

Technical Data Sheet

3M™ VHB™ Structural Glazing Tape G23F



[Product Details](#)

Product Description

Finite Element Analysis (FEA) data is available for this product at: 3m.com/FEA

3M™ VHB™ Structural Glazing Tapes are fully-cured, durable, high performance double-sided pressure sensitive acrylic foam tapes. They are used for attaching glass and other infill panels to metal frames in curtain wall systems, commercial windows and doors, skylight and canopy systems replacing commonly used mechanical fasteners, gaskets or structural silicone sealants. Application performance history since 1990 and 3rd party test results demonstrate the outstanding durability, UV resistance and temperature performance of 3M™ VHB™ Tape acrylic foam chemistry.

Product Features

- Fast and easy-to-use permanent bonding method provides high strength and long-term durability
- Virtually invisible fastening keeps surfaces smooth
- Used as an alternative to structural silicone and spacer tapes/gaskets
- Gray multi-purpose adhesive and conformable acrylic foam core offers a balance of strength and conformability
- Creates a permanent seal against water, moisture and more
- Pressure sensitive adhesive bonds on contact to provide immediate handling strength
- Also available in black with 3M™ VHB™ Structural Glazing Tape B23F
- UL GREENGUARD and UL GREENGUARD Gold Certified, contributing to LEED Credit

Technical Information Note

The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Typical Physical Properties

Attribute Name	Test Method	Value
Color		Gray
Adhesive Type		Multi-Purpose Acrylic
Foam Type		Conformable Acrylic Foam
Density	ASTM D3574	720 kg/m ³ (45 lb/ft ³) ¹
Total Tape Thickness	ASTM D3652	2.3 mm (90 mil) (0.090 in)
Thickness Tolerance		±10 %

¹ Foam with adhesive

Attribute Name	Value
Liner	PE Film
Liner Thickness	0.13 mm (5 mil) (0.005 in)
Primary Liner Color	Red (printed)

Handling/Application Information

Surface Preparation

Clean: Most substrates should be cleaned with a 70/30 mixture of (IPA*)/Water prior to applying 3M™ VHB™ Tape.

Exceptions 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 Technical Bulletin “Surface Preparation for 3M™ VHB™ Tape Applications” for additional details and suggestions. (70-0704-8701-5)

***Note:** Please consult with your local Air Quality District to ensure compliance. When using solvents, be sure to follow the manufacturer’s precautions and directions for use.

Application Techniques

Initial and Final Pressure Application:

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 ensure that the tape experiences approximately 100 kPa (15 psi) of pressure. Either roller or platen pressure can be used. When bonding two rigid parts, additional final pressure is often required to ensure that the bond line experiences 100 kPa (15 psi).

Tape Application Temperature:

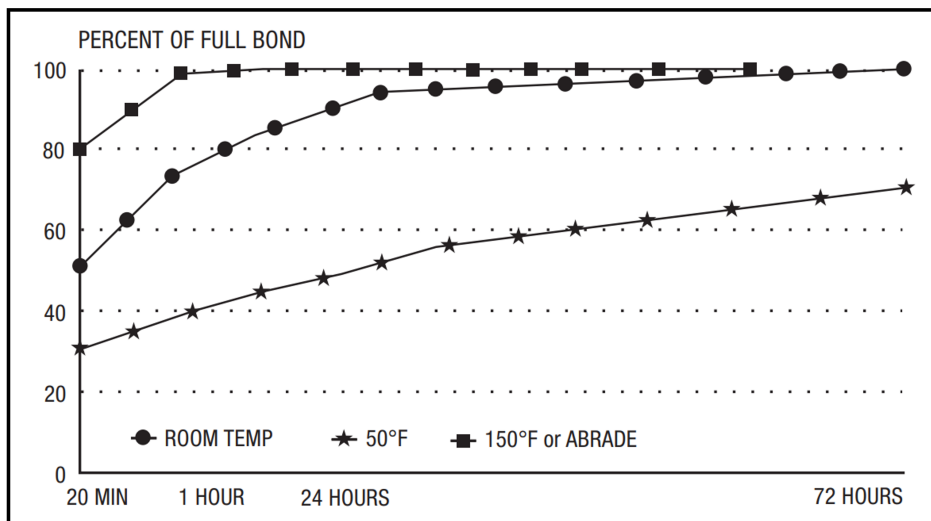
The ideal tape application temperature range for 3M™ VHB™ Tapes is generally 21°C to 38°C (70°F to 100°F). Pressure sensitive adhesives use viscous flow to achieve substrate contact area. The minimum suggested application temperature for most 3M™ VHB™ Tapes is 10°C to 15°C (50°F to 60°F)

***Note:** Initial tape application to surfaces at temperatures below these suggested minimums is not suggested because the adhesive becomes too firm to adhere readily. Ideally, all substrates and tape should be conditioned above the minimum application temperature in covered, weatherproof conditions until it is verified the substrates are at or above the minimum temperature. Once properly applied, low temperature holding is generally satisfactory.

Bond Build Rate:

After application, the bond strength will gradually increase as the adhesive flows onto to the surface (also referred to as “wet out”). The bond build rate will depend on both tape and substrate, but generally, at room temperature, approximately 50% of ultimate bond strength will be achieved after 20 minutes, 90% after 24 hours, and 100% after 72 hours. Adhesive flow is faster at higher temperatures and slower at lower temperatures. Ultimate bond strength can be accelerated (and in some cases bond strength can be increased) by exposure to elevated temperature (e.g. 66°C [150°F] for 1 hour). This can provide better adhesive wet out onto the substrates. Abrasion (~180 grit), or the use of primers/adhesion promoters can also increase both bond strength as well as the bond build rate.

Typical Bond Build vs. Time



*Note: Chart describes general performance of 3M™ VHB™ Tapes. Actual bond strength vs. time will depend on several factors including tape and substrate

Application Guidelines

Application Review:

Project applications with 3M™ VHB™ Structural Glazing Tapes must be reviewed by a 3M Application Engineer. Project drawings must be submitted to 3M to initiate the project-specific application review.

Adhesion Testing:

Adhesion testing must be conducted on project specific substrates to determine the appropriate surface preparation methods leading to high bond strength of the 3M™ VHB™ Structural Glazing Tape. Adhesion testing should be coordinated through a 3M Application Engineer. Adhesion test results will provide guidance on proper surface preparation methods, including cleaning and priming techniques, for project-specific substrates and finishes.

Fabrication Guidelines:

A shop work environment is appropriate for bonding applications with 3M™ VHB™ Structural Glazing Tape. Tape application temperature should be at least 60°F (15°C). Field bonding is only considered for deglaze/reglaze activities but only after consultation with a 3M Application Engineer. It is also important to provide adequate pressure to the tape after it has been applied to the first prepared substrate surface and after the two parts are joined together. A pressure of 15 lb/in² (100 kPa) or greater should be applied over the whole tape area to facilitate good contact of the adhesive to both substrates. Rigid surfaces may require 2 or 3 times more pressure to achieve >15 lb/in² (100 kPa) at the tape bond line. Pressure application methods must achieve acceptable wet-out (contact) of the adhesive to the bonding substrates. 3M Application Engineers or their channel partners are available to provide training of operators for 3M™ VHB™ Structural Glazing Tape bonding applications.

Design Considerations

Adhesion:

Adhesion to the substrate is critical to achieving high bond strength. Adhesives must flow onto the substrate surfaces in order to achieve intimate contact area and allow the molecular force of attraction to develop. The degree of flow of the adhesive on the substrate is largely determined by the surface energy of the substrate.

Tape Usage:

Use the right amount of VHB™ Tape to handle the expected stresses. Because 3M™ VHB™ Tapes are viscoelastic by nature, their strength and stiffness is a function of the rate at which they are stressed. They behave stronger when experiencing a higher rate of stress load (dynamic stresses) and will tend to show creep behavior with stress loads that act over a long period of time (static stresses). As a general rule, for static loads, approximately four square inches of tape should be used for each pound (57 cm² of tape per kg) of weight to be supported in order to prevent excessive creep. For dynamic loads a useful design factor is 12 lb/in² (85 kPa) for most dynamic stresses in general applications.

Tape Thickness:

Achieving good contact is also important. The necessary thickness of tape depends on the rigidity of substrates as well as their flatness and/or irregularity. While 3M™ VHB™ Tape will conform to a certain amount of irregularity, they will not flow to fill large gaps between the materials. When bonding rigid materials with normal flatness, consider use of tapes with thickness of 45 mils (1.1 mm) or greater. As substrate flexibility increases, thinner tapes may be considered.

Thermal Expansion/Contraction:

3M™ VHB™ Tapes perform well in applications where two bonded surfaces may expand and contract at different rates. Assuming good adhesion to both substrates, VHB™ Tape can typically tolerate differential movement in the shear plane up to 3 times (300%) of their thickness.

Bond Flexibility:

While an advantage for many applications where allowing differential movement is a benefit, the tape bonds are typically more flexible than alternative fastening methods. Suitable design modifications or periodic use of rigid fasteners/adhesives may be necessary if additional stiffness is required.

Industry Specifications

UL GREENGUARD and UL GREENGUARD Gold Certified, contributing to LEED Credit

Storage and Shelf Life

All 3M™ VHB™ Tapes have a shelf life of 24 months from date of manufacture when stored at 4°C to 38°C (40°F to 100°F) and 0-95% relative humidity. The optimum storage conditions are 22°C (72°F) and 50% relative humidity. Performance of tapes is not projected to change even after shelf life expires; however, 3M does suggest that 3M™ VHB™ Tapes are used prior to the shelf life date whenever possible. The manufacturing date is available on all 3M™ VHB™ Tapes as the lot number, typically marked on the core or on a label on the outer roll lap. The lot number, typically a 4 digit code, is a Julian date (Y D D D). The first digit refers to the year of manufacture, the last 3 digits refer to the days after January 1. Example: A lot number of 7266 (or 17266) would translate to a date of manufacture of Sept. 23 (266th day of year) in 2017.

Available Sizes

Attribute Name	Value
Core Size (ID)	76.2 mm (3 in)
Maximum Available Width	1219 mm (48 in)
Minimum Available Width	6.4 mm (0.25 in)
Normal Slitting Tolerance	±0.8 mm (±1/32 in)
Standard Roll Length	32.9 m (36 yd) ¹

¹ Longer roll lengths are available for most 3M™ VHB™ Tapes. Exact length will depend on caliper and width.

Automotive Disclaimer**Select Automotive Applications:**

This product is an industrial product and has not been designed or tested for use in certain automotive applications, such as automotive electric powertrain battery or high voltage applications, which may require the product to be manufactured in a IATF certified facility, meet a Ppk of 1.33 for all properties, undergo an automotive production part approval process (PPAP), or fully adhere to automotive design or quality system requirements (e.g., IATF 16949 or VDA 6.3). Customer assumes all responsibility and risk if customer chooses to use this product in these applications.

Information

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ISO Statement

This product was manufactured under a 3M quality system registered to ISO 9001 standards.

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