Technical Data Sheet

3M™ VHB™ Tape LVO-040BF

Product Description

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

3M™ VHB™ Tape LVO-040BF is a 0.016 inch (0.4 mm) thick black double-sided acrylic foam tape with PE film liner. The low odor adhesive on both sides bonds to a broad range of substrates and plastics, optimized for polypropylene and polystyrene. The very conformable foam provides good contact between substrates even when they are slightly mismatched. 3M™ VHB™ Tape LVO-040BF is part of the low VOC and low odor (LVO) tape family. Each product in this family has low odor adhesive and very conformable foam but varies in thickness.

Product Features

• 85 % reduced VOC's compared to common acrylic foam tapes, tested to VDA278 standard
• Low in Odor – tested to VDA270 standard
• Fast and easy-to-use permanent bonding method provides high strength and long-term durability
• Virtually invisible fastening keeps surfaces smooth
• Can replace mechanical fasteners (rivets, welding, screws) or liquid adhesives
• Closed-cell foam creates a seal against water and moisture
• Pressure sensitive adhesive bonds on contact to provide immediate handling strength
• Allows the use of thinner, lighter weight and dissimilar materials
• This product might be suitable for use in indirect food contact applications. Please see the applicable Regulatory Data Sheet for more information relating to FDA compliance.

Technical Information Note

The following data is taken from tests conducted on a limited number of production runs. 3M will continue to test samples from additional manufacturing lots and issue a new Technical Data Sheet if the results change.

The 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		Black
Adhesive Type		Low Odor
Foam Type		Very Conformable Acrylic Foam
Density	ASTM D3574	735 kg/m³ (46 lb/ft³) [1]
Total Tape Thickness	ASTM D3652	0.4 mm (0.016 in) (16 mil)
Thickness Tolerance		±15 %

[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)

Typical Performance Characteristics

Temperature: 23 °C (73 °F)
Dwell Time: 72 h

Attribute Name	Test Method	Substrate	Backing	Value
Normal Tensile	ASTM D897	Aluminum		965 kPa (140 lb/in²) [1]
Overlap Shear Strength	ASTM D1002, ISO 4587	Stainless Steel		1110 kPa (160 lb/in²) [2]
90° Peel Adhesion	ASTM D3330	Stainless Steel	5 mil Aluminum Foil	21.2 N/cm (12.1 lb/in) [3]
90° Peel Adhesion	ASTM D3330	Polypropylene (PP)	5 mil Aluminum Foil	31.6 N/cm (18.0 lb/in) [3]

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

[2] 6.45 cm² (1 in²), Jaw Speed 12.7 mm/min (0.5 in/min)

[3] 304 mm/min (12 in/min)

Static Shear

Test Method: ASTM D3654

Temperature	Substrate	Value
23 °C (73 °F)	Polypropylene (PP)	1,000 g [1]
23 °C (73 °F)	Stainless Steel	1,000 g [1]
66 °C (150 °F)	Stainless Steel	500 g [1]
93 °C (200 °F)	Polypropylene (PP)	500 g [1]
93 °C (200 °F)	Stainless Steel	250 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	Test Method	Test Condition	Substrate	Value
Minimum Application Temperature				10 °C (50 °F)
Short Term Temperature Resistance				121 °C (250 °F) [1]
Long Term Temperature Resistance	ASTM D3654	250 g	Stainless Steel	93 °C (200 °F) [2]

[1] No change in room temperature dynamic shear properties following 4 hour conditioning at indicated temperature with 100 g/static load. (Represents minutes, hour in a process type temperature exposure).

[2] Maximum temperature where tape supports indicated load per 6.5cm² (1 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.

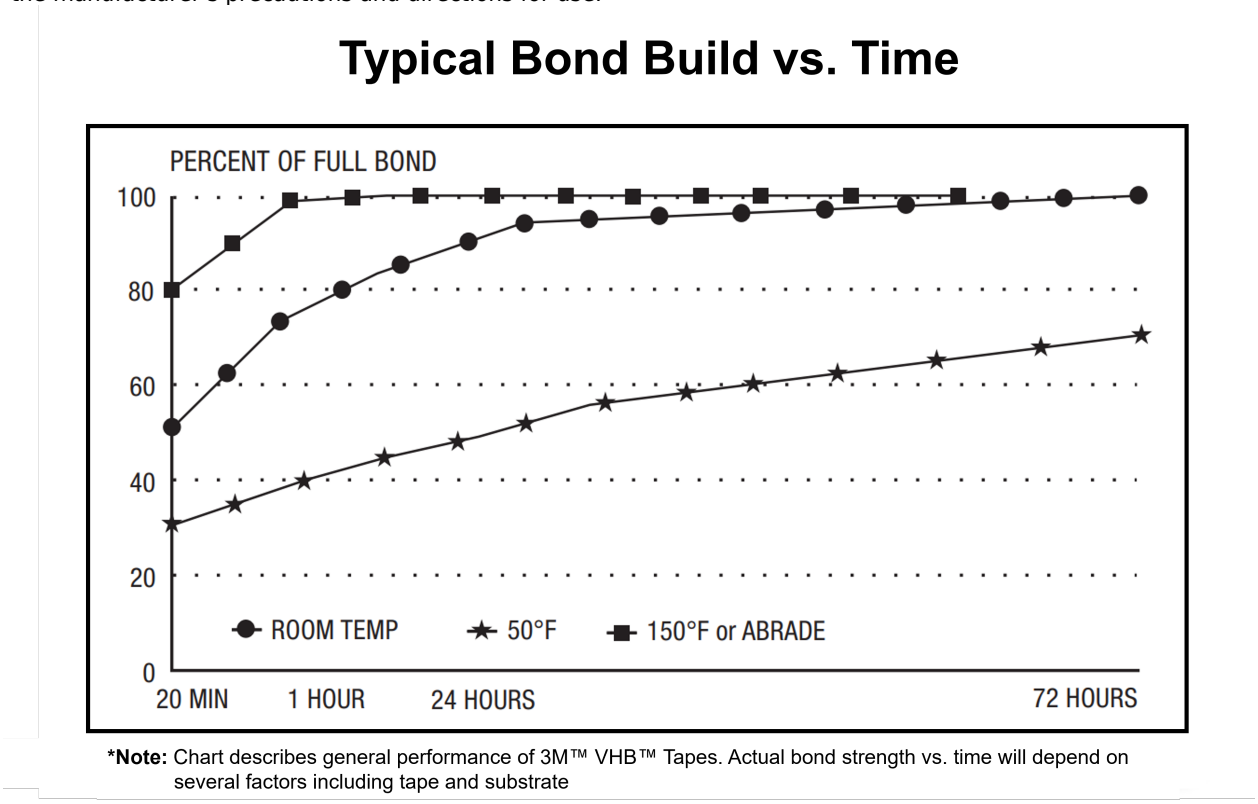
Handling/Application Information

Surface Preparation

Clean: Most substrates should be cleaned with a 70/30 mixture of isopropyl alcohol (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.



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

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 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 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

FDA Statement

This product might be suitable for use in food contact applications. Please see the applicable Regulatory Data Sheet for more information relating to FDA compliance.

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 (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	1168 mm (46 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)

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

Technical Information: The technical information, guidance, and other statements contained in this document or otherwise provided by 3M are based upon records, tests, or experience that 3M believes to be reliable, but the accuracy, completeness, and representative nature of such information is not guaranteed. Such information is intended for people with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any 3M or third party intellectual property rights is granted or implied with this 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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