Technical data sheet

Product:	583
Manufacturer:	3M DEUTSCHLAND GMBH
Product group:	KLEBEBAND
Article group:	DOPPELSEITIG
Download:	07.12.2025

3M™ THERMAL BONDING FILM 583

This data sheet was provided to you by Tewipack Uhl GmbH. The company tewipack Uhl GmbH assumes no responsibility for the topicality and the Accuracy of the information contained. The properties of the products can vary due to various influences such as composition and condition of the Substrate, impurities in or on the substrate, temperature and humidity at the Change storage and environmental conditions during use. Using this product in combination with other material, the customer is responsible for to check through our own tests whether the product is suitable for the planned combination and whether this combination delivers the expected results

Tewipack Uhl GmbH
Industriestraße 15
D-75382 Althengstett

Telephone:
+49(0)7051/9297-0
Fax:
+49(0)7051/9297-99

E-Mail:
info@tewipack.de
Website:
www.tewipack.de

Managing director:
Alexander Uhl,
Michael Uhl
HRB 330424
Amtsgericht
Stuttgart

Bank details:
Sparkasse
Pforzheim
Calw
BLZ 666 500
85
Konto 17 787

Commerzbank
Sindelfingen
BLZ 603 400 71
Konto 8 001 166

Vereinigte
Volksbank AG
Böblingen
BLZ 603 900 00
Konto 80 089
003

Postbank
Stuttgart
BLZ 600 100
70
Konto 146
294 708

Science. Applied to Life.™

Technical Data | May 2024

3M™ Thermal Bonding Film 583

Product Description

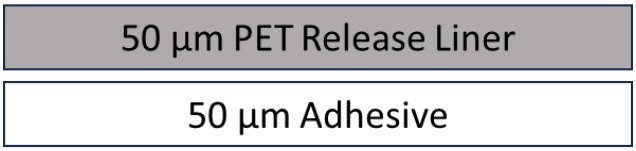
3M™ Thermal Bonding Film 583 is a high strength, flexible, nitrile phenolic based thermoplastic bonding film. The product should be activated for bonding using a primary heating source and can be crosslinked (after bonding) by post-heating bonded parts for an extended time period at elevated temperature. Crosslinking provides additional heat and solvent resistance.

Key Features

- Flexible
- Heat Activated
- Die Cuttable
- High Adhesion
- Heat Crosslinkable Option

Product Construction/Material Description

Note: The following technical information and data is based upon limited 3M testing conditions and should not be used for specification purposes.



3M™ Thermal Bonding Film 583 Property	Value
Base Adhesive	Nitrile Phenolic
Adhesive Thickness	2.0 mils (50.8µm)
Adhesive Tack	Slightly tacky
Adhesive Color	Hazy (Transparent)
Liner	Clear PET 2.0 mils (50.8µm)

Typical Applications

The 3M film 583 can be used to bond together a wide variety of similar and dissimilar materials. Some application ideas include:

- Bonding metals, plastics, rubbers, fabrics
- Metal-to-metal, metal-to-fabrics, rubber-to-metal, metal-to-plastic
- Please work with your 3M Application Engineer to discuss other potential joining and bonding applications.

3M™ Thermal Bonding Film 583

Application Equipment Suggestions

Note: Appropriate application equipment can enhance bonding film performance. We suggest the following equipment, but user applications vary depending on purpose and method of application.

The type of application equipment that can be used to bond 3M™ Thermal Bonding Film 583 will depend on the application involved and on the type of equipment available to the user. Thin films 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. For applications where a shaped adhesive is bonded to a flat or three-dimensional part, a hot shoe or thermode method may be appropriate.

The optimum bonding conditions should be predetermined by the end user with substrates specific to their application and the bonding method they chose.

Directions For Use – Heat Activation (Bonding)

3M™ Thermal Bonding Film 583 can typically be "heat stacked" (pre-tacked) onto one substrate by heating the adhesive at low heat and pressure to achieve a partial bond to the substrate. After heat stacking the adhesive to the first substrate, remove the product's liner and then place the second substrate atop the surface of the heat stacked adhesive. Next, align the parts and place them into the bonding apparatus and adjoin the components using your final bonding protocol. Final bonds are made by heating the two substrates together under pressure with a heated press, a hot roll laminator, a hot shoe thermode or similar equipment. Note: Pre-tacking can help facilitate easier liner removal. Results may vary depending on end user's skill and experience when working with heat activation bonding.

Suggested <u>TACKING</u> Conditions

38°C to 90°C (100°F to 194°F) bondline temperature

2 - 5 seconds dwell time (at bondline temperature)

5 - 40 psi pressure

For optimum bonding, heat, pressure, and dwell time for using 3M film 583 will depend on the substrate type and thickness being bonded. A suggested starting point for bonding is described on the next page.

3M™ Thermal Bonding Film 583

Suggested BEGINNING Bonding Conditions

107°C to 149°C (225°F to 300°F) bondline temperature

2 - 10 seconds dwell time (at bondline temperature)

15 - 40 psi pressure

Directions for Use – Bonding Optimization

One approach to obtaining optimum bonding conditions is to evaluate a series of bonding temperatures, pressures and dwell times, and then evaluating bond performance to determine the best overall results. Evaluating a range of temperatures [e.g., 93°C (200°F), 107°C (225°F), 121°C (250°F), 135°C (275°F) or 149°C (300°F)], pressures (e.g., 10 psi, 15 psi or 20 psi) and dwell times (5 seconds, 10 seconds or 15 seconds) allows users to optimize or tune conditions that best suit their application needs. Substrate type(s), thickness and heat capacity will play a role in determining optimum bonding conditions. Thicker substrates and surfaces that may be more difficult to bond could require longer times, higher pressures, and higher temperatures than mentioned herein. **If voids are experienced in the bondline, they can be minimized by increasing pressure.**

Note: Once a bond is made, the bondline should be allowed to cool before stress is applied to the bond. Generally, cooling the bondline below 66°C (150°F) is adequate to allow the bonded parts to be unfixtured/unclamped and handled. Results may vary depending on end user's skill and experience when working in bonding applications.

Directions for Use – Post Crosslinking

3M™ Thermal Bonding Film 583 may also be lightly crosslinked to enhance shear performance. Crosslinking of the 3M film 583 can typically be achieved by heating bond(s) between 105°C (302°F) to 177°C (350°F) for extended periods.

Note: The amount of crosslinking achieved via heating is temperature and time dependent. 3M™ Thermal Bonding Film 583 will achieve its highest degree of curing after an extended time (e.g., 8 to 15 minutes) at 177°C (350°F) or higher, however, an increase in adhesive internal strength can also be realized by holding bonded parts at much lower temperature for extended times. As an example, curing (crosslinking) of 3M™ Thermal Bonding Film 583 can be achieved by post-heating bonded parts isothermal at a temperature of 110°C (or greater) for 4 to 15 hrs. Again, the degree to which the adhesive crosslinks is directly proportional to its exposure time at a given temperature. **It is the user's responsibility to determine the optimal degree of crosslinking required for a given application.** Results may vary depending on end user's skill and experience when working with crosslinking and bonding.

3M™ Thermal Bonding Film 583

Typical Physical Properties and Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the product's Certificate of Analysis (COA) that is shipped with the commercialized product.

3M™ Thermal Bonding Film 583 Property	Test Method[1]	Value
T-Peel Adhesion @ RT, 24 hr dwell[2]	ASTM D1876	Alum (etched) 2.25 N/mm
180 Degree Peel Adhesion @ RT 72 hr dwell[3,4]	ASTM D3330	SS 2.88 N/mm PC 3.69 N/mm ABS 3.61 N/mm Alum (etched) 3.07 N/mm FR4 3.31 N/mm
180 Degree Peel Adhesion @ 65°C/90% RH, 72 hr dwell[3,4]	ASTM D3330	SS 3.35 N/mm
180 Degree Peel Adhesion @ 85°C, 72 hr dwell[3,4]		SS >3.00 N/mm
Static Shear[5] 1kg RT (Uncured) 1kg 70°C (Cured)	ASTM D3654	Minutes >10,000 >10,000
Overlap[6] Shear Strength @ RT	ASTM D1002	2.93 MPa (Uncured) 6.53 MPa (Fast Cure) 9.92 MPa (Slow Cure)
Glass Transition Temperature (Peak at tan delta)	Shear Parallel Plate DMA (1Hz 1% strain)	31°C (Uncured) 63°C (Cured)
Dielectric Constant[7] @ 1kHz	ASTM D-150	5.83 (Uncured) 5.19 (Cured)
Dissipation Factor[7] 1kHz	ASTM D-150	0.086 (Uncured) 0.058 (Cured)
Dielectric Breakdown[7] Voltage	ASTM D-149	4.41 kV (Uncured) 5.20 kV (Cured)
Dielectric Breakdown Strength[7]	ASTM D-149	77.8 kV/mm (Uncured) 99.4 kV/mm (Cured)
Surface Resistivity[7]	ASTM D-257	8.20E+13 ohm/sq (Uncured) 1.10E+15 ohm/sq (Cured)
Volume Resistivity[7]	ASTM D-257	1.10E+12 ohms/cm (Uncured) 1.30E+13 ohms/cm (Cured)

1. Methods listed as ASTM are tested in accordance with the ASTM method noted
2. T-Peel bonds were 0.5" wide using 10 mil etched aluminum bonded to each other; Peel rates were 12"/minute; Bonds were made at 149°C (300°F), 20 psi with a 15 second ramp time and heating from both sides
3. 180° peel bonds were 0.5" wide using 4 mil primed aluminum; Peel rates were 12"/minute; All 180° peel bonds were made using 140°C (284°F), 20 psi with a 15 second ramp time and heating from one side (metal) only
4. 4 mil aluminum coupons were pre-cleaned with MEK and heptane, and then primed with 3M™ Chemical-Resistant Tape Primer CR-100A
5. Static shear bonds were 1" x 1" using 4 mil primed aluminum against stainless steel with a 1-kg load; Static shear samples were bonded at 140°C (284°F), 70 psi and a 20 second ramp time and heating from one side (metal) only; 70°C static shear samples were post-cured by subjecting them to an 8-minute isothermal cure at 177°C (350°F) after heat bonding
6. OLS bonds were 1" x 0.5" on etched aluminum; pull rate was 0.2"/minute; All bonds were made using 140°C (284°F), 20 psi with 30 seconds of ramp time; Fast Curing = 8 minute post-curing cycle at 177°C (350°F); Slow Curing = 15 hour post-curing cycle at 110°C
7. All cured films were subjected to 8 minutes at 177°C (350°F) cure cycle prior to being tested

3M™ Thermal Bonding Film 583

Storage and Shelf Life

3M™ Thermal Bonding Film 583 should be stored at or below 4°C (40°F) for maximum storage life. Higher storage temperatures reduce normal storage life.

Shelf life is 6 months from date of manufacturing when stored at 23°C (75°F), and 18 months from date of manufacturing when stored at 4°C (40°F).

Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is manufactured and deemed commercially available from 3M. The COA contains the 3M test methods, specifications limits and test results for the product's performance attributes that the product will be supplied against. Contact your local 3M representative for this product's COA.

3M™ Thermal Bonding Film 583

Safety Data Sheet: Review product Safety Data Sheet before use.

Regulatory: For regulatory information about this product, contact your 3M representative.

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.

Product Use: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. As a result, customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment and reviewing all applicable regulations and standards (e.g., OSHA, ANSI, etc.). Failure to properly evaluate, select, and use a 3M product in accordance with all applicable instructions and with appropriate safety equipment, or to meet all applicable safety regulations, may result in injury, sickness, death, and/or harm to property.

Warranty, Limited Remedy, and Disclaimer: Unless a different warranty is specifically stated on the applicable 3M product packaging or product literature (in which case such warranty governs), 3M warrants that each 3M product meets the applicable 3M product specifications on the Certificate of Analysis, which is established when the product is manufactured and deemed commercially available and is provided at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM, OR USAGE OF TRADE. If a 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement or repair of the 3M product or refund of the purchase price.

Limitation of Liability: Except for the limited remedy stated above, and except to the extent prohibited by applicable law, 3M will not be liable for any loss or damage arising from or related to the 3M product, whether direct, indirect, special, incidental, or consequential (including, but not limited to, lost profits or business opportunity), regardless of the legal or equitable theory asserted, including, but not limited to, warranty, contract, negligence, or strict liability.

Disclaimer: For industrial use only. Not intended, labeled or packaged for consumer sale or use.

3M

Electronics Materials Solutions Division
3M Center, Building 223-3S-22
St. Paul, MN 55144
1-800-251-8634 phone
651-778-4244 fax
www.3M.com/electronics

60-5005-0427-3