Technical data sheet

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Manufacturer:	3M DEUTSCHLAND GMBH
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3M™ VHB™ TAPE MAX-110GF

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Technical Data Sheet

3M™ VHB™ Tape Max-110GF

English-EU
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Product Details

Product Description

3M™ VHB™ Tape Max-110GF is a 1.1 mm thick gray double-sided acrylic foam tape with a PE film liner. The acrylic adhesive on both sides combined with the use of 3M™ VHB™ Tape Max Promoter bonds to a variety of common high surface energy (HSE) and medium surface energy (MSE) materials including metals, glass and a variety of paints and plastics. 3M™ VHB™ Tape Max-110GF is part of the 3M™ VHB™ Tape Max series. Each product in this family has an acrylic adhesive and firm foam core but varies in thickness.

Product Features

• Foam tape and adhesion promoter offering 2-3x shear and tensile strength of existing 3M™ VHB™ Tapes
• Pressure sensitive adhesive combined with adhesion promoter bonds on contact to provide immediate handling strength
• Higher strength allows more design flexibility enabling narrower bond lines and less bond area than common 3M™ VHB™ Tapes
• Fast and easy-to-use bonding method provides high strength and long-term durability
• Can replace mechanical fasteners (rivets, welding, screws) or liquid adhesives
• Virtually invisible fastening keeps surfaces smooth
• Allows the use of thinner, lighter weight and dissimilar materials
• Creates a seal against water, moisture and dust/debris
• Gray, 1.1 mm, acrylic adhesive and firm acrylic foam core for good performance in a variety of applications

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
Adhesive Type		Acrylic
Foam Type		Firm Acrylic
Total Tape Thickness	ASTM D3652	1.1 mm
Thickness Tolerance		±10 %
Color		Gray
Liner		PE Film
Liner Thickness		0.12 mm
Primary Liner Color		Red (printed)
Density	ASTM D3574	850 kg/m³ [1]

[1] Foam with adhesive

Typical Performance Characteristics

Temperature: 23 °C
Dwell Time: 72 h

Attribute Name	Test Method	Substrate	Backing	Value
90° Peel Adhesion	ASTM D3330	Stainless Steel	5 mil Aluminum Foil	92 N/cm [1]
Normal Tensile	ASTM D897	Aluminum		1.9 MPa ( ) [2]
Overlap Shear Strength	ASTM D1002, ISO 4587	Stainless Steel		2.7 MPa [3]

[1] 300 mm/min (12 in/min)

[2] 6.45 cm² (1 in²), Jaw Speed 51 mm/min (2 in/min)

[3] 6.45 cm² (1 in²), Jaw Speed 12.7 mm/min (0.5 in/min)

Static Shear

Substrate: Stainless Steel
Test Method: ASTM D3654

Temperature	Value
23 °C	2,000 g [1]
66 °C	1,500 g [1]
93 °C	1,000 g [1]
121 °C	750 g [1]

[1] Tested at various temperatures and gram loadings. 3.23 cm² (0.5 in²). Will hold listed weight for 10,000 minutes (approximately 7 day).

Attribute Name	Value
Minimum Application Temperature	15 °C
Short Term Temperature Resistance	180 °C [1]
Long Term Temperature Resistance	121 °C [2]

[1] Greater than or equal to 75% retention of room temperature dynamic shear properties following a 4 hour exposure at indicated temperature with 15.5g/cm² (100g/in²) static load.

[2] Maximum temperature at which tape supports at least 155g/cm² (1kg/in²) in static shear for 10,000 minutes.

Converting

In addition to standard and custom roll sizes available from 3M through the distribution network, 3M™ VHB™ Tapes are also available in limitless shapes and sizes through the 3M Converter network. For additional information, contact 3M Converter Markets at 1-800-223-7427 or on the web at www.3M.com/converter.

Handling/Application Information

Surface Preparation

Clean: Bonding surfaces must be clean, dry, and free of wax, oil, grease, and/or loose particles. Use an appropriate solvent (such as acetone or a 50/50 or 70/30 mixture of isopropyl alcohol/water) to remove surface contaminants. A clean, lint-free towel should be used for the cleaning process.

Application of Promoter: 3M™ VHB™ Tape Max Promoter can be applied to the clean surface with a dauber bottle, brush, or lint-free towel. Apply a thin, uniform coating to the bonding surface using the minimum amount that will fully coat the surface. Allow 3M™ VHB™ Tape Max Promoter to dry thoroughly before applying tape. This is usually accomplished in 5 minutes at room temperature. Apply tape within 30 minutes of drying. REPLACE CAP WHEN NOT IN USE.

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.
• 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

Application of Tape:

Apply the 3M™ VHB™ Tape Max to the substrate surface by hand or with a tape application tool. Be careful not to contaminate the tacky surface of the tape. Handle the tape by the edges only.

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 140 kPa 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 140 kPa.
Tape Application Temperature:
The ideal tape application temperature range for 3M™ VHB™ Tapes is generally 21 °C to 38 °C. Pressure sensitive adhesives use viscous flow to achieve substrate contact area. The minimum suggested application temperature for 3M™ VHB™ Tapes Max is 15 °C.
***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 whether 3M™ VHB™ Tape Max is paired with 3M™ VHB™ Tape Max Promoter or 3M™ VHB™ Water-Based Promoter UV , 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. The time to ultimate bond strength can be acceleratedby exposure to elevated temperature (e.g. 66 °C for 1 hour).

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 3M™ VHB™ Tape Max 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 two

square inches of tape should be used for each pound (30 cm^2 of tape per kg) of weight to be supported in order to prevent excessive creep. For dynamic loads a useful design factor is 170 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 Max will conform to a certain amount of irregularity, it will not flow to fill large gaps between the materials. When bonding rigid materials with normal flatness, consider use of tapes with a thickness of 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 Max can typically tolerate differential movement in the shear plane up to 3 times (300 %) of its 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.

Storage and Shelf Life

This product has a shelf life of 24 months from date of manufacture when stored at 4 °C to 38 °C and 0-95 % relative humidity. The optimum storage conditions are 22 °C and 50 % relative humidity. 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
Maximum Available Width	1219 mm
Minimum Available Width	6.4 mm
Normal Slitting Tolerance	±0.79 mm
Standard Roll Length	32.9 m [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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