

DRAWN DATE
JHF 04-06-93

CHECKED
MBH 04-14-93

APPROVED



TRUCK INCORPORATED
415 EAST DUNDEE
OTTAWA, KANSAS 66067
(913) 242-2200 FAX (913) 242-6117

SHEET
1 OF 3

ENGINEERING SPECIFICATION
OR INSTRUCTIONS

ESN-0013

TITLE:

SURFACE PREPARATION TECHNIQUES TO BE USED FOR "Scotch Brand VHB" TAPE APPLICATIONS.

THE FOLLOWING GUIDELINES ARE SUGGESTED METHODS ONLY. BECAUSE OF THE VARIETY OF SURFACES AND CONTAMINENTS, EACH APPLICATION SHOULD BE TESTED AND EVALUATED TO DETERMINE IF BOND STRENGTH IS SUITABLE FOR YOUR APPLICATION.

TO REQUEST ADDITIONAL INFORMATION OR TO ARRANGE FOR ASSISTANCE ON VHB TAPE APPLICATIONS CALL TOLL FREE 1-800-227-5085.

CORRESPONDENCE SHOULD BE ADDRESSED TO:
3M INDUSTRIAL TAPE AND SPECIALTIES DIVISION
3M CENTER BLDG. 220-7E-01
ST. PAUL, MN 55144-1000

NOTE: WHEN USING ANY CHEMICALS DESCRIBED IN THESE GUIDELINES, ALWAYS READ AND FOLLOW THE MANUFACTURER'S DIRECTIONS AND PRECAUTIONS FOR HANDLING SUCH MATERIALS.

GENERAL DESCRIPTION:

Scotch Brand VHB (very high bond) tape is constructed of a closed cell acrylic or neoprene foam with a pressure-sensitive acrylic adhesive on both sides of the foam.

TEMPERATURE RANGE:

Ideal tape application temperature range is 70°F to 100°F, although application at temperatures down to 50°F is possible. At temperatures below 50°F the adhesive is too firm for bonding.

BOND STRENGTH:

Reaches 90% bond strength in 24 hours and full bond strength in 72 hours.

SURFACE CLEANLINESS:

One way to assess cleanliness is that a surface prepared for VHB Tape application should be as clean as one being prepared for painting. Most substrates common to VHB tape applications are best prepared by cleaning with a 50/50 mixture of Isopropyl Alcohol (IPA) and water. Where heavy oils or greases are present there may be a need to first cut the oil with a degreasing solvent, but this should always be followed with an IPA-water cleaning to ensure that any residue or film is cleaned up. Some plastics and paints may also have additives which are low surface energy materials and may impede adhesion. These require removal by abrading, priming or using a VHB tape suitable for that surface.

SUGGESTED PROCEDURE FOR CLEANING:

Spray or wipe the IPA-water solution onto the surface to be cleaned and scrub with a rag or paper towel until it is dry. Sometimes it may work better to use one rag for cleaning and one rag for drying. Cotton rags and heavy-duty paper towels tend to work best. Be sure to change rags or towels often to avoid smearing the dirt to areas already cleaned.

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ABRASION:

Abrasion of a surface can serve several functions. It can be used to remove caked-on dirt or oxide. It can also be used to create additional surface area which may enhance adhesion, and it can be used to smooth the surface to obtain more flatness and therefore increase surface contact with a tape. On surfaces where a VHB tape bond is lower than desired, abrasion can often be used to improve adhesion. When using abrasion as a process, it is important for tapes to have a very finely abraded surface. Very small scratches generated with circular motion rather than straight line motion is preferred. A surface with lots of micro-scratches can have 30-40% additional surface area for the adhesive to make a bond. The most important factors are to have a fine abrasive and to clean up the surface with solvent and/or IPA-water solution.

NOTE: An exception to this guideline applies to the use of 4932 and 4952 tapes. These tapes perform well on smooth, glossy surfaces and abrasion usually negatively affects the bond of these two products.

OILY SURFACES:

On surfaces with a light oily film, the 50/50 IPA-water solution is usually adequate. Where heavy oils or grease are present, a degreasing solvent such as heptone, mineral spirits or naphtha are suggested to cut the film. The more oil there is present, the more important it is to change rags frequently. These types of solvents will often leave a slight film of residue behind and it is necessary to follow up by cleaning with IPA-water solution before applying the VHB tape.

HEAVY GRIME OR OXIDIZED SURFACES:

If there is a hard film of dirt, oxidized paint and oxidized metal, it will probably be necessary to abrade the surface to clean it up. Fine steel wool or abrasive paper (220 grit or finer) can be used to expose a suitable layer on which to bond. Tools such as wire brushes or power sanders will assist on large jobs. Avoid grinding a surface with coarse abrasive materials since they may create too rough of a texture for the adhesive to adequately flow into. Finally, be certain all loose particles are cleaned up followed by cleaning with IPA-water solution.

GALVANIZED STEEL:

VHB tape bonds to galvanized steel usually yield high adhesion levels. When "white rust" (zinc oxide) forms on the surface, this may inhibit the ability of the VHB tape to make complete contact with the surface and reduce bond strength. The oxidation can be removed by abrasion or cleaned with a weak acidic solution such as 6 to 8% phosphoric acid. For light oxidation vinegar may be sufficient.

BRASS, COPPER AND BRONZE:

Brass, Copper and Bronze are all prone to oxidation even after the VHB tape is applied. To prevent this from weakening the bond, a lacquer or varnish can be applied to these surfaces to help ensure long term adhesion to these metals. Be sure to test the VHB tape bond to the lacquer on a metal surface to verify good adhesion.

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PLASTICS AND PAINTS:

Some plastics and paints may require special surface preparation because of additives which impede adhesion. The 4932 and 4952 VHB tapes for low surface energy materials will often have good adhesion to these substrates. Sometimes however, these surfaces may yield low adhesion even with these special tapes. If this is observed, it would be worthwhile to evaluate a product such as 4950 VHB tape in conjunction with abrasion.

NOTE: Do not bond 4932 or 4952 to abraded surfaces, they tend to work better on smooth glossy surfaces.

On "powder" or "E" coated paints, if 4952 VHB tape has low adhesion, often 4941, 4945 or 4950 tapes will have a higher level of adhesion if the paint is lightly abraded.

PLASTICIZED VINYLs:

To prevent plasticizer migration from flexible vinyls, VHB tapes 4926, 4936, 4941, 4945, 4946 or 4956 should be evaluated. The level of plasticizer and type can affect adhesion to these materials. The above tapes are formulated to be resistant to plasticizer migration. To evaluate the potential for plasticizer migration, age bonded samples for a week at 150°F then check for softening of the adhesive, discoloration and reduction in bond strength.

GLASS, STONE AND CERAMIC SURFACES:

Applications to glass, stone, ceramic or other siliceous materials with VHB tapes that will be outdoors or in extremely humid or wet environments may require a silane primer to promote long term adhesion. Although it is not required in all cases, a silane adhesion promoter can be added to the IPA-water cleaning solution to clean and primer in one step. A Technical Service Bulletin entitled "Glass Bonding: VHB Tapes and Silane Coupling Agents" has been issued on this subject. Call or write 3M at the address given at the beginning of this specification.

Be careful not to use commercial or industrial glass cleaners (Windex, etc) to prepare the surface for VHB tapes. These cleaners contain surfactants or other contaminants which can remain on the glass and impede adhesion. If the glass has already been cleaned with a glass cleaner, follow with a cleaning of IPA-water solution, dry and test to assure good adhesion.

POROUS AND FIBROUS SURFACES:

Most porous and fibered materials such as wood, particle board, and concrete require sealing to provide a unified surface. VHB tape bonds to these materials will be marginal if the surface is not coated or primed. On concrete or wood 3M Spray 80 Contact Adhesive has been found to be a good sealant and primer in conjunction with VHB tapes. Because of the variation of fibered or porous surfaces, always run tests to determine if the bond strength is suitable for your application.

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