



# VHB™ Structural Glazing Tapes

## G23F • B23F

**Technical Data**

**November, 2009**

**Product Description**

3M™ VHB™ Structural Glazing Tape is a high performance double-coated pressure sensitive acrylic foam tape. It is used to attach glass to metal frames in curtain wall systems and commercial windows replacing commonly used structural silicone sealants or mechanical fasteners and gaskets. Application history since 1990 and 3rd party test results demonstrate the outstanding performance, durability, UV and temperature resistance of 3M™ VHB™ Tape acrylic foam chemistry.

**Application Requirements**

All 3M™ VHB™ Structural Glazing Tape projects must be reviewed on a project-specific basis by a 3M representative to begin the structural glazing process. 3M™ VHB™ Structural Glazing Tape Sales and Technical Service Representatives are available to assist the customer to determine the suitability of 3M™ VHB™ Structural Glazing Tape for structural glazing applications.

**Construction**

Tape Type:	3M™ VHB™ Structural Glazing Tape G23F	3M™ VHB™ Structural Glazing Tape B23F
<b>Adhesive:</b>	High Performance Acrylic	
<b>Adhesive Carrier:</b>	Conformable Acrylic Closed Cell Foam	
<b>Thickness:</b>	2.3 mm (0.090 in.)	
<b>Tolerance:</b>	± 10%	
<b>Density:</b>	720 kg/m <sup>3</sup> (45 lb./ft. <sup>3</sup> )	
<b>Tape Color:</b>	Gray (G)	Black (B)
<b>Liner:</b>	0.125 mm (0.005 in.) Red Polyethylene Film	

**Typical Physical Properties and Performance Characteristics**

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

<b>Peel Adhesion:</b> (stainless steel, ASTM D 3330)	440 N/100 mm (25 lb./in. width)	
<b>Normal Tensile:</b> (aluminum T-block, ASTM D 897)	480 kPa (70 lb./in. <sup>2</sup> )	
<b>Dynamic Overlap Shear:</b> (stainless steel, ASTM D 1002)	450 kPa (65 lb./in. <sup>2</sup> )	
<b>Static Shear:</b> (stainless steel, ASTM D 3654)	22°C (72°F)	1000 g/3.2cm <sup>2</sup> (2.2 lb./0.5 in. <sup>2</sup> ) – holds 10,000 min.
	66°C (150°F)	500 g/3.2cm <sup>2</sup> (1.1 lb./0.5 in. <sup>2</sup> ) – holds 10,000 min.
	93°C (200°F)	500 g/3.2cm <sup>2</sup> (1.1 lb./0.5 in. <sup>2</sup> ) – holds 10,000 min.
<b>Solvent Resistance:</b>	Medium	
<b>U.V. Resistance:</b>	Excellent	
<b>Temperature Resistance:</b>		
Short Term: (minutes, hours)	149°C (300°F)	
Long Term: (days, weeks)	93°C (200°F)	

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### Design Guidelines

**Note: For tape area calculation the following guidelines can be used. Please ensure that each project is reviewed and approved by local 3M Technical Service.**

<b>Tape Design Strength for Dynamic Loads: (deadload support)*</b>	For dynamic tensile or shear stress such as wind loads, a design strength of 85 kPa (12 psi) is used for 3M™ VHB™ Structural Glazing Tape. This design strength guideline provides a safety factor of at least 5 and was established based on material property testing as well as ASTM dynamic load testing for curtain wall applications.
<b>Tape Design Strength for Static Loads: (no deadload support)</b>	For static tensile or shear stress such as dead weight loads, snow loads and other long-term loads, a design strength of 1.7 kPa (0.25 psi) is used for 3M™ VHB™ Structural Glazing Tape. This means 60 cm <sup>2</sup> of tape per 1 kg or 4 in <sup>2</sup> of tape per 1 lb load should be used to support static loads. This guideline provides a safety factor of at least 5.
<b>Differential Movement: (shear strain)</b>	Two bonded surfaces like glass and an aluminum frame may experience differential movement relative to each other as a result of thermal expansion and contraction or other events such as seismic movement or slab deflection. 3M™ VHB™ Structural Glazing Tape can tolerate shear movement up to 3 times its original thickness (300% shear strain). This means 2.3 mm (0.090 in.) thick 3M™ VHB™ Structural Glazing Tape can safely experience shear strain up to 6.9 mm (0.27 in.).

**\*Important:** Static load and dynamic load calculations should be performed on unsupported deadload structural glazing applications. The calculation resulting in the wider tape width should be used as the appropriate tape width for the application.

### Available Sizes

<b>Standard Length:</b>	32.9 m (36 yds.)
<b>Maximum Length:</b>	12.7 mm (1/2 in.) and wider - 65.8 m (72 yds.)
<b>Standard Width:</b>	≥ 15 mm in 5 mm increments (≥ 5/8 in. in 1/8 in. increments)
<b>Width Tolerance:</b>	± 0.8 mm (± 1/32 in. or ± 0.031 in., )
<b>Core Diameter (ID):</b>	76.2 mm (3.0 in.)

Precision slitting with a tolerance of ± 0.44 mm (1/64 in.) is available with a minimum order of full web increments.

### Application Guidelines

Each 3M™ VHB™ Structural Glazing Tape application will be reviewed on a project specific basis. Application guidelines will be based upon adhesion test results generated by 3M Technical Service. These project specific application guidelines will be provided to the customer and must be followed during the glass bonding process. Listed below are some typical application guidelines for a 3M™ VHB™ Structural Glazing Tape project. However, these do not replace the project specific application guidelines provided by the 3M Technical Service Representative.

- For maximum bond strength, non-glass surfaces should be thoroughly cleaned with a 50/50 IPA/water mixture to remove contaminants. Glass surfaces should also be cleaned with a 50/50 IPA/water mixture followed by treatment of the glass with a mixture of an IPA/water/silane solution prior to tape application. Contact 3M for further information on appropriate silane mixtures. Some surfaces may require additional surface preparation that will be determined on a project specific basis by a 3M Technical Services Representative.
- Ideal tape application is accomplished when temperature is between 21° and 38°C (70° and 100°F) and the bond is allowed to dwell 72 hours. Initial tape application to surfaces at temperatures below 16°C (60°F) is not recommended. However, the use of a primer may lower the minimum application temperature. Contact 3M for more information.

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## Application Guidelines (continued)

- Bond strength is dependent upon the amount of adhesive-to-surface contact developed. Flat bonding surfaces and firm application pressure develops better adhesive contact and helps improve bond strength. Generally, this means that the tape should experience at least 100 kPa (15 psi) in roll down, vacuum or platen pressure. 3M must approve pressure application equipment for 3M™ VHB™ Structural Glazing Tape applications.
- After final bonding of the parts, immediate handling strength is achieved and glazed units can be moved as there is no curing mechanism in this process. However, the bond strength will continue to increase as the adhesive flows onto the surface. At room temperature, approximately 50% of the ultimate strength will be achieved in 10-20 minutes after pressure application, 90% after 24 hours and 100% after 72 hours. The use of a primer may accelerate the bond strength build rate. Contact 3M for more information.

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## Storage

Store in original cartons at 21°C (70°F) and 50% relative humidity.

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## Shelf Life

When stored under proper conditions, product retains its performance and properties for 24 months from date of manufacture.

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## Product Use

All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors 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. All questions of liability relating to this product are governed by the terms of the sale subject, where applicable, to the prevailing law.

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## Limited 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 limited 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. AN APPLICATION WARRANTY EXPRESSLY APPROVED AND ISSUED BY 3M IS AN EXCEPTION. THE CUSTOMER MUST APPLY FOR A SPECIFIC APPLICATION WARRANTY AND MEET ALL WARRANTY AND PROCESS REQUIREMENTS TO OBTAIN AN APPLICATION WARRANTY. CONTACT 3M FOR MORE INFORMATION ON APPLICATION WARRANTY TERMS AND CONDITIONS.

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## 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.

ISO 9001:2000

This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001:2000 standards.



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