Application Techniques

For successful application of 3M™ VHB™ Tapes it is important to have clean and dry surfaces, to provide adequate pressure to make contact with the substrates, and to insure application temperature is sufficient to build adhesion. 3M™ VHB™ Tapes will build adhesion with time. Adhesion promoters can be used to increase adhesion, to speed bond build or to improve durability on select materials.

Clean

Most substrates are best prepared by cleaning with a 50:50 mixture of isopropyl alcohol (IPA)* and water prior to applying 3M™ VHB™ Tapes. **Exceptions to the general procedure** that may require additional surface preparation include:

- **Heavy Oils**
  A degreaser or solvent-based cleaner may be required to remove heavy oil or grease from a surface and should be followed by cleaning with IPA/water.
- **Abrasion**
  Abrading a surface, followed by cleaning with IPA/water, can remove heavy dirt or oxidation and can increase surface area to improve adhesion.
- **Adhesion Promoters**
  Priming a surface can significantly improve initial and ultimate adhesion to many materials such as plastics and paints.
- **Porous surfaces**
  Most porous and fibered materials such as wood, particleboard, concrete, etc. need to be sealed to provide a unified surface.
- **Unique Materials**
  Special surface preparation may be needed for glass and glass-like materials, copper and copper containing metals, and plastics or rubber that contain components that migrate (e.g. plasticizers).

Refer to 3M™ VHB™ Tapes technical bulletin "Surface Preparation for 3M™ VHB™ Tape Applications" for additional details and suggestions.

* NOTE: These cleaner solutions contain greater than 250 g/l of volatile organic compounds (VOC). Please consult your local Air Quality Regulations to be sure the cleaner is compliant. When using solvents, be sure to follow the manufacturer's precautions and directions for use when handling such materials.

Pressure

Bond strength is dependent upon the amount of adhesive-to-surface contact developed. Firm application pressure develops better adhesive contact and helps improve bond strength. Typically, good surface contact can be attained by applying enough pressure to insure that the tape experiences approximately 15 psi (100 kPa) pressure. Either roller or platen pressure can be used. Note that rigid surfaces may require 2 or 3 times that much

pressure to make the tape experience 15 psi.

Temperature
Ideal application temperature range is 70ºF to 100ºF (21ºC to 38ºC). Pressure sensitive adhesives use viscous flow to achieve substrate contact area. Minimum suggested application temperatures:

- 50ºF (10ºC): 4950, 5952, 4910, 4952, 4611, 4622 tape families
- 60ºF (15ºC): 4941, 4945 tape families
- 32ºF (0ºC): 4951 tape families

Note: Initial tape application to surfaces at temperatures below these suggested minimums is not recommended because the adhesive becomes too firm to adhere readily. However, once properly applied, low temperature holding is generally satisfactory. To obtain good performance with all 3M™ VHB™ Tapes it is important to ensure that the surfaces are dry and free of condensed moisture.

Time
After application, the bond strength will increase as the adhesive flows onto the surface. At room temperature approximately 50% of ultimate bond strength will be achieved after 20 minutes, 90% after 24 hours and 100% after 72 hours.

- This flow is faster at higher temperatures and slower at lower temperatures.
- Ultimate bond strength can be achieved more quickly (and in some cases bond strength can be increased) by exposure of the bond to elevated temperatures (e.g. 150ºF (66ºC) for 1 hour). This can provide better adhesive wet out onto the substrates.
- Abrasion of the surfaces or the use of primers/adhesion promoters can also have the effect of increasing bond strength and achieving ultimate bond strength more quickly.

Adhesion Promoters
Adhesion promoters or primers are used to:

- Increase adhesion to otherwise difficult to bond surfaces
- Develop a faster, stronger bond
- Seal non-unified surfaces such as wood or concrete
- Increase bond durability and stability to substrates such as glass and copper
- Provide a barrier from migrating materials such as those found in rubber or plasticized vinyl

Consult the 3M™ VHB™ Tapes Technical Bulletin "Surface Preparation for 3M™ VHB™ Tape Applications" for a suggestion of possible adhesion promoters or primers for each situation.

Note: It is important for the user to determine the suitability of the 3M™ VHB™ Tapes,

primer and application process and compliance with local Air Quality Regulations.

Removal
The 3M™ VHB™ Tapes are intended for permanent applications. However, there are a variety of removal techniques that can be considered for breaking a bond and cleaning the adhesive residue from the substrate surfaces.

- Because the 3M™ VHB™ Tapes stay soft and resilient the foam can be cut with a variety of tools, from a textured piano wire to a 3M SMART Tool. Because the 3M™ VHB™ Tapes are sticky all the way through use of a lubricant, such as soap, will make the job easier.
- With small bonds the strength of the tape can be overpowered by prying or twisting. Removing at slower rates or at higher temperatures is generally easier.
- The residue can be removed by abrasion such as with a 3M™ Stripe Off Wheel, can be softened with a variety of solvents, or can be baked off with high temperature.

For details, consult the 3M™ VHB™ Tapes Technical Bulletin "Disassembly of 3M™ VHB™ Tapes Bonded Materials and Removal of Residue Adhesive". For applications that require regular removal the 3M Dual Lock Reclosable Fasteners with 3M™ VHB™ Tapes adhesive should be considered.