VHB™ Tapes
Design Guide

Improve process, improve products

Permanently bonding and sealing worldwide for 25 years
For 25 years, industries worldwide have been using 3M™ VHB™ Tapes to permanently bond and seal many substrates for increased productivity, high strength, long term durability, and improved appearance.

Table of Contents

- 3M VHB Tapes product information .......................................................... page 3
- Strength ..................................................................................................... page 4
- Durability .................................................................................................. page 5
- Productivity ............................................................................................... page 6
- Appearance ............................................................................................... page 7
- Construction from panels to windows ....................................................... pages 8-9
- Signs limited only by the imagination ....................................................... page 10-11
- Metal fabrication – strength and durability with ease ............................... page 12
- Transportation – built fast to last ............................................................... page 13
- Electronics from board to “box” ................................................................. page 14
- Optimizing tape performance on a wide variety of surfaces ....................... page 15
### 3M™ VHB™ Tapes Product Information

<table>
<thead>
<tr>
<th>Product Number</th>
<th>Tape Thickness w/o liner (Mils)</th>
<th>Description</th>
<th>Adhesive Type</th>
<th>Temperature Resistance</th>
<th>Solvent Resistance</th>
<th>Relative Adhesion</th>
<th>Application Ideas</th>
<th>Liner Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4926</td>
<td>15 (0.4)</td>
<td>Gray, closed-cell acrylic foam carrier. Conformable. Good adhesion to many painted metals. Plasticizer resistant. UL 746C.</td>
<td>Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Med.</td>
<td>Bond muntin bars to windows. Bond and seal polycarbonate lens over LCD. Bond pre-painted metals in truck assembly. Bond and seal plastic windows to pre-painted control panels/switch gear. Mount vinyl wiring ducts and conduit channels.</td>
<td>A</td>
</tr>
<tr>
<td>4936</td>
<td>25 (0.64)</td>
<td>Black version of 4936 tape. Black version of 4941 tape.</td>
<td>Modified Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Med.</td>
<td>Bonds to a variety of plastics and paint systems.</td>
<td>D</td>
</tr>
<tr>
<td>4936F</td>
<td>25 (0.64)</td>
<td>Black version of 4956 tape.</td>
<td>Modified Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Med.</td>
<td>Bonds to a variety of plastics and paint systems.</td>
<td>D</td>
</tr>
<tr>
<td>4941</td>
<td>45 (1.1)</td>
<td>Gray conformable foam.</td>
<td>Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Low</td>
<td>Bond cellular phone antennas. Bond automatic toll tags to vehicle.</td>
<td>C</td>
</tr>
<tr>
<td>4941F</td>
<td>45 (1.1)</td>
<td>Gray conformable foam.</td>
<td>Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Low</td>
<td>Bond cellular phone antennas. Bond automatic toll tags to vehicle.</td>
<td>C</td>
</tr>
<tr>
<td>4956</td>
<td>62 (1.6)</td>
<td>Dark gray, closed-cell acrylic foam carrier. Conformable. Good adhesion to many painted surfaces, including powder coated paint. UL 746C.</td>
<td>Modified Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Med.</td>
<td>Bonds to a variety of plastics and paint systems.</td>
<td>D</td>
</tr>
<tr>
<td>4956F</td>
<td>62 (1.6)</td>
<td>Dark gray, closed-cell acrylic foam carrier. Conformable. Good adhesion to many painted surfaces, including powder coated paint. UL 746C.</td>
<td>Modified Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Med.</td>
<td>Bonds to a variety of plastics and paint systems.</td>
<td>D</td>
</tr>
<tr>
<td>4959</td>
<td>62 (1.6)</td>
<td>Dark gray, closed-cell acrylic foam carrier. Conformable. Good adhesion to many painted surfaces, including powder coated paint. UL 746C.</td>
<td>Modified Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Med.</td>
<td>Bonds to a variety of plastics and paint systems.</td>
<td>D</td>
</tr>
<tr>
<td>4959F</td>
<td>62 (1.6)</td>
<td>Dark gray, closed-cell acrylic foam carrier. Conformable. Good adhesion to many painted surfaces, including powder coated paint. UL 746C.</td>
<td>Modified Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Med.</td>
<td>Bonds to a variety of plastics and paint systems.</td>
<td>D</td>
</tr>
<tr>
<td>4919F</td>
<td>45 (1.1)</td>
<td>Gray, closed-cell acrylic foam carrier. Conformable. Good adhesion to many painted surfaces, including powder coated paint. UL 746C.</td>
<td>Modified Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Med.</td>
<td>Bonds to a variety of plastics and paint systems.</td>
<td>D</td>
</tr>
<tr>
<td>4991</td>
<td>90 (2.3)</td>
<td>Gray, closed-cell acrylic foam carrier. Conformable. Good adhesion to many painted surfaces, including powder coated paint. UL 746C.</td>
<td>Modified Acrylic</td>
<td>300°F (149°C)</td>
<td>200°F (93°C)</td>
<td>High High Med.</td>
<td>Bonds to a variety of plastics and paint systems.</td>
<td>D</td>
</tr>
</tbody>
</table>

**Liner Types:**
- A – 3 mil 54# Densified Kraft Paper
- B – 5 mil Clear Polyethylene Film
- C – 2 mil Polyester Film
- D – 5 mil Red Polyethylene Film
- E – 4 mil 58# Polycoated Kraft Paper

**Relative Adhesion:**
- HSE – High Surface Energy
- LSE – Low Surface Energy

条件：
- 确保提供此处的技术信息和数据应被视为代表性和典型的，并且不应用于特定程序和用途。
- 用户应根据3M产品判断其是否适合特定用途和适用用户的方法。

http://www.3M.com/vhb
3M™ VHB™ Tapes all-acrylic construction provides strength and durability in highly demanding applications.

- Bond with high holding strength for static or dynamic stress
- Provide a continuous bond to distribute stress over the entire surface
- Viscoelastic properties absorb shock and flexing for reliability against wind, vibration, and other stresses
- Eliminate pull-through, dimpling and weld distortion
- Damp vibration

Damps vibration and noise producing a quieter ride.

Securely bonds stainless steel scuff strips to aluminum wing flaps despite extreme ground-to-air temperature swings of 150°F to -40°F (65°C to -40°C).

Jumeirah Beach Hotel, Dubai, UAE
Curtain wall design: Schmidlin AG, 1998
Aluminum panels bonded to steel stiffeners.

Aeroporto Fortaleza, Fortaleza, Brazil
Architect: Claudio Silva, 1997
Stainless steel panels bonded to steel frame.

www.3M.com/vhb
Signs that resist cold winds in Denmark (installed 1985)

Replace rivets in bonding truck side panels to steel frames for a much smoother, cleaner appearance and a strong bond. VHB tape can also reduce vibration in the box.

O'Hare Airport, Chicago, IL, USA
Architect: Custom Products of Southgate, CA, 1987
Mirror-finish composite ceiling panels bonded to a suspension frame.

- Resists all of the following:
  - High temperature
  - Cold
  - Temperature cycling
  - UV light
  - Moisture and solvents
- Seal against environmental conditions
- Prevent bi-metallic corrosion
- Damp vibration to prevent metal fatigue
- Compensate for differential of thermal expansion

www.3M.com/vhb
For assembly efficiency, die-cut pieces of 3M™ VHB™ Tape bond components in a water-resistant video camera case. The foam conforms to help seal the unit.

- Save money and time with increased efficiency
- PSA (pressure sensitive adhesive) bonds on contact with no bottlenecks for drying time or fixturing
- Fast, easy assembly
- Eliminate time consuming labor – drilling, grinding, refinishing, screwing, welding and clean-up
- Die cut to precisely fit any shape, size or profile
- Easy to use with minimal training

Apply 3M™ VHB™ Tapes...

Prepare surface...

Remove liners, and assemble parts.

Easily cut to size, 3M™ VHB™ Tape 5952 bonds polycarbonate sheets to the back of a routed aluminum face. Surface is simply cleaned prior to application. Tape is pressed with a roller for optimum bonding.
• Virtually invisible fastening helps keep surface smooth and clean to enhance design and appearance
• Expand the range of material options
  - Bond most painted and powder coated surfaces, and plastics such as acrylic, polycarbonate, and ABS
  - Bond metal and most plastics with minimal surface preparation
• Use lighter weight and thinner materials
• Use a wider variety of materials more readily for high impact visual combinations
• Prevent bi-metallic corrosion
• Join dissimilar materials
• Uniform thickness creates repeatable results without expensive equipment

Assembled with 3M™ VHB™ Tape.

Decorative copper cladding adheres to window system creating a unique appearance.

Gas station canopy, Sydney, Australia
Fabricator: Albert Smith Signs, 1989

www.3M.com/vhb
Construction from panels to windows

Fast application to permanently bond many materials flat or curved

Plaza Centenário,
Sao Paulo, Brazil
Architect: Carlos Bratke, 1995
Aluminum stiffeners bonded to ACM panels.

Walt Disney Concert Hall,
Los Angeles, CA, USA
Curtain wall: stiffener and frame attachment

Aluminum hat channel stiffener
ACM

www.3M.com/vhb
Glass bonded to aluminum framework.
Subway station platform door, Korea.

Bond muntin bars made of vinyl, primed wood, or painted aluminum to glass windows or doors. Resists UV exposure.

Glass bonded to aluminum framework.
Subway station platform door, Korea.
Versatility and reliable performance throughout any sign

Twin pole monument sign, Medina, Ohio
Fabricator: Lawrence Sign, 2003

Channel letter sign with decorative backdrop, Seattle, Washington

Signs limited only by the imagination
Monolith style monument sign, St. Paul, Minnesota
Fabricator: Lawrence Sign, 1991

Characters on glass, Fort Lee, New Jersey
Fabricator: Spanjer Brothers, Inc., 1989

Grocery store signage, Sagamihara, Japan
Fabricator: Sanwa Neon, 1993

www.3M.com/vhb
Metal fabrication – strength and durability with ease

Choice of 3M™ VHB™ Tapes for bare or painted metal

Permanently bond metal skin to enclosure frame.

Permanently attach brackets and stiffeners.

Permanently attach plastic pocket to enclosure panel without priming in most applications.

Under equal stress conditions, metal panels bonded with VHB tape show no visible signs of stress compared to those with mechanical fasteners.

www.3M.com/vhb
Built tough with smooth sides to look good for the long haul

- Eliminate rivets and screws that can loosen, rattle, and leak
- Damp vibration and noise for a quieter ride
- Keep sides smooth for graphics
- Separate metals to reduce potential for galvanic corrosion

Transportation – built fast to last

www.3M.com/vhb
Flexibility to meet rigid standards of the electronics industry

Bond and seal polycarbonate viewing window into the door of a process control system.

Bond rigidizer to flex circuit and withstand process heat.

A precise fit with die-cut VHB tape.

Bond screen to high definition television.

Bond and weather-seal a fish finder lens.
3M™ VHB™ Tapes bond permanently to most surfaces when application requirements are met.

**Clean**
In most cases, simply clean substrate with an IPA/water mixture.

**Pressure**
Apply 15 psi at the bond line.

**Temperature**
Typically apply at 50-60°F (10-26°C). Some VHB tapes can be applied as low as 32°F (0°C).

**Time**
Instant tack at room temperature.

### Time Bond strength
- 20 min. 50%
- 60 min. 75%
- 24 hrs. 90%
- 3 days 100%

**NOTE:** The technical information and data provided here should be considered representative or typical only and should not be used for specification purposes. User should evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for user’s method of application.

3M™ VHB™ Tape Removal Systems

Easy-to-use for separating bonded parts and removing residue

3M™ VHB™ Tapes bond most surfaces permanently, but if you have to separate the surfaces and remove residue, 3M also has the tools for a fast, effective job.

**3M™ SMART Tool**
Use by hand or in an air chisel to quickly separate such bonded assemblies as overlapped panels and stiffeners.

**3M™ Stripe Off Wheel**
Takes residue off faster and easier than solvents or adhesive cleaners. Resilient rounded edge follows contours and irregular surfaces and cleans without scratches or damage to acrylic enamel or urethane paint.

www.3M.com/vhb
Limited Product 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 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. Important Notice: User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user’s method of application. Please remember that many factors can affect the use and performance of a 3M product in a particular application. The materials to be bonded with the product, the surface preparation of these materials, the product selected for use, the conditions in which the product is used, and the time and environmental conditions in which the product is expected to perform are among the many factors that can affect the use and performance of a 3M product. Given the variety of factors that can affect the use and performance of a 3M product, some of which 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.

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.

Industrial Business
Industrial Adhesives and Tapes Division
3M Center Bldg. 21-1W-10
900 Bush Ave.
St. Paul, MN 55144
www.3M.com/vhb

Wide experience to support you with applications engineering

- Technical experts at your service backed with more than 25 years experience in putting 3M™ VHB™ tape to work improving products and processes in many applications
- 3M will be there to make sure you are satisfied
- 3M is constantly developing new solutions for constantly changing customer needs

For Additional Information: To request additional product information or to arrange for sales assistance, call toll free 1-800-362-3550. Address correspondence to 3M Industrial Adhesives and Tapes Division, 3M Center, Building 21-1W-10, 900 Bush Avenue, St. Paul, MN 55144. Our fax number is 651-778-4244.