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

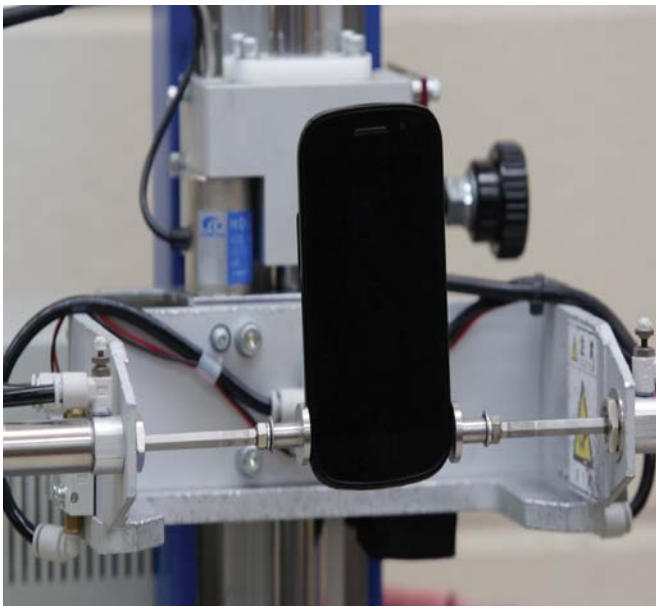
Advance your product performance with increased flexibility in production and design.

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 confi-

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.

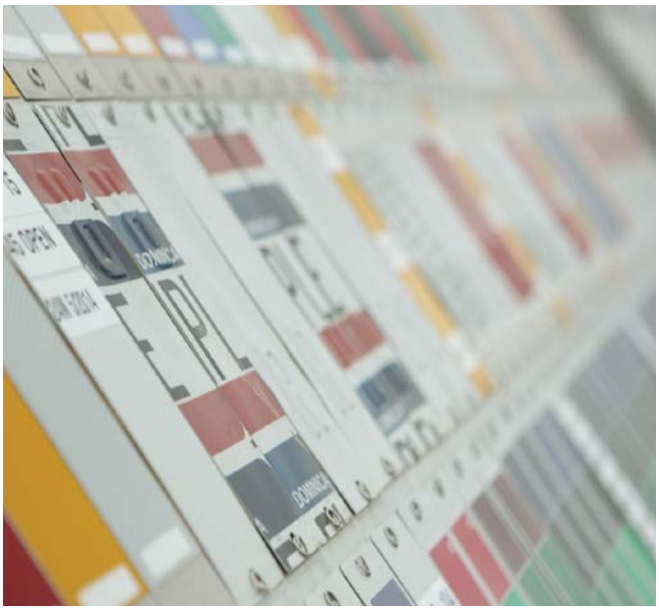


Drop tests allow 3M to compare shock and impact resistance of products used to bond devices.

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.

dence that 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 mm	Page No.	Application Ideas
4941 Tape Family			
4926P	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
4936P	0,6	10	
4936F	0,6	10	
4941P	1,1	10	
4941F	1,1	10	
4956P	1,6	10	
4956F	1,6	10	
4991P	2,3	10	
4991B	2,3	10	
4919F	0,6	10	
4947F	1,1	10	
4979F	1,6	10	
5952 Tape Family			
5906F	0,15	12	Bond and seal polycarbonate lens over LCD Lens and touch panel bonding Logo attachment POP and display construction
5907F	0,2	12	
5908F	0,25	12	
5909F	0,3	12	
5915F	0,4	12	Bonds to a variety of plastics and paint systems Bond architectural signs to frames Attach trim and extrusions for aerospace interiors Hat channels and stiffeners
5915P	0,4	12	
5925F	0,6	12	
5925P	0,6	12	
5925WF	0,6	12	
5930F	0,8	12	
5952F	1,1	12	
5952P	1,1	12	
5952WF	1,1	12	
5962F	1,6	12	
5962P	1,6	12	
5958FR	1,0	12	Bonds to a variety of plastics and paint systems Bond architectural signs to frames Attach trim and extrusions for aerospace interiors Hat channels and stiffeners Meets FAR 25.853 (a) 12 second vertical burn, Appendix F, Part I (a)(ii)
GPH Tape Family			
GPH-060GF	0,6	14	Panel bonding Stiffener attachment Trim attachment LED and sign component bonding, bonds stiffeners & panels prior to liquid paint processes, e.g. powder coating
GPH-110GF	1,1	14	
GPH-160GF	1,6	14	

3M™ VHB™ Tape Selection

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.

Relative Adhesion:
HSE – High Surface Energy
MSE – Medium Surface Energy
LSE – Low Surface Energy

Liner Types:
A – 3 mil / 80 µm 54# Densified Kraft Paper
B – 5 mil / 125 µm Clear Polyethylene Film
C – 2 mil / 50 µm Polyester Film
D – 5 mil / 125 µm Red Polyethylene Film
E – 4 mil / 100 µm 58# Polycoated Kraft Paper
F – 5 mil / 125 µm Red Printed Polyethylene Film
G – 3 mil / 80 µm Clear Polyethylene Film
H – 4 mil / 100 µm Green PE Film

Product Number	Tape Thickness w/o Liner mm	Liner Type	Description	Adhesive Type	Temperature Resistance	
					Minutes Hours	Days Weeks
4941 Tape Family						
4926P	0,4	A	Gray, closed-cell acrylic foam tape. Excellent combination of strength, conformability and adhesion to high and medium surface energy materials. Plasticizer resistant. UL 746.	Multi-purpose Acrylic	150°C (300°F)	93°C (200°F)
4936P	0,6	A				
4936F	0,6	F				
4941P	1,1	A				
4941F	1,1	D				
4956P	1,6	A				
4956F	1,6	F				
4991F	2,3	F			121°C (250°F)	93°C (200°F)
4991B	2,3	F	Black version of 4991F.			
4919F	0,6	F	Black version of 4936F.		150°C (300°F)	93°C (200°F)
4947F	1,1	F	Black version of 4941F.			
4979F	1,6	F	Black version of 4956F.			

Multi-purpose Acrylic: Bonds to a wide range of materials including metals, glass and high and medium surface energy plastics and paints. Resists migration of plasticizers in vinyl substrates.

Modified Acrylic: Bonds to medium and low surface energy paints and plastics, including many powder coated paints, in addition to the substrates listed with the multi-purpose acrylic adhesive (except plasticized vinyl).

General Purpose Acrylic: Bonds to most higher surface energy substrates including metal, glass and high surface energy plastics.

Low Temperature Acrylic: Bonds down to 32°F (0°C) compared to 50°F (10°C) for most acrylic adhesives. Bonds most high surface energy substrates including metal, glass and high surface energy plastics.

Low Surface Energy: High performance synthetic adhesive bonds to many lower surface energy substrates, including polypropylene, polyethylene, and some powder coated paints.

Solvent Resistance	Relative Adhesion			Color	Product Number
	HSE	MSE	LSE		
4941 Tape Family					
High	High	High	Low	Gray	**4926P**
				Gray	**4936P**
				Gray	**4936F**
				Gray	**4941P**
				Gray	**4941F**
				Gray	**4956P**
				Gray	**4956F**
				Gray	**4991F**
				Gray	**4991B**
				Gray	**4919F**
				Gray	**4947F**
				Gray	**4979F**

Product Number	Tape Thickness w/o Liner mm	Liner Type	Description	Adhesive Type	Temperature Resistance	
					Minutes Hours	Days Weeks
5952 Tape Family						
5906F	0,15	G	Black, closed-cell acrylic foam tape. High dynamic stress resistance and adhesion to multiple surfaces.	Modified Acrylic	150°C (300°F)	121°C (250°F)
5907F	0,2	G				
5908F	0,25	G				
5909F	0,3	G				
5915F	0,4	F	Black or white, closed-cell acrylic foam tape. Good adhesion to many painted surfaces, including powder coated paint. UL 746C. Very conformable foam core.			
5915P	0,4	E				
5925F	0,6	F				
5925P	0,6	E				
5925WF	0,6	F				
5930F	0,8	F				
5952F	1,1	F				
5952P	1,1	E				
5952WF	1,1	F				
5962F	1,6	F				
5962P	1,6	E				
5958FR	1,0	F	Meets FAR 25.853 (a) 12 sec vertical burn Appendix F, Part 1 (a) (ii).			93°C (200°F)

Solvent Resistance	Relative Adhesion			Color	Product Number
	HSE	MSE	LSE		
5952 Tape Family					
High	High	High	High to powder coated paints	Black	**5906F**
				Black	**5907F**
				Black	**5908F**
				Black	**5909F**
				Black	**5915F**
				Black	**5915P**
				Black	**5925F**
				Black	**5925P**
				White	**5925WF**
				Black	**5930F**
				Black	**5952F**
				Black	**5952P**
				White	**5952WF**
				Black	**5962F**
				Black	**5962P**
				Black	**5958FR**

Product Number	Tape Thickness w/o Liner mm	Liner Type	Description	Adhesive Type	Temperature Resistance	
					Minutes Hours	Days Weeks
RP Tape Family						
RP16	0,4	A	Gray, closed-cell acrylic foam tape. Conformable. Good adhesion to many painted metals.	Multi-purpose	121°C (250°F)	93°C (200°F)
RP16F	0,4	F				
RP25	0,6	A				
RP25F	0,6	F				
RP32	0,8	A				
RP32F	0,8	F				
RP45	1,1	A				
RP45F	1,1	F				
RP62	1,6	A				
RP62F	1,6	F				
GPH Tape Family						
GPH-060GF	0,6	F	Gray, closed-cell, conformable acrylic foam. Superior high-temperature performance for powder coat or liquid paint processes and multi material bonding.	Modified Acrylic	230°C (450°F)	150°C (300°F)
GPH-110GF	1,1	F				
GPH-160GF	1,6	F				
4945 Tape Family						
4945P	1,1	A	White, closed-cell acrylic foam tape. Plasticizer resistant.	Multi-purpose	150°C (300°F)	93°C (200°F)
4945F	1,1	D				
4952 Tape Family						
4932P	0,6	A	White, closed-cell acrylic foam tape. Good adhesion to polypropylene and many powder paints. Suggested for indoor use.	Low Surface Energy Adhesive	93°C (200°F)	71°C (160°F)
4952P	1,0	A				

Solvent Resistance	Relative Adhesion			Color	Product Number
	HSE	MSE	LSE		
RP Tape Family					
High	High	High	Low	Gray	**RP16**
				Gray	**RP16F**
				Gray	**RP25**
				Gray	**RP25F**
				Gray	**RP32**
				Gray	**RP32F**
				Gray	**RP45**
				Gray	**RP45F**
				Gray	**RP62**
				Gray	**RP62F**
GPH Tape Family					
High	High	High	Low	Gray	**GPH-060GF**
				Gray	**GPH-110GF**
				Gray	**GPH-160GF**
4945 Tape Family					
High	High	High	Low	White	**4945P**
				White	**4945F**
4952 Tape Family					
High	High	High	High	White	**4932P**
				White	**4952P**

Product Number	Tape Thickness w/o Liner mm	Liner Type	Description	Adhesive Type	Temperature Resistance	
					Minutes Hours	Days Weeks
4950 Tape Family						
4920P	0,4	A	Closed-cell acrylic foam tape. UL 746C.	General Purpose Acrylic	150°C (300°F)	93°C (200°F)
4929F	0,6	C				
4930P	0,6	A				
4930F	0,6	D				
4949F	1,1	C				
4950P	1,1	A				
4950F	1,1	D				
4955F	2,0	C				
4959F	3,0	D			204°C (400°F)	150°C (300°F)
4951 Tape Family						
4951F	1,1	C	White, closed-cell acrylic foam tape. Apply at temps as low as 32°F (0°C).	Low Temperature Appliable Acrylic	150°C (300°F)	93°C (200°F)
4943F	1,1	C	Gray, closed-cell acrylic foam tape. Apply at temps as low as 32°F (0°C).			
4957F	1,6	C				
4910 Tape Family						
4905P	0,5	A	Clear, acrylic construction for joining transparent material, for glass partition walls	General Purpose	150°C (300°F)	93°C (200°F)
4905F	0,5	F				
4910P	1,0	A				
4910F	1,0	F				
4918F	2,0	F				

Solvent Resistance	Relative Adhesion			Color	Product Number
	HSE	MSE	LSE		
4950 Tape Family					
High	High	Medium	Low	White	**4920P**
				Black	**4929F**
				White	**4930P**
				White	**4930F**
				Black	**4949F**
				White	**4950P**
				White	**4950F**
				White	**4955F**
				White	**4959F**
4951 Tape Family					
High	High	High	Low	White	**4951F**
				Gray	**4943F**
				Gray	**4957F**
4910 Tape Family					
High	High	High	Low	Clear	**4905P**
				Clear	**4905F**
				Clear	**4910P**
				Clear	**4910F**
				Clear	**4918F**

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 Application Engineering to determine if a surface preparation step will be required for your application.

Product	Description	Solvent	Active Ingredients	Color	Flashpoint	Coverage
3M™ Primers						
AP111	for metal and painted surfaces	Isopropyl Alcohol (IPA)	Less than 5% by weight	Clear	11°C (52°F)	800 ft^2/gal (19m^2/liter)
Silane Treatment AP115	for glass	Isopropyl Alcohol and Water	Less than 1% by weight	Clear	12°C (53°F)	815 ft^2/gal (20m^2/liter)
Primer 94	for LSE surfaces	See SDS	See SDS	Clear light yellow to clear dark orange	-20°C (-4°F)	600 ft^2/gal (15m^2/liter)
Primer UPUV	for plastics and general purpose	See SDS	Approximately 5% by weight	Slightly hazy, colorless with fluorescent bluish tint	-21°C (-5°F)	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 (clean, abrade, clean)
- **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 AP115.
- **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:

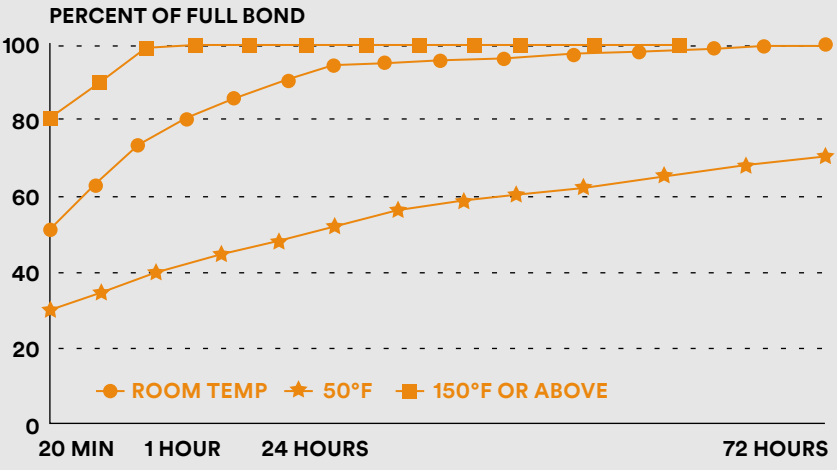
Apply pressure with a J-roller to at least 15 psi (100 kPa). This will help develop high-strength adhesion and bonding. Bond strength will increase after application.

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. 70°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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