



# Technical Data Sheet

## 3M™ VHB™ Tape 5906

### Product Description

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

3M™ VHB™ Tape 5906 is a 0.006 inch (0.15 mm) thick black double-sided acrylic foam tape with PET liner. The modified acrylic adhesive on both sides bonds to a broad range of high, medium and medium/low surface energy substrates including metals, glass and a wide variety of plastics and paints, including many powder coated paints. The very conformable foam provides good contact between substrates even when they are slightly mismatched. 3M™ VHB™ Tape 5906 is part of the 5952 tape family. Each product in this family has modified acrylic adhesive and very conformable foam but varies in thickness, color and liner type.

### Product Features

- Fast and easy-to-use permanent bonding method provides high strength and long-term durability
- Can replace mechanical fasteners or liquid adhesives
- Black, 0.006 in (0.15 mm), modified acrylic adhesive and very conformable acrylic foam core bonds to a wide variety of substrates
- Creates a permanent seal against water, moisture and more
- Pressure sensitive adhesive bonds on contact to provide immediate handling strength
- Allows the use of thinner, lighter weight and dissimilar materials

### 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        |             | Modified Acrylic                   |
| Foam Type            |             | Very Conformable Acrylic Foam      |
| Density              | ASTM D3574  | 720 kg/m <sup>3</sup> <sup>1</sup> |
| Total Tape Thickness | ASTM D3652  | 0.15 mm                            |
| Color                |             | Black                              |
| Liner                |             | PET                                |
| Liner Thickness      |             | 0.08 mm                            |
| Primary Liner Color  |             | Clear                              |
| Thickness Tolerance  |             | ±15 %                              |

<sup>1</sup> Foam with adhesive

| Attribute Name           | Test Method | Temperature | Environmental Condition | Value   |
|--------------------------|-------------|-------------|-------------------------|---|
| Water Vapor Transmission | ASTM F1249  | 38 °C       | 100%RH                  | See 3M™ VHB™ Tape 5952 g/m <sup>2</sup> /24 h |
| Shear Modulus            |             |             |                         | See 3M™ VHB™ Tape 5952 Pa                     |

## Typical Performance Characteristics

Temperature: 23 °C

| Attribute Name         | Test Method          | Dwell Time | Substrate       | Backing             | Value                |
|------------------------|----------------------|------------|-----------------|---------------------|----------------------|
| 90° Peel Adhesion      | ASTM D3330           | 72 h       | Stainless Steel | 5 mil Aluminum Foil | 9 lb/in <sup>1</sup> |
| Overlap Shear Strength | ASTM D1002, ISO 4587 |            |                 |                     | 690 kPa <sup>2</sup> |
| Normal Tensile         | ASTM D897            | 72 h       | Aluminum        |                     | 690 kPa <sup>3</sup> |

<sup>1</sup> 304 mm/min (12 in/min)

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

<sup>3</sup> 6.45 cm<sup>2</sup> (1 in<sup>2</sup>), Jaw Speed 51 mm/min (2 in/min)

### Static Shear

Substrate: Stainless Steel

Test Method: ASTM D3654

| Temperature | Value                |
|-------------|----------------------|
| 23 °C       | 1,000 g <sup>1</sup> |
| 66 °C       | 500 g <sup>1</sup>   |
| 93 °C       | 500 g <sup>1</sup>   |
| 121 °C      | 250 g <sup>1</sup>   |

<sup>1</sup> Tested at various temperatures and gram loadings. 3.23 cm<sup>2</sup> (0.5 in<sup>2</sup>). Will hold listed weight for 10,000 minutes (approximately 7 day).

| Attribute Name                    | Value               |
|-----------------------------------|---------------------|
| Minimum Application Temperature   | 10 °C               |
| Short Term Temperature Resistance | 149 °C <sup>1</sup> |
| Long Term Temperature Resistance  | 121 °C <sup>2</sup> |

<sup>1</sup> 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).

<sup>2</sup> Maximum temperature where tape supports at least 78g/cm<sup>2</sup> (500 g/in<sup>2</sup>) in static shear for 10,000 minutes. (Represents continuous exposure for day or weeks).

## Typical Environmental Performance

### 90° Peel Adhesion

Substrate: Stainless Steel

Dwell Time: 72 h

Backing: 5 mil Aluminum Foil

| Environmental Condition | Value              |
|-------------------------|--------------------|
| Water                   | 100 % <sup>1</sup> |
| Salt Water              | 100 % <sup>1</sup> |
| Hydraulic Fluid         | 100 % <sup>1</sup> |
| 10W30 Motor Oil         | 100 % <sup>1</sup> |
| Ethylene Glycol         | 100 % <sup>1</sup> |
| Kerosene                | 90 % <sup>1</sup>  |
| Isopropyl Alcohol (IPA) | 50 % <sup>1</sup>  |
| Jet Fuel                | 50 % <sup>1</sup>  |
| Gasoline                | 35 % <sup>1</sup>  |
| MEK                     | 5 % <sup>1</sup>   |

<sup>1</sup> 72 hr dwell after adhesion followed by 72 hr immersion in solvent and testing within 45 min of removal at 12 in/min (300mm/min). Peel adhesion measured as relative to control.

Continuous submersion in chemical solutions is not recommended. The above information is presented to show that occasional chemical contact should not be detrimental to tape performance in most applications in ordinary use.

## Electrical and Thermal Properties

Temperature: 23 °C

| Attribute Name      | Test Method | Test Condition | Value                          |
|---------------------|-------------|----------------|--------------------------------|
| Dielectric Constant | ASTM D150   | 1 KHz          | See 3M™ VHB™ Tape 5952         |
| Dielectric Constant | ASTM D150   | 1 MHz          | See 3M™ VHB™ Tape 5952         |
| Dissipation Factor  | ASTM D150   | 1 KHz          | See 3M™ VHB™ Tape 5952         |
| Dissipation Factor  | ASTM D150   | 1 MHz          | See 3M™ VHB™ Tape 5952         |
| Surface Resistivity | ASTM D257   |                | See 3M™ VHB™ Tape 5952<br>Ω    |
| Volume Resistivity  | ASTM D257   |                | See 3M™ VHB™ Tape 5952<br>Ω-cm |

| Attribute Name                   | Test Method | Value                         |
|----------------------------------|-------------|-------------------------------|
| Coefficient of Thermal Expansion |             | See 3M™ VHB™ Tape 5952 m/m/°C |
| Dielectric Strength              | ASTM D140   | See 3M™ VHB™ Tape 5952 V/μm   |
| Thermal Conductivity             |             | See 3M™ VHB™ Tape 5952 W/m/K  |

## 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).

## 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.

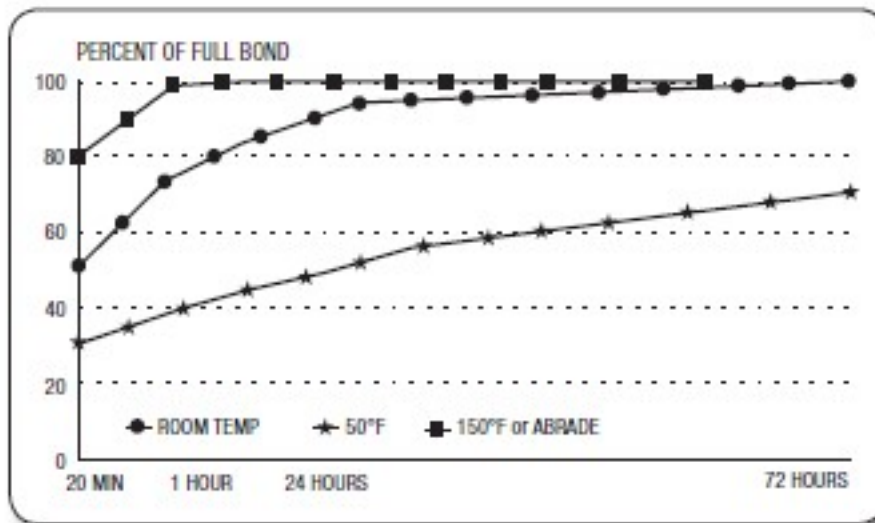
**Temperature:** Ideal application temperature range is 70°F to 100°F (21°C to 38°C). Pressure sensitive adhesives use viscous flow to achieve substrate contact area. Minimum suggested application temperature for the 3M™ VHB™ Tape 5952 family is 50°F (10°C). Minimum application temperature does vary 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.

### Bond Typical Build vs. Time



### 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™ 5952 family tapes bond well to high (HSE), medium (MSE), and medium/low (M/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.

## 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  |
| Maximum Available Width   | 1168 mm  |
| Minimum Available Width   | 12.7 mm  |
| Normal Slitting Tolerance | ±0.79 mm |
| Standard Roll Length      | 65.8 m   |

## Available Sizes - Detailed

| Available Sizes               |                                   |                              |                              | Maximum Roll Length  |   |  |
|-------------------------------|-----------------------------------|------------------------------|------------------------------|--|---|--|
| Tape Thickness<br>inches (mm) | Standard Length<br>yards (meters) | Minimum Width<br>inches (mm) | Maximum Width<br>inches (mm) | Width 1/4" up to 3/8"<br>(6.4mm up to 9.5mm)<br>yards (meters) | Width >3/8" up to 1/2"<br>(>9.5mm up to 12.7mm)<br>yards (meters) | Width 1/2" and wider<br>(12.7mm and wider)<br>yards (meters) |
| < 0.015 (0.4)                 | 72 (65.8)                         | 0.5 (13)                     | 46 (1168)                    | N/A N/A  | N/A N/A   | See Note Below   |
| 0.015/0.016 (0.4)             | 72 (65.8)                         | 0.25 (6)                     | 48* (1219)                   | 144 (131.7)  | 175 (160.0)   | 360 (329.2)  |
| 0.025 (0.6)                   | 72 (65.8)                         | 0.25 (6)                     | 48* (1219)                   | 72 (65.8)  | 108 (98.8)  | 175 (160.0)  |
| 0.032 (0.8)                   | 72 (65.8)                         | 0.25 (6)                     | 48 (1219)                    | 72 (65.8)  | 108 (98.8)  | 175 (160.0)  |
| 0.040 (1.0)                   | 36 (32.9)                         | 0.25 (6)                     | 48 (1219)                    | 72 (65.8)  | 108 (98.8)  | 144 (131.7)  |
| 0.045 (1.1)                   | 36 (32.9)                         | 0.25 (6)                     | 48 (1219)                    | 72 (65.8)  | 108 (98.8)  | 144 (131.7)  |
| 0.062 (1.6)                   | 36 (32.9)                         | 0.25 (6)                     | 46 (1168)                    | 72 (65.8)  | 72 (65.8)   | 108 (98.8)   |
| 0.090 (2.3)                   | 36 (32.9)                         | 0.25 (6)                     | 46 (1168)                    | 36 (32.9)  | 36 (32.9)   | 72 (65.8)  |

\*Exception – 5915 (P) max. width 46 inches (1168 mm); 5925 (P) max. width 47 inches (1194 mm).

Note: 5952 family tapes thinner than 0.015 in (0.4 mm) have max. length 360 yd (329.2 m) for widths 1 in (25 mm) to 8 in (203 mm) and 180 yd (164.6 m) for all other widths.

## 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

Intended Use: 3M™ VHB™ Tape products are intended for use in general industrial bonding applications when used in accordance with the guidance provided by 3M in this Technical Data Sheet and other product instructions. Since there are many factors that can affect a product's use, the customer remains responsible for determining whether the 3M product is suitable and appropriate for the customer's specific application and system, including customer conducting an appropriate risk assessment and evaluating the 3M product in customer's application and system. Restricted Use: 3M advises against the use of this 3M product in any application other than the stated intended use(s), since other applications have not been evaluated by 3M and may result in an unsafe or unintended condition. Important Information: 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 or application. All questions of liability relating to this product are governed by the terms of the sale subject, where applicable, to the prevailing law. Values presented have been determined by standard test methods and are average values not to be used for specification purposes. Our recommendations on the use of our products are based on tests believed to be reliable but we would ask that you conduct your own tests to determine their suitability for your applications. This is because 3M cannot accept any responsibility or liability direct or consequential for loss or damage caused as a result of our recommendations.

## **ISO Statement**

This product was manufactured under a 3M quality system registered to ISO 9001 standards.

3M™ Centre  
Cain Rd, Binfield, Bracknell RG12 8HT, United Kingdom  
3m.co.uk/iatd

3M and VHB are trademarks of 3M Company.  
©3M 2024 (9/24)