

3M

Thermo-Bond Web

695

Technical Data

October, 1996

(Supersedes December, 1993)

Product Description

3M™ Thermo-Bond Web 695 is a flexible, light colored, thermoplastic bonding nonwoven web which exhibits good adhesion to a variety of substrates, especially many fabrics. It is based on a polyester resin and exhibits good heat and machine wash resistance.

Key Features

- Thermo-Bond Web 695 provides the user with a uniform adhesive thickness, good handling ability and provides excellent bondline flexibility.
- When used on most fabrics this adhesive offers excellent resistance to normal laundering cycles.
- This solvent-free adhesive nonwoven web is especially useful where low-VOC applications are required.

Typical Physical Properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Base Resin	Polyester
Color	White (clear after bonding)
Specific Gravity	1.3
Solids	100%
Ball and Ring Softening Range	250-260°F (121-127°C)
Adhesive Thickness (Typical)	.010 inches (10 mil)
Tensile Strength @ Break (ASTM D 882)	225 psi
Elongation @ Break (ASTM D 882)	50-75%

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Typical Physical Properties (continued)

3M™ Thermo-Bond Web 695 will begin to soften at about 230°F (110°C). It can be bonded at this temperature if a relatively high pressure (50-60 psi) is used. Substrate type will have a large effect on adhesion values at these minimum bonding temperatures.

Raising the temperature of the web will decrease the pressure required to make a good bond. For example, at 270°F (132°C) adhesive temperature, bonds can be made using 25-50 psi. At 300°F (149°C) the adhesive becomes more flowable and bonds can be made using minimal pressure (just enough to keep the substrates together).

Whatever temperature is used to make the bond, the two substrates being bonded should be held together for 2-10 seconds to allow the adhesive to wet out the surfaces. The lower the temperature used, the longer the hold time should be.

This adhesive web is a nonwoven, random fiber construction and is ideal for bonding many fabrics and other flexible materials. Thermo-Bond Web 695 exhibits excellent water and solvent resistance. When used on porous substrates such as fabrics, too high bonding temperatures or pressures can result in bondline starvation (i.e., adhesive flows too much into the fabric) and low bond strengths.

Adhesion vs. Lamination Temperature Denim to Denim Fabric (T-Peel Strength)	
Bondline Temperature	Thermo-Bond Film 695
175°F (79°C)	0.1 piw
200°F (93°C)	0.2 piw
225°F (107°C)	0.4 piw
250°F (121°C)	2.8 piw
275°F (135°C)	7.5 piw

- Denim Fabric 20 mil.
- Bonds made using hot roll laminator, 1 FPM, 10 psi.
- Peels done at 90° angle, 2 in/min, Instron tester.

Application Equipment Suggestions

Note: Appropriate application equipment can enhance bonding film performance. We suggest the following equipment for the user's evaluation in light of the user's particular purpose and method of application.

The type of application equipment used to bond 3M™ Thermo-Bond Web 695 will depend on the application involved and on the type of equipment available to the user. Thin webs and flexible substrates can be bonded using a heated roll laminator where heat and pressure can be varied to suit the application. Larger, thicker substrates can be bonded using a heated static press or, in some cases, an autoclave.

It is recommended that whatever method of bonding the user chooses, the user should determine the optimum bonding conditions using the specific substrates involved.

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Directions For Use

To make a bond using Thermo-Bond Web 695, position the adhesive web between the substrates to be bonded, place this “sandwich” into a heated press or pass it through a heated hot roll laminator. The heat and pressure required will depend on the substrate being bonded. Easy to adhere to substrates can be bonded using 250-275°F (121-135°C) and 25-30 psi pressure. More difficult and less porous substrates may require higher temperatures (up to 325°F/162°F) and/or pressures (up to 50 psi). Once the bond has been made (typically 2-3 seconds at the bonding temperature) allow the bondline to cool below 225°F (93°C) before stress is applied to the bondline.

Typical Adhesive Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Test Substrate	Overlap Shear Strength
ABS	140 psi
PVC	900 psi
Polycarbonate	450 psi
HDPE	<1 psi
Polypropylene	<1 psi
Fir Wood	700 psi
FR-4 PCB	900 psi
Cold Rolled Steel	80 psi

- Bonds made using oven/weight method, 10 minutes, 4.4 psi pressure.
- Strength determined using Instron tester at 0.2 in/minute.
- Tested at 73°F (23°C).

Test Substrate	T-Peel Strength
Canvas (20 mil)	7-11 piw
Denim Fabric (10 mil)	8 piw
Polyester Film (2 mil)	<1 piw
Polyimide Film (2 mil)	<1 piw

- Bonds made bonding substrate to itself using hot roll laminator @ 300°F (149°C) at 1 FPM.
- Strengths determined using Instron tester at 2 in/minute and tested at 73°F (23°C).

Denim-Denim T-Peel bonds	T-Peel Strength
24 hr RT (control)	7-12 piw
1 hr @ 180°F (82°C) H ₂ O soak + 120°F (49°C) oven aging	5-9 piw
24 hr @ 73°F (23°C) H ₂ O soak + dry	4-7 piw
1 wk @ 90% RH/90°F (32°C) heat + dry	4-7 piw
Two home laundry cycles (120°F (49°C) wash/30 ^M dry)	6-12 piw

- Bonds made using 10 mil cotton denim bonded to itself at 300°F (149°C) using laminator at 1 FPM.
- Strengths determined using Instron tester at 2 in/minute and tested at 73°F (23°C).

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Typical Adhesive Performance Characteristics (continued)

Adhesion Strength <u>TESTED</u> at Various Temperatures	
Test Temperature	T-Peel Strength
75°F (24°C)	12 piw
100°F (38°C)	7.8 piw
125°F (52°C)	4.9 piw
150°F (66°C)	2.8 piw
175°F (79°C)	1.8 piw
200°F (93°C)	0.3 piw

- Bonds made using 20 mil denim fabric bond using hot roll laminator with 280°F (138°C) bondline temperature.
- Strength determined using Instron tester @ 2 in/minute.

Storage and Handling

Storage: Store in a dry (preferably <50% RH) location at 35°F (2°C) to 80°F (27°C).

Shelf Life: Shelf life is 2 years under the storage conditions mentioned above.

Precautionary Information

Refer to Product Label and Material Safety Data Sheet for Health and Safety Information before using this product.

For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-362-3550. Address correspondence to: 3M Industrial Tape and Specialties Division, 3M Center, Building 220-7E-01, St. Paul, MN 55144-1000. Our fax number is 612-733-9175. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-809-750-3000. In Mexico, phone: 5-728-2180.

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ISO 9002

This Industrial Tape and Specialties Division product was manufactured under a 3M quality system registered to ISO 9002 standards.

For Additional Product Safety and Health Information, See Material Safety Data Sheet, or call:

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