3M™ Thermally Conductive Adhesive Transfer Tapes 8805 • 8810 • 8815 • 8820

Product Description

3M™ Thermally Conductive Adhesive Transfer Tapes 8805, 8810, 8815 and 8820 are designed to provide a preferential heat-transfer path between heat-generating components and heat sinks or other cooling devices (e.g., fans, heat spreaders or heat pipes).

Features and Benefits

- High mechanical strength
- Improved surface wet-out for rough surface/LSE substrates
- Excellent shock performance
- Wider and longer roll is available
- Halogen free*
- Ideal for thin bonding applications
- Good thermal transfer

Product Construction

Product Number	3M™ Thermally Conductive Adhesive Transfer Tapes 8805	8810	8815	8820
Color	White			
Tape Type	Filled Acrylic Polymer			
Tape Thickness	0.125 mm (5 mils)	0.25 mm (10 mils)	0.375 mm (15 mils)	0.50 mm (20 mils)
Filler Type	Ceramic			
Liner Type	Dual liner using silicone-treated polyester. Easy release PET liner is clear in color, tight side PET liner is blue in color			
Liner Thickness	37.5-50 µm (1.5~2 mils) thickness for inside or outside wound liner.			

*Halogen Free is defined as having maximum 900 ppm bromine, maximum 900 ppm chlorine, and/or maximum 1500 ppm total bromine and chlorine, per IEC 61249-2-21.

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.

Product Number	3M™ Thermally Conductive Adhesive Transfer Tapes 8805	8810	8815	8820	
Property	**Value**				**Method**
Thermal Impedance (°C cm²/W) (°C in²/W)	3.2 (0.5)	5.8 (0.9)	7.7 (1.2)	9.7 (1.5)	3M test method
Thermal Conductivity (W/m-K)	0.60				ASTM C-177
Specific Gravity	1.07 g/cc				
Surface Resistivity (Ω-cm)	1.6×10^{11}	1.6×10^{11}	1.5×10^{11}	**1.5×10^{11}	ASTM D-2577
Volume Resistivity (Ω-cm)	5.2×10^{11}	3.9×10^{11}	3.8×10^{11}	**3.8×10^{11}	ASTM D-2577
Dielectric Strength (kV/mm) (V/mil)	26 (688)			** **	ASTM D-149
Dielectric Properties (frequency)	*3 MHz*	*100 MHz*	*1 GHz*	**	ASTM D-150
Dielectric Constant (8815)	93.5	3.2	3.0	**	ASTM D-150
90 Degree Peel Test grams/25.4 mm width (oz/in) Untreated aluminum substrate	**8805**	**8810**	**8815**	**8820**	3M test method 1 mil PET Backing
Room Temp Dwell @ 15 min	990 (35)	1300 (46)	1500 (53)	1700 (60)	
65°C Dwell @ 15 min	1450 (51)	2040 (72)	2440 (86)	2780 (98)	
Room Temp Dwell @ 72 hrs	1500 (53)	2130 (75)	2520 (89)	3060 (108)	
65°C Temp Dwell @ 72 hrs	1590 (56)	2500 (88)	4000 (141)	4130 (181)	
Static Shear test of holding 1000g @ Room Temp using 1 in²	PASS	PASS	PASS	PASS	3M test method: SS & PET Hold weight 1 week
Static Shear test of holding 500g @ 70°C using 1 in²	PASS	PASS	PASS	PASS	3M test method: SS & PET Hold weight 1 week
Heat Aging and Environmental Cycling Performance	Products pass UL-746C Heat Aging testing* and Environmental Cycling testing. Contact your 3M technical services representative for details.			TBD	UL-746C

*UL-746A file number E213134

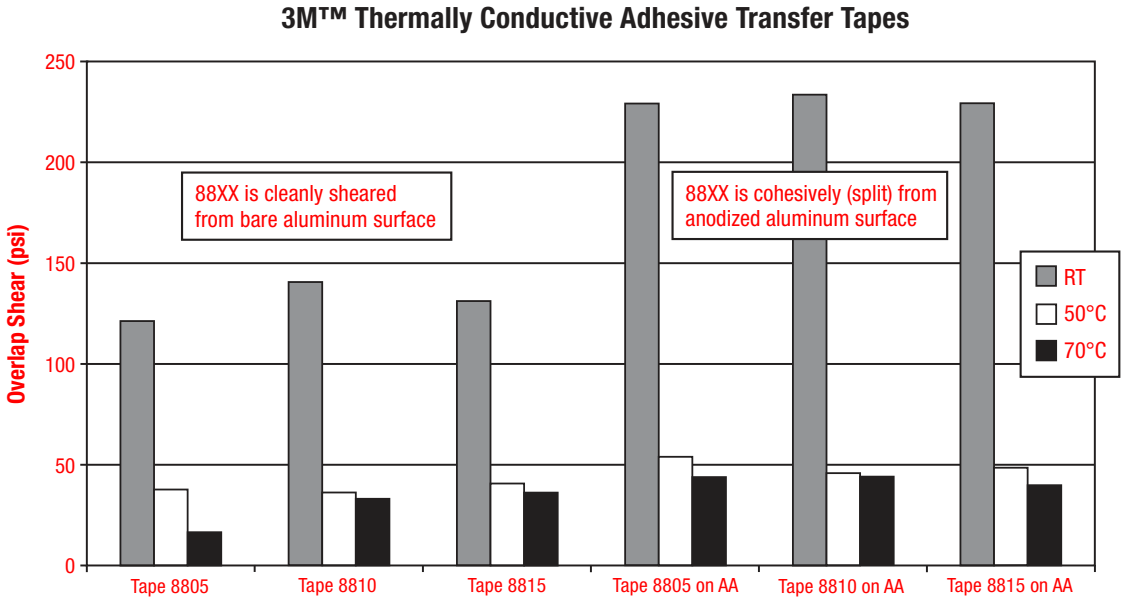
**Estimated value based on Tape 8815 test data

***When ASTM is mentioned, the test was performed in accordance with the ASTM test method

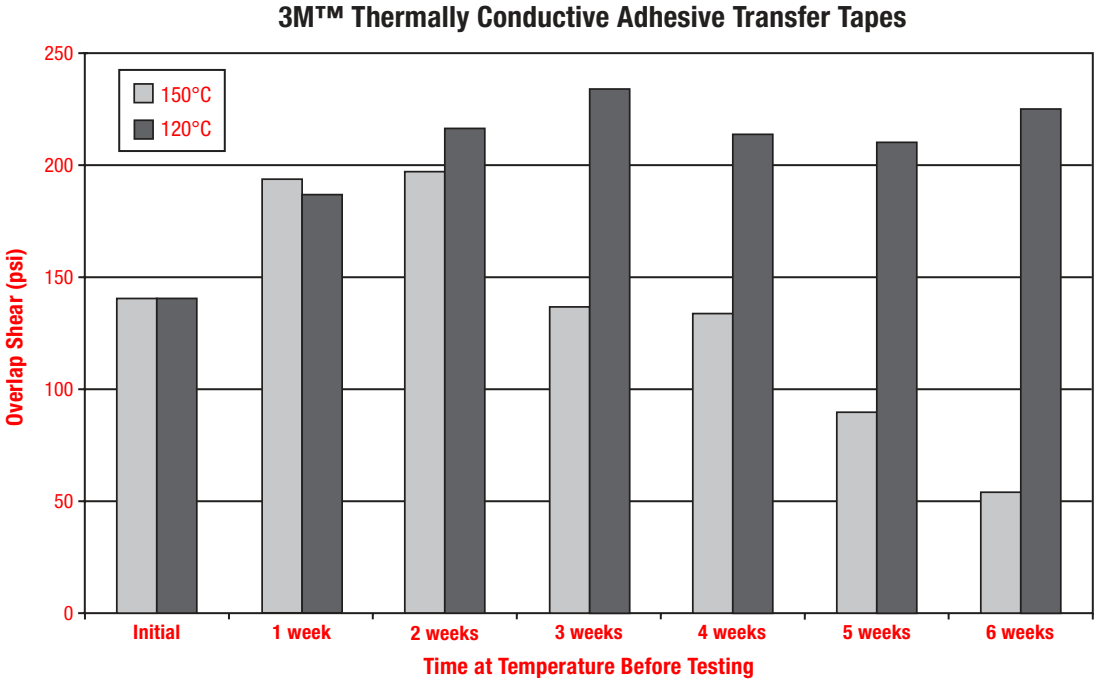
Typical Physical Properties and Performance Characteristics (continued)

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

Overlap Shear at Specific Temperatures Properties: (Test conditions: Test substrates are bare untreated aluminum or anodized aluminum, 1 in.^{2} test sample size, shear speed = 0.5 inch/minute. Samples heated to temperature noted below in 5 minutes and then OLS tested. Before testing, samples are dwelled for 3 days at RT to build adhesive bond to substrate).



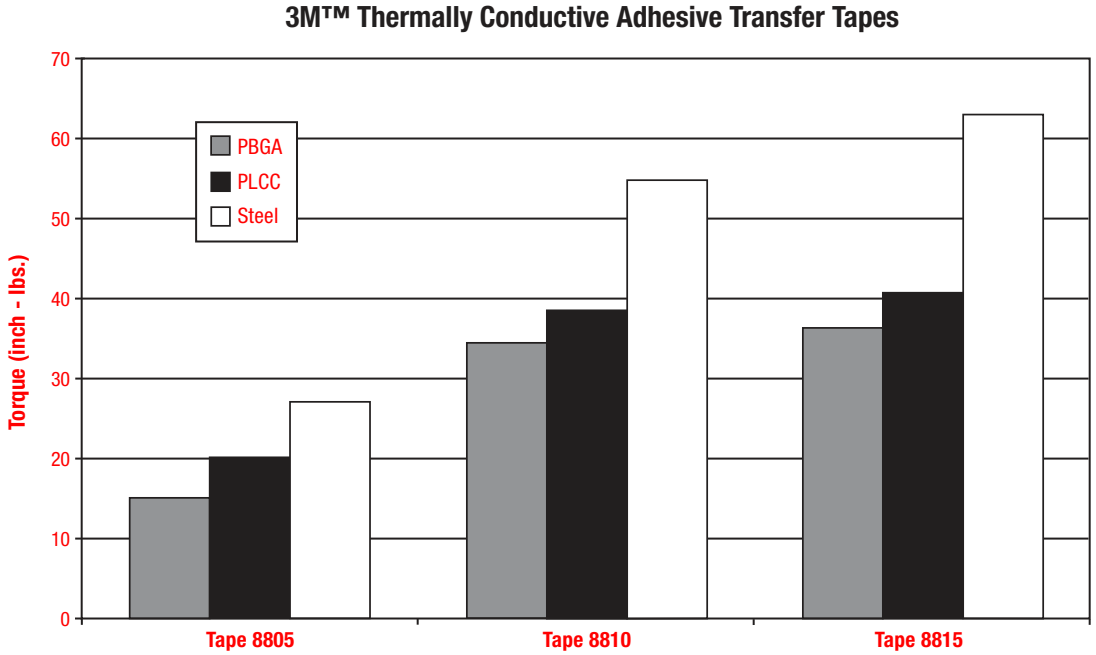
Overlap Shear Heat Aged Properties: (Test conditions: Test substrates are bare untreated aluminum, OLS speed is 0.5 in./min., adhesive cleanly removes from substrate surface during OLS test, 1 in.^{2} test sample size, test at RT conditions after aging cycle complete, 3M Tape 8810).



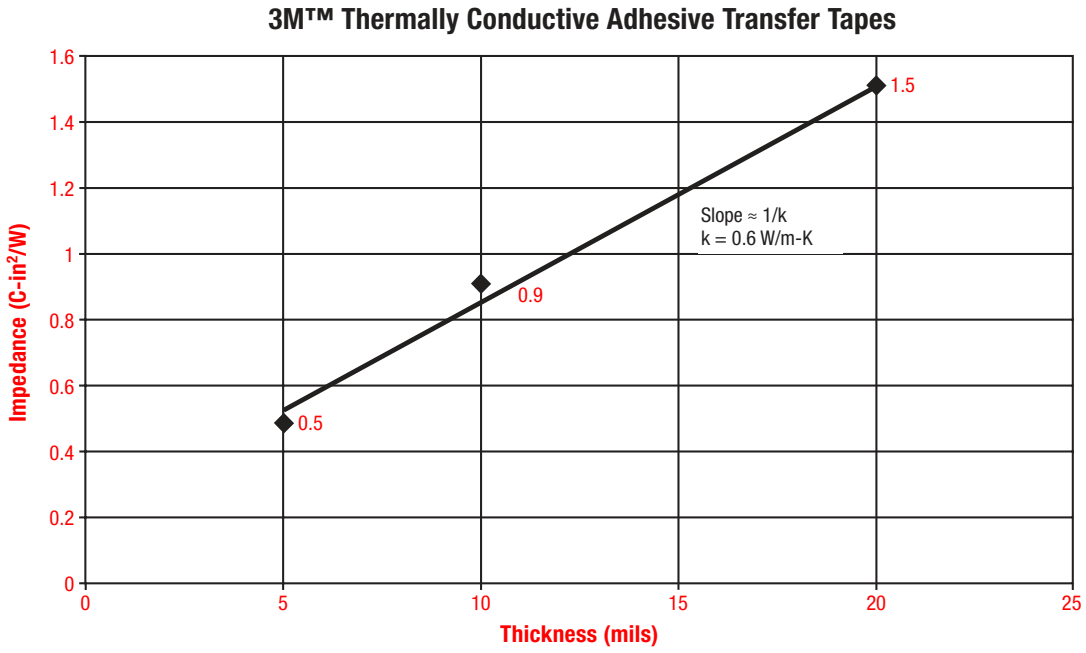
Typical Physical Properties and Performance Characteristics (continued)

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

Torque Resistance: (Test conditions: This test indicates the resistance to twisting shear forces, heat sink attachment to different chip package material types, 1.0 hour room temperature dwell after attachment to the package surface before torque testing is completed).



Thermal Impedance (C-in²/W) vs. Thickness: (Test Conditions: 3M test method).



Available Sizes

Width: Maximum width 22 inches.

Length: Multiples of 36 yds. Maximum 108 yds.

Custom Sizes: Contact your local 3M sales representative for information and availability of custom sizes (width and length) or die cut parts of 3M™ Thermally Conductive Adhesive Transfer Tapes 8805, 8810, 8815 and 8820.

Application Guidelines

1) Substrate surfaces should be clean and dry prior to tape application. Isopropyl alcohol (isopropanol) applied with a lint-free wipe or swab should be adequate for removing surface contamination such as dust or finger prints. Do not use "denatured alcohol" or glass cleaners which often contain oily components. Allow the surface to dry for several minutes before applying the tape. More aggressive solvents (such as acetone, methyl ethyl ketone (MEK) or toluene) may be required to remove heavier contamination (grease, machine oils, solder flux, etc.) but should be followed by a final isopropanol wipe as described above.

Note:-Be sure to read and follow the manufacturers' precautions and directions when using primers and solvents.

2) Apply the tape to one substrate at a modest angle with the use of a squeegee, rubber roller or finger pressure to help reduce the potential for air entrapment under the tape during its application. The liner can be removed after positioning the tape onto the first substrate.

3) Assemble the part by applying compression to the substrates to ensure a good wetting of the substrate surfaces with the tape. Proper application of pressure (amount of pressure, time applied, temperature applied) will depend upon design of the parts. Rigid substrates are more difficult to bond without air entrapment as most rigid parts are not flat. Use of a thicker tape may result in increased wetting of rigid substrates. Flexible substrates can be bonded to rigid or flexible parts with much less concern about air entrapment because one of the flexible substrates can conform to the other substrate.

4) Application pressure guideline table for 3M™ Thermally Conductive Adhesive Transfer Tapes 8805, 8810, 8815 and 8820.

Substrate	Application Conditions	Time
Rigid to rigid	Minimum: 15 psi at room temperature Preferred: 50 psi at room temperature More pressure equals better wetting	2 sec 5 sec
Flexible to rigid	Minimum: 5 psi at room temperature Preferred: 15 psi at room temperature	1 sec 5 sec
Flexible to flexible	Minimum: 5 psi at room temperature Preferred: 15 psi at room temperature	1 sec 5 sec

Application Guidelines (continued)

5) Application Tips:

- For rigid to rigid bonding, a twisting motion during assembly of the substrates will improve wetting. This should be a back and forth twisting motion during the application of compression.
- For flexible to rigid or flexible to flexible bonding, a roll lamination system may be employed to apply the flexible substrate down to the rigid (or other flexible) substrate. Rubber nip rollers, heated steel rollers, and other methods can be employed to bond in a continuous manner.
- Heat can be employed to increase wetting percentage and wetting rate of the substrates and to build room temperature bond strength.
- Primers may be employed to increase adhesion to low surface energy substrates (eg. plastic packages). Contact your 3M Technical Service Representative for more information about primers.
- For best product performance, it is important to use pressure and time conditions to achieve as much wetting as possible.

6) Rework Tips:

- Rework requires separation of the two substrates. Separation can be accomplished by any practical means: prying, torquing or peeling. The tape will be destroyed upon separation and must be replaced. The surfaces should be re-cleaned according to the recommendations in this data page.
- Heating up the substrates can reduce the adhesion level and make removal easier.
- Part separation can be aided by immersion in warm water. This should eventually reduce the adhesion and make prying, torquing or peeling apart the substrates easier.

Application Ideas

- 3M™ Thermally Conductive Adhesive Transfer Tapes 8805, 8810, 8815 and 8820 are designed to provide a preferential heat-transfer path between heat-generating devices and cooling devices (e.g., fans, heat pipes and heat sinks).

Shelf Life

The shelf life of 3M™ Thermally Conductive Adhesive Transfer Tapes 8805, 8810, 8815 and 8820 is 24 months from the date of manufacture when stored in the original packaging materials and stored at 22°C (72°F) and 50% relative humidity.

Regulatory

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

Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

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. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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