-6124 Silane has a shelf life of 36 months from date of manufacture. Refer to product packaging for “Use By” date.

PACKAGING

Dow Corning Z-6124 Silane is supplied in 34.8- and 400-lb (15.8- and 181.4-kg) containers, net weight. A 4-oz (113-g) sample is available upon request.

LIMITATIONS

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

SHIPPING LIMITATIONS

DOT Classification: Flammable.

HEALTH AND ENVIRONMENTAL INFORMATION

To support customers in their product safety needs, Dow Corning has an extensive Product Stewardship organization and a team of Health, Environment and Regulatory Affairs specialists available in each area.

For further inforation, please consult your local Dow Corning representative.

WARRANTY INFORMATION

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer’s tests to ensure that Dow Corning’s products are safe, effective, and fully satisfactory for the intended end use. Dow Corning’s sole warranty is that the product will meet the Dow Corning sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted. Dow Corning specifically disclaims any other express or implied warranty of fitness for a particular purpose or merchantability, unless Dow Corning provides you with a specific, duly signed endorsement of fitness for use. Dow Corning disclaims liability for any incidental or consequential damages. Suggestions of use shall not be taken as inducements to infringe any patent.

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