3M VHB Tape Since 1980

3M™ VHB™ Tape
Design Guide

Dream. Design. Deliver.

3M™ VHB™ Tape

Open a world of new possibilities.

Bonding product parts with precision, ease, reliability and strength requires an approach that breaks the barriers of traditional construction elements. 3M VHB Tapes open up a world of possibilities — eliminating rivets, screws, bolts and welds — and improving design construction, aesthetics and productivity. With unmatched strength, these tapes increase the overall durability and reliability of every product bond.

Experience the strength and reliability of 3M VHB Tapes.

Invisible bond

Enhance your design appearance with virtually invisible bonding — a game-changing approach for your design concepts. Explore new possibilities and use new, innovative materials to improve the look of your products while optimizing performance, preventing bi-metallic corrosion and streamlining your production processes.

A durable difference

With a bond that's built to withstand the rigors of exposure, 3M VHB Tapes resist hot, cold and cycling temperatures, UV light, moisture and solvents. They seal against environmental conditions and damp vibration to reduce metallic wear-and-tear.

Demanding strength

For your most demanding bonding applications, 3M™ VHB™ Tapes distribute dynamic or static stress over the entire surface of the design, improving holding strength and eliminating the need for mechanical fasteners.

Application efficiency

3M VHB Tapes are simple and easy to apply, saving you time and money. The tapes bond on contact, assemble easily and can be cut to precise shapes and sizes for custom applications. 3M VHB Tapes don’t require a cure time and can be used in pre-assembly processes.

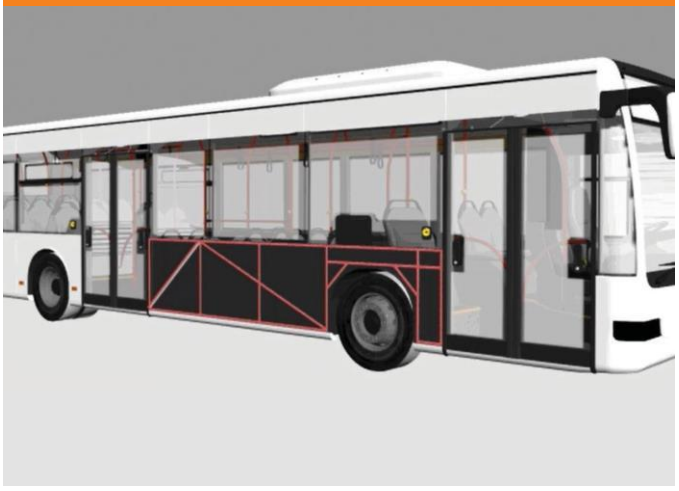
Applications and Innovations

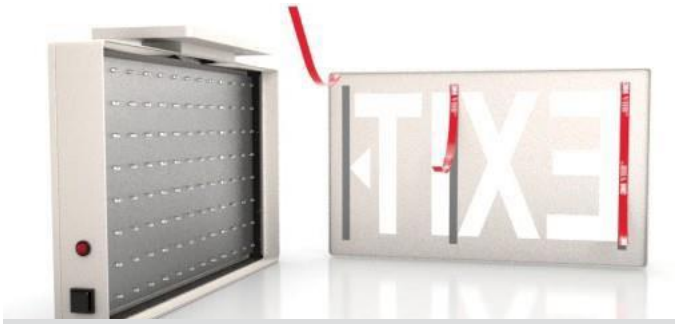
The Proven, High Strength Alternative to Mechanical Fasteners

3M™ VHB™ Tape offers manufacturers a distinct bonding advantage by spreading stress loads across the entire length of the joint, permanently adhering materials with a powerful bond.

It's time to replace screws, rivets, welds and other traditional fasteners with a better solution — 3M VHB Tape.

Panel to Frame





Solve dynamic force challenges while reducing weight and producing a clean, sharp look.

Stiffener to Panel

Experience the freedom to create unique designs with exceptional vibration and corrosion resistance.

Dream. Design. Deliver.

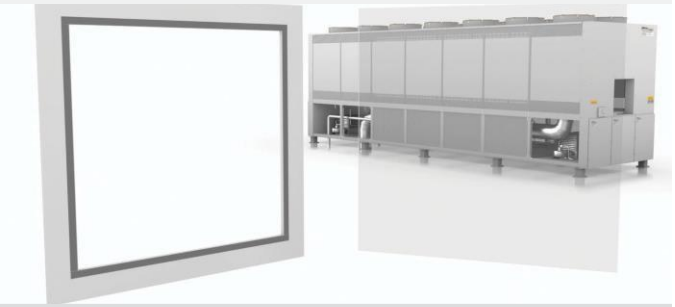
Durability for Long-Term Performance

- Resist cold, UV light, temperature cycling, moisture and solvents
- Seal against environmental conditions

Design Flexibility

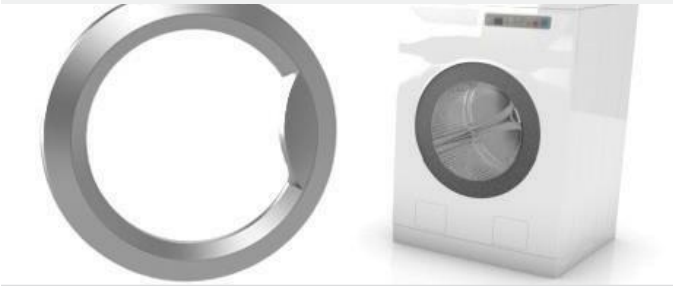
- Expand the range of material options for high impact visual combinations
- Use lighter weight and thinner materials to lower component and transportation costs

Lens Window to Housing



Apply a secure seal to dissimilar materials, while enhancing productivity and design innovation.

Decorative Material Attachment



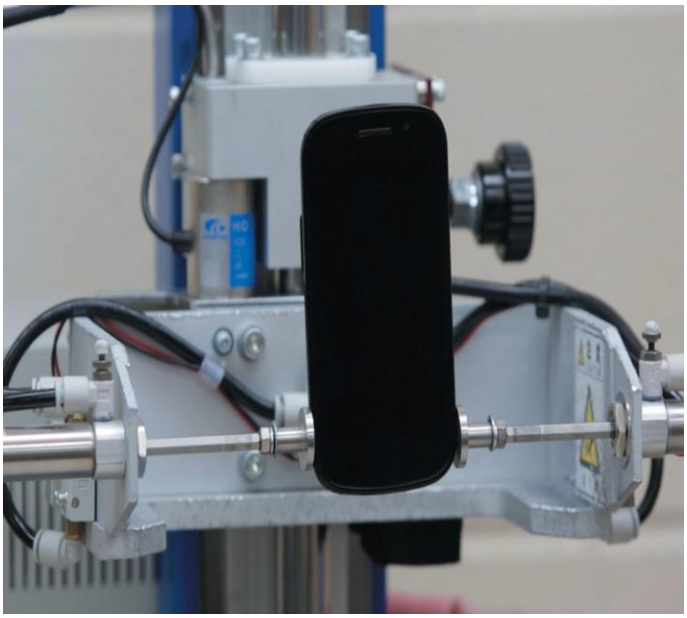
Advance your product performance with increased flexibility in production and design.

Your Application Advantage — 3M Expertise and Support

Develop product innovations and improve process efficiencies with the science of 3M™ VHB™ Tape and the support of 3M application specialists.

3M VHB Tape has been tested again and again to ensure ultimate performance. Our experienced application experts stress, pull, dunk, freeze and burn 3M VHB Tape to understand how it reacts in many environments. Engineers, designers, architects and regulators can have confidence that

3M supports every application with an extraordinary team of dedicated Application Engineers who consult with designers to help solve difficult design challenges and reveal new design opportunities. When you choose 3M VHB Tape, you get more than an amazing product, you get access to our global support network of technical expertise.

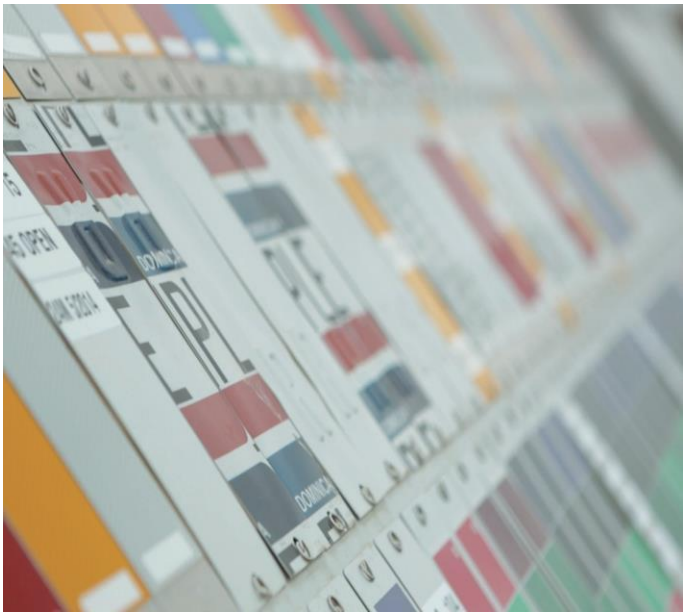


Drop tests allow 3M to compare shock and impact resistance of products used to bond devices.

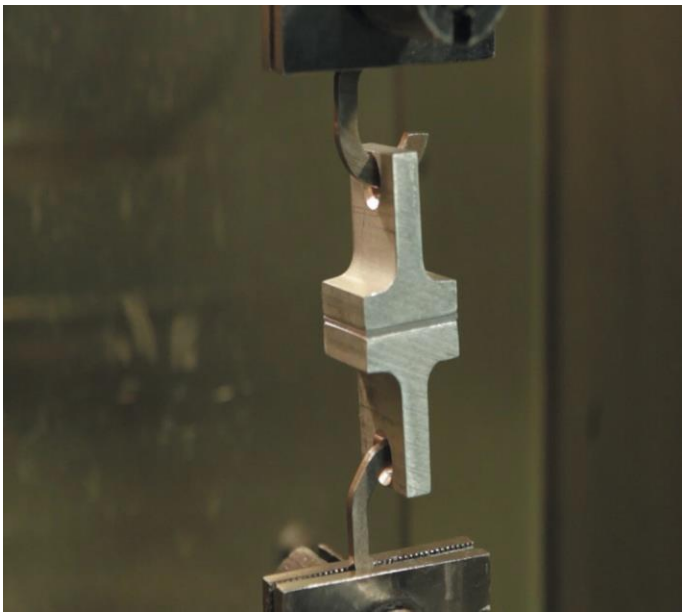
Our experts invest thousands of hours every year testing customers' substrates and designs, ensuring the right products are selected for each application and delivering the best results possible.

3M™ VHB™ Tape will perform every day, at the highest level possible. Test after test, the tape's closed cell, acrylic construction stands up to water, dirt, dust and many chemicals.

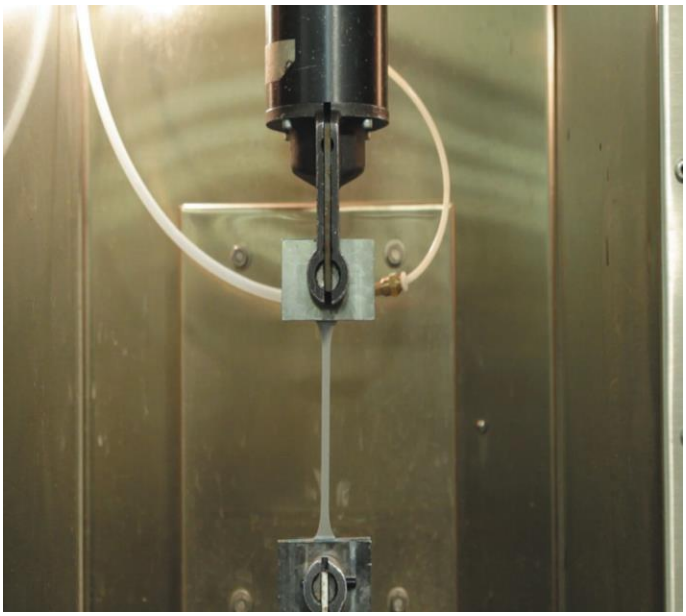
Our deep expertise in bonding dissimilar materials for challenging applications is unmatched. 3M stands alone in its capabilities, facilities and experience. Leverage our expertise to your competitive advantage.



3M performs weathering tests on many of our products using the most advanced weather facilities in the world. Substrates bonded with 3M VHB Tape are subjected to artificial indoor tests and real-world outdoor tests to determine the effects of years of extreme weathering. Exposing them to extreme UV radiation, water and heat ensures your products can stand the test of time.



Dynamic normal tensile test: Quantifies the internal cohesive strength of 3M VHB Tape. Unlike mechanical fasteners, the viscoelastic foam core of 3M VHB Tape absorbs the tensile stress, spreading the stress throughout the entire bond.



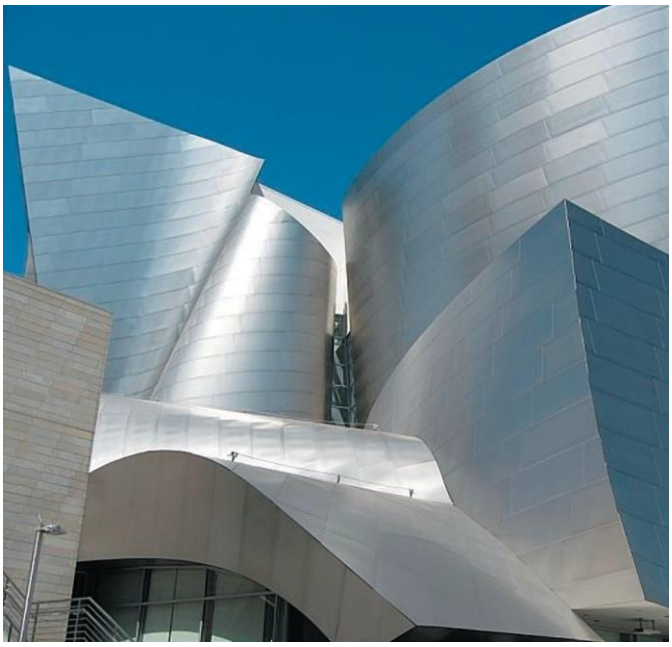
Tensile and elongation tests: Used to compare 3M VHB Tape's elongation versus adhesives. Unlike traditional joining methods, 3M VHB Tape can isolate stresses by allowing them to move independently, while still maintaining a strong hold.

Design and Application Guidelines

Selecting the Right 3M™ VHB™ Tape for Your Application

Our application experts are here to consult with your team to determine the correct 3M VHB Tapes for your product design and production process. When you're reviewing options, consider these factors:

- **SUBSTRATES —** Surfaces function and interact with adhesives differently, based on their properties and surface energy. Test the surface for both the flow of the adhesive and the ability to achieve contact with the other surface.
- **THICKNESS —** Choose tapes with higher thickness to correspond with higher rigidity and flatness irregularity of your materials. Use thinner tapes when working with more flexible materials.
- **QUANTITY —** Consider the variables of viscoelasticity, strength, stiffness, stress and creep behavior when determining the amount of tape for a dynamic load versus a static load.
- **EXPANSION/CONTRACTION —** Tapes can typically tolerate differential movement in the shear plane up to three times their thickness.
- **BOND FLEXIBILITY —** Because tape bonds can be more flexible, applications that need higher stiffness may benefit from corresponding design modifications.
- **COLD TEMPERATURES —** Evaluate applications that require performance at severe cold temperatures to assure proper adhesion performance.
- **SURFACE PREPARATION —** Ensure your surfaces are clean and pressure is applied after tape application for optimal adhesion.



Go-To Products Chart

3M™ VHB™ Tapes help you design beyond the limits of mechanical fasteners, to build better products, improve productivity and enhance performance. A great place to get started is the Go-To Products Chart, which offers a range of products well-suited for a variety of projects and applications.

Product Number	Tape Thickness w/o liner Mils (mm)	Page No.	Application Ideas
4941 Tape Family			
4926	15 (0.4)	10	Bond and seal polycarbonate lens over LCD Bond and seal plastic windows to pre-painted control panels/switch gear Mount vinyl wiring ducts and conduit channels Seam vinyl banners
4936 | 4936F	25 (0.6)	10	
4941 | 4941F	45 (1.1)	10	
4956 | 4956F	62 (1.6)	10	
4991 | 4991B	90 (2.3)	10	
4919F	25 (0.6)	10	
4947F	45 (1.1)	10	
4979F	62 (1.6)	10	
5952 Tape Family			
5906	6 (0.15)	12	Bond and seal polycarbonate lens over LCD Lens and touch panel bonding Logo attachment POP and display construction
5907	8 (0.2)	12	
5908	10 (0.25)	12	
5909	12 (0.3)	12	
5915 | 5915P | 5915WF	16 (0.4)	12	Bonds to a variety of plastics and paint systems Bond architectural signs to frames Attach trim and extrusions Hat channels and stiffeners
5925 | 5925P | 5925WF	25 (0.6)	12	
5930 | 5930P | 5930WF	32 (0.8)	12	
5952 | 5952P | 5952WF	45 (1.1)	12	
5962 | 5962P | 5962WF	62 (1.6)	12	
5958FR	40 (1.0)	12	Bonds to a variety of plastics and paint systems Bond architectural signs to frames Attach trim and extrusions Hat channels and stiffeners Meets FAR 25.853 (a) 12 second vertical burn, Appendix F, Part I (a)(ii)
RP Tape Family			
RP16 | RP16F	16 (0.4)	14	Panel bonding Stiffener attachment Trim attachment LED and sign component bonding
RP25 | RP25F	25 (0.6)	14	
RP32 | RP32F	32 (0.8)	14	
RP45 | RP45F	45 (1.1)	14	
RP62 | RP62F	62 (1.6)	14	
GPH Tape Family			
GPH-060GF	25 (0.6)	14	Application prior to powder-coat or liquid painting process Panel to Frame bonding Stiffener attachment Mounting and Trim attachment
GPH-110GF	45 (1.1)	14	
GPH-160GF	62 (1.6)	14	
LSE Tape Family			
LSE-060WF	25 (0.6)	14	Bonds to wide variety of medium and low surface energy (LSE) plastics and composites Bonds down to 0°C on frost and condensation free surfaces Outdoor, LED and durable signage bonding Bonding and mounting on plastic housings for transportation and agricultural equipment Appliance bonding and trim attachment
LSE-110WF	45 (1.1)	14	
LSE-160WF	62 (1.6)	14	

Putting it All Together

Choose the Right Primer for Your Surface

For some challenging substrates, a primer or adhesion promoter may improve the reliability of the bond. Consult with 3M Technical Service to determine if a surface preparation step will be required for your application.

Product	Solvent	Active Ingredients	VOCs	Color	Flashpoint	Coverage
3M™ Primers						
AP111	Isopropyl Alcohol (IPA)	Less than 5% by weight	5.91 lbs/gallon (708 g/l)	Clear	52°F (11°C)	800 ft^2/gal (19m^2/liter)
AP115	Isopropyl Alcohol and Water	Less than 1% by weight	6.08 lbs/gallon (728 g/l)	Clear	53°F (12°C)	815 ft^2/gal (20m^2/liter)
Primer 94	See SDS	See SDS	Approximately 6.3 lbs/gallon (755 g/l) less H_2O and exempt solvents	Clear light yellow to clear dark orange	-4°F (-20°C)	600 ft^2/gal (15m^2/liter)
Primer UPUV	See SDS	Approximately 5% by weight	3.58 lbs/gallon (429 g/l)	Clear	-5°F (-21°C)	600 ft^2/gal (15m^2/liter)

Note: The technical information and data on these pages should be considered representative or typical only and should not be used for specification purposes. Coverage can depend on the application method and the substrate.

How to Prepare Specific Surfaces

- **HEAVY OILS —** remove oil or grease using a degreaser or solvent-based cleaner.
- **ABRASION —** Abrade the surface to remove heavy dirt or oxidation.
- **HIGHER ADHESION —** Prime surfaces to increase adhesion — especially for paint or plastic surfaces.
- **POROUS SURFACES —** Seal surfaces such as wood, particle board or concrete.
- **GLASS —** Use silane treatment.
- **OTHER MATERIALS —** Consider the potential for special surface preparation for all materials, including metal, copper, plastics, rubber and more.

Applying 3M™ VHB™ Tapes

STEP 1: Align the materials — and make sure all surfaces are clean and dry. Use a 50:50 mix of isopropyl alcohol and water before applying tapes.

STEP 2: When surfaces are dry, apply 3M VHB Tape to the surface.

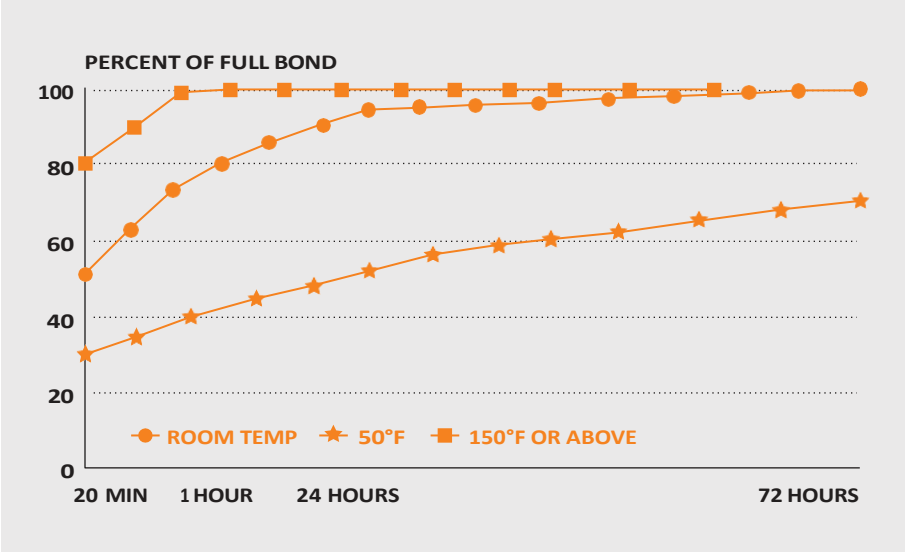
STEP 3: Apply pressure with a J-roller to at least 15 psi (100 kPa). This will help develop high-strength adhesion and bonding. Bond strength will increase after application.

APPROXIMATE TIME TO ACHIEVE ULTIMATE BOND STRENGTH:

- 50% after 20 minutes
- 90% after 24 hours
- 100% after 72 hours

Bond strength may be achieved more quickly and in some cases, may be increased by exposing the bond to elevated temperatures (e.g. 150˚F (66˚C) for 1 hour).

BOND TYPICAL BUILD vs. TIME



Product Selection and Use: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. As a result, customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment and reviewing all applicable regulations and standards (e.g., OSHA, ANSI, etc.). Failure to properly evaluate, select, and use a 3M product and appropriate safety products, or to meet all applicable safety regulations, may result in injury, sickness, death, and/or harm to property.

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