

CoatOSil* 2287

CoatOSil* 2287

Description

CoatOSil 2287 silane may provide shelf stable non-yellowing crosslinking performance to enhance the physical properties of waterborne dispersion polymers such as polyurethane and acrylic latexes. When CoatOSil 2287 silane is incorporated as a crosslinker or adhesion promoter, it may provide improved water resistance and wet adhesion, with good shelf stability.

Key Features and Benefits

- Enhanced water and organic solvent resistance of coatings
- Improved wet and dry adhesion, without yellowing
- Performance consistency with aging

Typical Physical Properties

Property	CoatOSil 2287
Specific Gravity at 25°C	0.979
Viscosity at 25°C, cSt	3
Flash Point, Pensky-Martens closed cup ASTM D93, °C (°F)	104 (220)

Chemical Structure



Chemical Name
3-Glycidoxypropylmethyldiethoxysilane

CAS # 2897-60-1

Potential Applications

CoatOSil 2287 silane is an excellent candidate to consider for formulations employing carboxylated latexes

(acrylic, SBR, polyurethane, etc.) exhibiting a pH between 6 and 8.5.

CoatOSil 2287 silane may be employed as an adhesion promoter or crosslinker. It may be suitable for use as a water stable single component crosslinker in applications such as:

- Wood furniture and flooring finishes
- Metal coatings

In such applications, CoatOSil 2287 silane may provide a means of replacing a 2 part waterborne coating with a single component system. The potential benefits of a silane crosslinked water stable single component system include reduced scrap, improved process efficiency and reduced crosslinker toxicity.

Table 1: Acrylic Latex Wood Coating Test Formulation

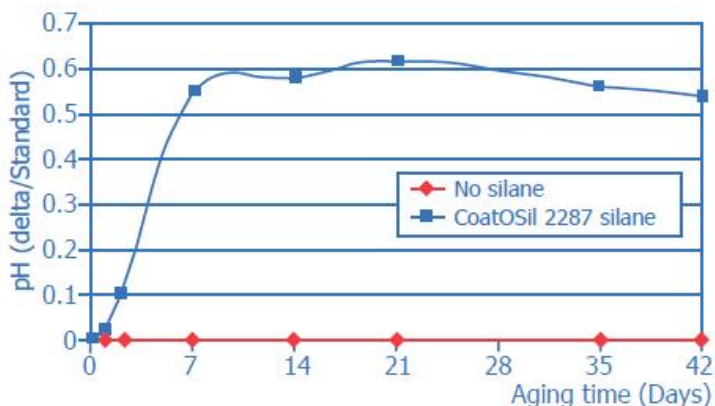
Material	Control Phr	Silane modified Phr
First step		
Latex (45% solids, acid number = 48, MFFT <5°C)	69.5	69.5
Water	9.5	8.3
CoatOSil 2287 Epoxysilane	0.0	1.2 (induction time of 2 days)
Second step		
Matting agent	0.9	0.9
Water	4	4
CoatOSil 1211 Surfactant	0.2	
Coalescing agent	9	9
Wax dispersion	4.3	4.3
Wax dispersion	2.5	2.5
Ammonium Hydroxide (25%)	0.1	0.1
Total	100	100

Note: Ratio of epoxysilane to acid functionality of resin = 0.08% silane per mg KOH acid number (3.8 phr)
Test data. Actual values may vary.

Reactivity Characteristics

CoatOSil 2287 silane reacts with carboxyl groups in anionic polymers to produce a silylated polymer. An acid number of 15 or greater is necessary to have enough sites for effective silylation and crosslinking during coalescence and cure of the coating.

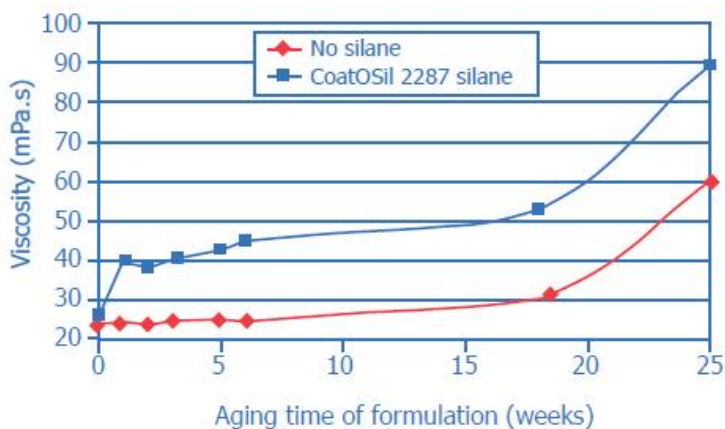
It is recommended that the silane be added to the latex and then allowed to stand for one to three days before the mixture is applied to a substrate. This induction time is polymer dependant and must be checked prior to final tests or application. As the modified latex typically stays shelf stable, it is usually not a problem to keep material for induction prior to industrial applications. Figure 1 illustrates the pH change (relative to the latex control) that occurs as the -COOH group is reacted with the glycidoxo group.

Figure 1: Impact of Epoxysilane on pH of Acrylic Latex

Note: Test data. Actual results may vary.

Shelf Stability Performance

CoatOSil 2287 silane may help deliver enhanced crosslinking and adhesion performance without the rapid loss of shelf stability observed with methoxysilanes. Figure 2 illustrates the effect of aging on viscosity of the acrylic latex formulation described in Table 1.

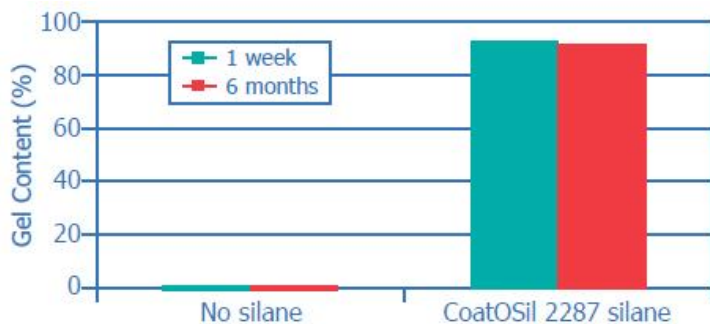
Figure 2: Waterborne Acrylic Latex Shelf Stability - Change in Viscosity at Ambient Conditions

Note: Test data. Actual results may vary.

Crosslinking Performance

CoatOSil 2287 silane delivers high gel content by crosslinking polymer chains. Figure 3 illustrates the measured gel content of the acrylic latex formulation described in Table 1. Figure 4 shows the potential improvement in solvent resistance for the same formulation with and without CoatOSil 2287 and Figure 5 illustrates the potential improvement in water resistance. The different figures illustrate the effects of freshly modified latexes after one week or of aged latexes after 6 months storage.

Figure 3: Gel Content of Acrylic Latex Coating Cured with CoatOSil 2287 Silane



Note: Test data. Actual results may vary.

Figure 4: Solvent Resistance of Acrylic Latex Coating Cured with CoatOSil 2287 Silane

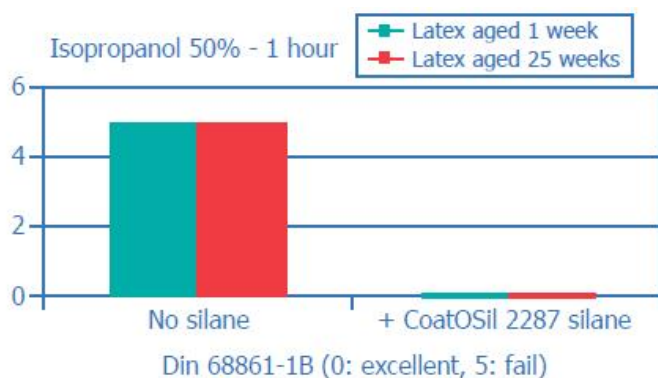
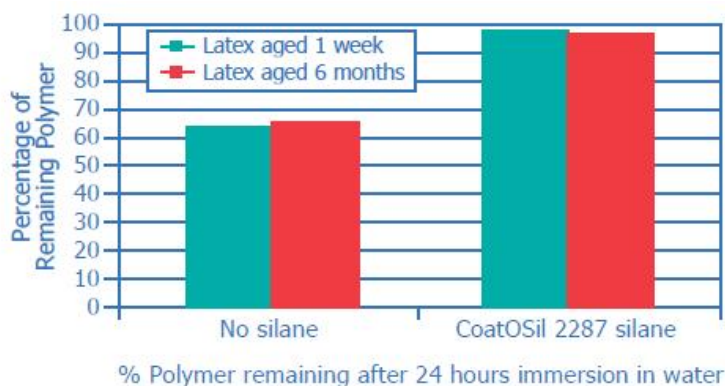


Figure 5: Water Resistance of Acrylic Latex Coating Cured with CoatOSil 2287 Silane



Note: Test data. Actual results may vary.

Recommended Loading Levels

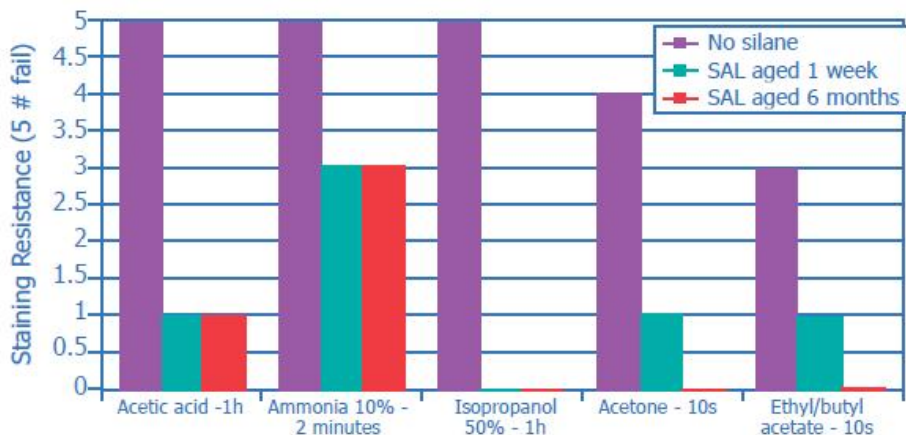
Initial loading levels of 2.0 phr on resin solids are recommended for the development of improved performance through crosslinking. The formulation demonstrated in this bulletin had 0.08 weight % silane added for each unit of acid number. Higher levels may impact shelf life.

Staining Resistance of Wood Coating

Figure 6 shows the staining resistance of formulation given in Table 1 as applied on oak ply wood panels. Application procedure involves deposit of 130g/sqm of wet coating using a spray gun.

Staining tests are made according to DIN 68861-1B. Figure 6 reports tests for latex without silane and for Silylated Acrylic Latex (SAL) using CoatOSil 2287 silane aged 1 week or six months.

Figure 6



Note: Test data. Actual results may vary.

Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute a 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 Safety Data Sheet (SDS) and label for product safety information, safe handling instructions, personal protective equipment if necessary, emergency service contact information, and any special storage conditions required for safety. Momentive Performance Materials (MPM) maintains an around-the-clock emergency service for its products. SDS are available at www.momentive.com or, upon request, from any 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.

Limitations

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

Contact Information

For product prices, availability, or order placement, contact our customer service at Momentive.com/CustomerService/

For literature and technical assistance, visit our website at: www.momentive.com

DISCLAIMER:

THE MATERIALS, PRODUCTS AND SERVICES OF MOMENTIVE PERFORMANCE MATERIALS INC. AND ITS SUBSIDIARIES AND AFFILIATES (COLLECTIVELY "SUPPLIER"), ARE SOLD SUBJECT TO SUPPLIER'S STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDER ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, SUPPLIER MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, (i) THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER END-USE CONDITIONS, OR (ii) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING ITS PRODUCTS, MATERIALS, SERVICES, RECOMMENDATIONS OR ADVICE. EXCEPT AS PROVIDED IN SUPPLIER'S STANDARD CONDITIONS OF SALE, SUPPLIER AND ITS REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS, PRODUCTS OR SERVICES DESCRIBED HEREIN.

Each user bears full responsibility for making its own determination as to the suitability of Supplier's materials, services, recommendations, or advice for its own particular use. Each user must identify and perform all tests and analyses necessary to assure that its finished parts incorporating Supplier's products, materials, or services will be safe and suitable for use under end-use conditions. Nothing in this or any other document, nor any oral recommendation or advice, shall be deemed to alter, vary, supersede, or waive any provision of Supplier's standard Conditions of Sale or this Disclaimer, unless any such modification is specifically agreed to in a writing signed by Supplier. No statement contained herein concerning a possible or suggested use of any material, product, service or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of Supplier covering such use or design, or as a recommendation for the use of such material, product, service or design in the infringement of any patent or other intellectual property right.

Momentive and the Momentive logo are trademarks of Momentive Performance Materials Inc.