English
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Technical Data Sheet

3M™ VHB™ Tape LSE-110WF

Product Description

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

3M™ VHB™ Tape LSE-110WF is a 0.045 (1.1 mm) thick white, conformable, double-sided acrylic foam tape with high initial tack and a very conformable foam core. Its design enables bonding of many low surface energy substrates/materials without the use of a primer or adhesion promoter. 3M™ VHB™ Tape LSE Series is available in three different thicknesses with a 3M™ branded red polyethylene film liner.

Product Features

- Double-coated acrylic foam tape
- 100% closed cell acrylic foam
- Multi material bonding for high, medium or low surface energy substrates including many metals and plastics (i.e. PP, PA, TPO, Composites)
- Enables bonding of many LSE substrates without primer or adhesion promoter
- Good low temperature tack
- Soft foam core enables stress relaxation & an easy application
- High initial tack
- For indoor and outdoor 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

Property	Values	Additional Information
Adhesive Type	Acrylic	
Adhesive Carrier	Very Conformable Acrylic Foam (closed cell)	
Color	White	
Liner	Red PE film with 3M™ VHB™ print	
Total Tape Thickness (mil)	45 mil	View

Test Method: ASTM D3652

Total Tape Thickness (mm)	1.1 mm	View
Test Method: ASTM D3652		
Total Tape Thickness	0.045 in	View
Test Method: ASTM D3652		
Thickness Tolerance	±10 %	
Density	710 kg/m³	View
Test Method: ASTM D3574 Notes: Foam with adhesive		
Density	45 lb/ft³	

Typical Performance Characteristics

Property	Values	Additional Information
90° Peel Adhesion	25 lb/in	View
Test Method: ASTM D3330 Dwell/Cure Time: 24.0 Dwell Time Units: hr Temp C: 23C Temp F: 72F Environmental Condition: 50%RH Backing: 5 mil Aluminum Foil Notes: 12 in/min (300 mm/min)		
90° Peel Adhesion Polypropylene (PP)	42 N/cm	View
Test Method: ASTM D3330 Test Name: 90° Peel Adhesion Dwell/Cure Time: 72.0 Dwell Time Units: hr Temp C: 23C Temp F: 72F Environmental Condition: 50%RH Substrate: Polypropylene (PP) Backing: 2 mil PET Notes: 12 in/min (300 mm/min)		
90° Peel Adhesion Polypropylene (PP)	23 lb/in	View
Test Method: ASTM D3330 Test Name: 90° Peel Adhesion Dwell/Cure Time: 72.0 Dwell Time Units: hr Temp C: 23C Temp F: 72F Environmental Condition: 50%RH		

Substrate: Polypropylene (PP)
Backing: 2 mil PET

Notes: 12 in/min (300 mm/min)

90° Peel Adhesion Glass	24 lb/in	View

Test Method: ASTM D3330

Test Name: 90° Peel Adhesion
Dwell/Cure Time: 72.0
Dwell Time Units: hr
Temp C: 23C
Temp F: 72F
Environmental Condition: 50%RH
Substrate: Glass

90° Peel Adhesion ABS	40 N/cm	View

Test Method: ASTM D3330

Test Name: 90° Peel Adhesion
Dwell/Cure Time: 72.0
Dwell Time Units: hr
Temp C: 23C
Temp F: 72F
Environmental Condition: 50%RH
Substrate: ABS
Backing: 2 mil PET

Notes: 12 in/min (300 mm/min)

90° Peel Adhesion ABS	22 lb/in	View

Test Method: ASTM D3330

Test Name: 90° Peel Adhesion
Dwell/Cure Time: 72.0
Dwell Time Units: hr
Temp C: 23C
Temp F: 72F
Environmental Condition: 50%RH
Substrate: ABS

90° Peel Adhesion Stainless Steel	44 N/cm	View

Notes: 12 in/min (300 mm/min) ASTM D3330 72 hour dwell on Stainless Steel at 23°C (72°F) and 50% RH Backing: 2 mil Polyester

90° Peel Adhesion Glass	43 N/cm	View

Test Method: ASTM D3330

Test Name: 90° Peel Adhesion
Dwell/Cure Time: 72.0
Dwell Time Units: hr
Temp C: 23C
Temp F: 72F
Environmental Condition: 50%RH
Substrate: Glass
Backing: 2 mil PET

Notes: 12 in/min (300 mm/min)

Normal Tensile	470 kPa	View

Test Method: ASTM D897

Dwell/Cure Time: 72.0
Dwell Time Units: hr
Temp C: 23C
Temp F: 73F

Substrate: Aluminum

Notes: 1 in.² (6.45 cm²), Jaw Speed 2 in./min. (50 mm/min.)

Normal Tensile	70 lb/in²	View

Test Method: ASTM D897

Dwell/Cure Time: 72.0
Dwell Time Units: hr
Temp C: 23C
Temp F: 73F
Substrate: Aluminum

Notes: 1 in.² (6.45 cm²), Jaw Speed 2 in./min. (50 mm/min.)

Overlap Shear Strength	590 kPa	View

Test Method: ASTM D1002

Notes: 1 in² (6.45 cm²), Jaw Speed 0.5 in/min (12.7 mm/min)

Overlap Shear Strength	85 lb/in²	View

Test Method: ASTM D1002

Notes: 1 in² (6.45 cm²), Jaw Speed 0.5 in/min (12.7 mm/min)

Short Term Temperature Resistance	150 °C	View

Notes: 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).

Short Term Temperature Resistance	300 °F	View

Notes: 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).

Long Term Temp C	100 °C	View

Notes: Maximum temperature where tape supports at least 250 g load per 0.5 in² in static shear for 10,000 minutes. (Represents continuous exposure for day or weeks).

Long Term Temp F	200 °F	View

Notes: Maximum temperature where tape supports at least 250 g load per 0.5 in² in static shear for 10,000 minutes. (Represents continuous exposure for day or weeks).

Minimum Application Temperature	0 °C

Minimum Application Temperature	32 °F

Static Shear	1000 g	View

Test Method: ASTM D3654

Temp C: 23C
Temp F: 73F

Substrate: Stainless Steel

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

Static Shear	500 g	View

Test Method: ASTM D3654

Temp C: 66C
Temp F: 150F
Substrate: Stainless Steel

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

Static Shear	250 g	View

Test Method: ASTM D3654

Temp C: 93C
Temp F: 200F
Substrate: Stainless Steel

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

Static Shear 23C Polypropylene	1000 g	View

Test Method: ASTM D3654

Temp C: 23C
Temp F: 73F
Substrate: Polypropylene (PP)

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

Static Shear 66C Polypropylene	500 g	View

Test Method: ASTM D3654

Temp C: 66C
Temp F: 150F
Substrate: Polypropylene (PP)

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

Static Shear 93C Polypropylene	500 g	View

Test Method: ASTM D3654

Temp C: 93C
Temp F: 200F
Substrate: Polypropylene (PP)

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

Available Sizes

Property	Values	Additional Information
Standard Roll Length	32.9 m	
Standard Roll Length	36 yd	

Minimum Available Width	6.4 mm
Minimum Available Width	0.25 in
Maximum Available Width	1118 mm
Maximum Available Width	44 in
Normal Slitting Tolerance	± 0.8 mm
Normal Slitting Tolerance	± 1/32 in
Core Size (ID)	76.2 mm
Core Size (ID)	3 in

Design Considerations

Adhesion to the substrate is important in achieving bonding success. 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. 3M™ VHB™ LSE series tapes bond well to high (HSE), medium (MSE), and low (LSE) surface energy materials. The image below shows typical materials in these categories.

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

Using the right amount of tape is important 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 with relatively faster rate of stress load (dynamic stresses) and will tend to show creep behavior with stress load acting 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.

Allow for thermal expansion/contraction. 3M™ VHB™ Tapes can perform well in applications where two bonded surfaces may expand and contract differentially. Assuming good adhesion to the substrates, the tapes can typically tolerate differential movement in the shear plane up to 3 times 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 bonding methods. Suitable design modifications or periodic use of rigid fasteners or adhesives may be needed if additional stiffness is required.

Performance in Severe Cold Temperature can be challenging. Applications which require performance at severe cold temperatures must be thoroughly evaluated by the user if the intended use will subject the tape product to high impact stresses. A technical bulletin “3M™ VHB™ Tape Cold Temperature Performance” (70-0707-3991-0) is available for additional information.

https://multimedia.3m.com/mws/media/2069455O/image-197-jpg.jpg

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.

Storage and Shelf Life

3M™ VHB™ Tape LSE Family has a shelf life of 18 months from date of manufacture when stored at 40°F to 100°F (4°C to 38°C) and 0-95% relative humidity. The optimum storage conditions are 72°F (22°C) and 50% relative humidity. Performance of tapes is not projected to change even after shelf life expires

Industry Specifications

UL 879 (File E65361)

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.

Bottom Matter

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Handling/Application Information

Application Techniques

Clean: Most substrates are best prepared by cleaning with a 50:50 mixture of isopropyl alcohol (IPA*) and water prior to applying 3M™ VHB™ Tapes. Exceptions to the general procedure 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: These cleaner solutions contain greater than 250 g/l of volatile organic compounds (VOC). Please consult your local Air Quality Regulations to be sure the cleaner is compliant. When using solvents, be sure to follow the manufacturer’s precautions and directions for use when handling such materials.

Pressure: 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 insure that the tape experiences approximately 15 psi (100 kPa) pressure. Either roller or platen pressure can be used. Note that rigid surfaces may require 2 or 3 times that much pressure to make the tape experience 15 psi.

Temperature: Ideal application temperature range is 50°F to 100°F (21°C to 38°C). 3M™ VHB™ LSE can be applied at temperatures as low as 32°F (0°C) provided the surface is frost free. Testing on application-specific substrates is recommended to confirm adhesion Minimum application temperature does vary by 3M™ VHB™ tape family and ranges from 32°F to 60°F (0°C to 15°C) Note: Initial tape application to surfaces at temperatures below these suggested minimums is not recommended because the adhesive becomes too firm to adhere readily. However, once properly applied, low temperature holding is generally satisfactory. To obtain good performance with all 3M™ VHB™ Tapes, it is important to ensure that the surfaces are dry and free of condensed moisture.

Time: After application, the bond strength will increase as the adhesive flows onto the surface (also referred to as “wet out”). At room temperature approximately 50% of ultimate bond strength will be achieved after 20 minutes, 90% after 24 hours and 100% after 72 hours. This flow is faster at higher temperatures and slower at lower temperatures. Ultimate bond strength can be achieved more quickly (and in some cases bond strength can be increased) by exposure of the bond to elevated temperatures (e.g. 150°F [66°C] for 1 hour). This can provide better adhesive wetout onto the substrates. Abrasion of the surfaces or the use of primers/ adhesion promoters can also have the effect of increasing bond strength and achieving ultimate bond strength more quickly.

https://multimedia.3m.com/mws/media/2069268O/image-10-jpg.jpg

References

Property	Values
3m.com Product Page	https://www.3m.com/3M/en_US/p/d/b5005036160/
Safety Data Sheet SDS	https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&msdsLocale=en_US&co=ptn&q=lse-060

Family Group

Link Tags:

LSE-060WF LSE-110WF LSE-160WF

Products	Liner	Color	Total Tape Thickness (mm)	Adhesive Carrier	Adhesive Type
LSE-060WF	Red PE film with 3M™ VHB™ print	N/A	N/A	N/A	N/A
LSE-110WF	Red PE film with 3M™ VHB™ print	White	1.1 mm	Very Conformable Acrylic Foam (closed cell)	Acrylic
LSE-160WF	Red PE film with 3M™ VHB™ print	N/A	N/A	N/A	N/A

ISO Statement

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

Information

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