



VHB™ Tape Glass Bonding and Silane Coupling Agents

Technical Bulletin

April, 2007

When to Use a Glass Primer (Silane Coupling Agent)?

Silane coupling agents should be used any time 3M™ VHB™ Tape is being used to bond to glass and is expected to perform in a high humidity environment or where frequent contact with water is encountered. Examples of some applications utilizing these primers include muntin bars bonded to glass windows, mounting letters to glass storefronts for outdoor signs and viewing windows for equipment expected to perform in the presence of water.

Which Silane Coupling Agents Work With 3M™ VHB™ Tapes?

There are many silane coupling agents available commercially. Most of them are designed as additives for materials such as fiberglass, since they create a bond between the glass fibers and the matrix resin. For use with 3M™ VHB™ Tapes, we have found that the best performance is obtained with 3-Glycidoxypropyl trimethoxysilane resin. The following source list is suggested for the user's evaluation in light of the user's particular purpose and method of application.

Suggested Sources For Silane Coupling Agents:

	Company	Contact	Products*
Premixed (ready to use)	3M	Available through distributors that carry 3M™ VHB™ Tapes. www.3m.com/vhb	3M™ Silane Glass Treatment AP 115 (4 oz. pump spray or 1 gal. bottle)
	Custom-Pak Products, Inc. N118 W18981 Bunsen Drive Germantown, WI 53022	ph) 262-251-6180 fax) 262-251-6243 dberg@custompakproducts.com	Gap-1: one time use pads Gap-4: 4 oz. pump applicator Gap-11: 11 oz. aerosol Gap 128: 1 gallon container
Concentrated (mix by customer)	Lancaster Synthesis, Inc. P.O. Box 1000 Windham, NH 03087	ph) 800-238-2324 fax) 603-889-3326 www.lancastersynthesis.com	4992: 25, 100, & 500 ml container

*Please consult the manufacturer for further information regarding specific products.

How Are the Solutions Prepared and Applied?

No special preparation is required for premixed silane coupling agents. For concentrated silane solution, discussions with the suppliers' technical personnel as well as 3M laboratory evaluation suggests that a 0.5 wt. % level of silane coupling agent diluted in a 91:9 isopropyl alcohol (IPA):water cleaning solution is optimum*. After addition of the silane coupling agent it is important that the solution is mixed thoroughly and allowed to hydrolyze (activate) for 8 hours before applying it to the glass surface. If hot water is used, the solution should be usable in 30 minutes. To apply either the pre-mixed or customer mixed concentrated primer-cleaner solution, spray on the surface of the glass or moisten a clean towel or cloth and treat the glass in the bonding area. Wipe the glass vigorously until it is completely dry and no film, streakiness or residue is visible. Since the silane coupling agent is incorporated into the cleaning solution, no extra process steps are added. However, the glass surface should be cleaned first with a 50:50 blend of IPA:water if the glass is excessively dirty prior to the silane treatment of the glass. Under normal room temperature conditions it is best to wait 1 to 3 minutes before applying the tape so that any residual moisture can evaporate.

*Be sure to read and follow silane and solvent manufacturer's precautions and directions for use for proper handling and storage information.

How Long Will This Solution Be Effective?

For premixed silane adhesion promoters, the shelf life is typically 12 months, as these products are manufactured under rigorous conditions and process controls. Be sure to check the expiration date on any premixed or concentrated silane solution before using. When concentrated silane coupling agents are activated with water by the customer, it is best to use this solution within two months. The effectiveness of either premixed or customer mixed silane-cleaner solutions will be reduced if the shelf life is exceeded. It is important to consult the manufacturer for specific shelf life recommendations for each product used.

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How is the 3M™ VHB™ Tape Performance Enhanced?

Normally, the hydrophilic or “water-loving” nature of glass makes acrylic adhesive bond strength unstable under high humidity or water contact conditions. In basic terms, the water vapor undercuts the bond and interferes with the normal adhesion forces. The silane coupling agents change the nature of the glass to hydrophobic or “water-hating”. With the proper use of silane coupling agents the adhesion strength of acrylic adhesive is stable over time, even in high moisture environments.

Product Use

All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

Limited Warranty

3M warrants for 24 months from the date of manufacture that 3M™ VHB™ Tape will be free of defects in material and manufacture. 3M MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. This limited warranty does not cover damage resulting from the use or inability to use 3M™ VHB™ Tape due to misuse, workmanship in application, or application or storage not in accordance with 3M recommended procedures.

Limitation of Remedies and Liability

If the 3M™ VHB™ Tape is proved to be defective within the warranty period stated above. THE EXCLUSIVE REMEDY, AT 3M'S OPTION, SHALL BE TO REFUND THE PURCHASE PRICE OF OR TO REPAIR OR REPLACE THE DEFECTIVE 3M™ VHB™ TAPE. 3M shall not otherwise be liable for loss or damages, whether direct, indirect, special, incidental, or consequential, regardless of the legal theory asserted, including negligence, warranty, or strict liability.

ISO 9001:2000

This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001:2000 standards.



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