



# Technical Data Sheet

## 3M™ VHB™ Tape LSE-110WF

### Product Description

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

3M™ VHB™ Tape LSE-110WF is a 0.045 (1.1 mm) thick white, conformable, double-coated 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)	
Liner	Red PE film with 3M™ VHB™ print	
Color	White	
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/m<sup>3</sup> [View](#) 

Test Method: ASTM D3574

Notes: Foam with adhesive

Density 45 lb/ft<sup>3</sup>

## Typical Performance Characteristics

Property	Values	Additional Information
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90° Peel Adhesion	25 lb/in	<a href="#">View</a> 
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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	<a href="#">View</a> 
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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)

Normal Tensile	470 kPa	<a href="#">View</a> 
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Test Method: ASTM D897

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

Notes: 1 in.<sup>2</sup> (6.45 cm<sup>2</sup>), Jaw Speed 2 in./min. (50 mm/min.)

Normal Tensile	70 lb/in <sup>2</sup>	View 
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Test Method: ASTM D897


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

Notes: 1 in.<sup>2</sup> (6.45 cm<sup>2</sup>), Jaw Speed 2 in./min. (50 mm/min.)

Overlap Shear Strength	590 kPa	View 
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Test Method: ASTM D1002

Notes: 1 in.<sup>2</sup> (6.45 cm<sup>2</sup>), Jaw Speed 0.5 in/min (12.7 mm/min)


Overlap Shear Strength	85 lb/in <sup>2</sup>	View 
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Test Method: ASTM D1002

Notes: 1 in.<sup>2</sup> (6.45 cm<sup>2</sup>), Jaw Speed 0.5 in/min (12.7 mm/min)

Short Term Temperature Resistance	150 °C	View 
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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 
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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 
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Notes: Maximum temperature where tape supports at least 250 g load per 0.5 in<sup>2</sup> in static shear for 10,000 minutes. (Represents continuous exposure for day or weeks).

Long Term Temp F	200 °F	View 
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Notes: Maximum temperature where tape supports at least 250 g load per 0.5 in<sup>2</sup> in static shear for 10,000 minutes. (Represents continuous exposure for day or weeks).

Minimum Application Temperature	0 °C	
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Minimum Application Temperature	32 °F	
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Static Shear	1000 g	View 
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Test Method: ASTM D3654


Temp C: 23C  
Temp F: 73F  
Substrate: Stainless Steel

Notes: Tested at various temperatures and gram loadings. 0.5 in<sup>2</sup> (3.23 cm<sup>2</sup>). Will hold listed weight for 10,000 minutes (approximately 7 day).

Static Shear	500 g	View 
<p>Test Method: ASTM D3654</p> <p>Temp C: 66C Temp F: 150F Substrate: Stainless Steel</p> <p>Notes: Tested at various temperatures and gram loadings. 0.5 in<sup>2</sup> (3.23 cm<sup>2</sup>). Will hold listed weight for 10,000 minutes (approximately 7 day).</p>		
Static Shear	250 g	View 
<p>Test Method: ASTM D3654</p> <p>Temp C: 93C Temp F: 200F Substrate: Stainless Steel</p> <p>Notes: Tested at various temperatures and gram loadings. 0.5 in<sup>2</sup> (3.23 cm<sup>2</sup>). Will hold listed weight for 10,000 minutes (approximately 7 day).</p>		
Static Shear 23C Polypropylene	1000 g	View 
<p>Test Method: ASTM D3654</p> <p>Temp C: 23C Temp F: 73F Substrate: Polypropylene (PP)</p> <p>Notes: Tested at various temperatures and gram loadings. 0.5 in<sup>2</sup> (3.23 cm<sup>2</sup>). Will hold listed weight for 10,000 minutes (approximately 7 day).</p>		
Static Shear 66C Polypropylene	500 g	View 
<p>Test Method: ASTM D3654</p> <p>Temp C: 66C Temp F: 150F Substrate: Polypropylene (PP)</p> <p>Notes: Tested at various temperatures and gram loadings. 0.5 in<sup>2</sup> (3.23 cm<sup>2</sup>). Will hold listed weight for 10,000 minutes (approximately 7 day).</p>		
Static Shear 93C Polypropylene	500 g	View 
<p>Test Method: ASTM D3654</p> <p>Temp C: 93C Temp F: 200F Substrate: Polypropylene (PP)</p> <p>Notes: Tested at various temperatures and gram loadings. 0.5 in<sup>2</sup> (3.23 cm<sup>2</sup>). Will hold listed weight for 10,000 minutes (approximately 7 day).</p>		
90° Peel Adhesion Polypropylene (PP)	23 lb/in	View 
<p>Test Method: ASTM D3330</p> <p>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</p> <p>Notes: 12 in/min (300 mm/min)</p>		
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 
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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 
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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 
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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 
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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)

### 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
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Maximum Available Width	1118 mm
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Maximum Available Width	44 in
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Normal Slitting Tolerance	± 0.8 mm
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Normal Slitting Tolerance	± 1/32 in
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Core Size (ID)	76.2 mm
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Core Size (ID)	3 in
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## 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 cm<sup>2</sup> 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/in<sup>2</sup> (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](http://www.3m.com/converter).

## Storage and Shelf Life

All 3M™ VHB™ Tapes have a shelf life of 24 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; 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.

## Industry Specifications

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UL 879 (File E65361)

## Automotive Disclaimer

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Automotive Applications: This product is an industrial product and has not been designed or tested for use in certain automotive applications, including, but not limited to, automotive electric powertrain battery or high voltage applications. This product does not fully adhere to typical automotive design or quality system requirements, such as IATF 16949 or VDA 6.3. This product may not be manufactured in an IATF certified facility and may not meet a Ppk of 1.33 for all properties. The product may not undergo an automotive production part approval process (PPAP). Customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's automotive application and for conducting incoming inspections before use of the product. Failure to do so may result in injury, death, and/or harm to property. No written or verbal statement, report, data or recommendation by 3M related to automotive use of the product shall have any force or effect unless in an agreement signed by the Technical Director of 3M's Automotive Division. Customer assumes all responsibility and risk if customer chooses to use this product in an automotive electric powertrain battery or high voltage application, and 3M will not be liable for any loss or damage arising from or related to the 3M product or customer's use of the product, whether direct, indirect, special, incidental, or consequential (including, but not limited to, lost profits or business opportunity or recall costs), regardless of the legal or equitable theory asserted, including, but not limited to, warranty, contract, negligence, or strict liability. In no event shall 3M be liable for any damages in excess of the purchase price paid for the product.

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## Bottom Matter

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## Trademarks

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3M and VHB are trademarks of 3M.

## Handling/Application Information

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### 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	<a href="https://www.3m.com/3M/en_US/p/d/b5005036160/">https://www.3m.com/3M/en_US/p/d/b5005036160/</a>
Safety Data Sheet SDS	<a href="https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&amp;msdsLocale=en_US&amp;co=ptn&amp;q=lse-060">https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&amp;msdsLocale=en_US&amp;co=ptn&amp;q=lse-060</a>

## ISO Statement

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

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