3M™ Thermally Conductive Adhesive Transfer Tapes 9882 • 9885 • 9890

Product Description

3M™ Thermally Conductive Adhesive Transfer Tapes 9882, 9885, and 9890 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).

- These tapes are pressure sensitive adhesives loaded with thermally conductive ceramic fillers. Pressure is needed to form a bond. Heat and pressure may be needed on some substrates to achieve an acceptable bond.
- The specialized acrylic chemistry of these tapes provide for good thermal stability of the base polymer.
- The thermally conductive tapes are on a silicone treated polyester release liner for ease of handling and die cutting.
- The tapes offer both good thermal conductivity and good electrical insulation properties.
- Tapes 9882, 9885, and 9890 provide best adhesion results when used with high surface energy substrates. If using low surface energy material, 3M™ Thermally Conductive Adhesive Transfer Tapes 8805, 8810, 8815, or 8820 could provide a higher adhesion bond and improved wet-out of the surface..

Product Construction

Product Number	3M™ Thermally Conductive Adhesive Transfer Tapes 9882	9885	9890
Color	Grey		
Tape Type	Filled Acrylic Polymer		
Tape Thickness	2 mils (0.05 mm)	5 mils (0.13 mm)	10 mils (0.25 mm)
Filler Type	Ceramic		
Liner Type	Single Liner using Silicone-Treated Polyester		
Liner Thickness	2 mil (50 µm)		

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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 9882	9885	9890	
Property	**Value**			**Method**
Thermal Impedance (C-in.^{2}/W)	0.35	0.50	0.90	3M test method
Thermal Conductivity (W/m-K)	0.60			ASTM C-177
Specific Gravity	2g/cm^3			
Coefficient of Thermal Expansion (CTE)	CTE@ 23°C to 150°C = 400ppm/°C CTE@ -55°C = 250ppm/°C			ASTM D-3386
Volume Resistivity (Ω-cm)	—	—	2 x 10^{14}	ASTM D-257
Dielectric Strength (Volts/mil)	750 Volts / mil (9890 Tested)			ASTM D-149
Dielectric Properties (frequency)	*1 kHz*	—	*1 MHz*	ASTM D-150
Dielectric Constant (9890)	6	—	5	
90 Degree Peel Test (oz/in) Untreated aluminum substrate	**9882**	**9885**	**9890**	3M test method 1 mil PET Backing Ref: ASTM D-3330 @12 in/min and 90 Degree Peel
Room Temp Dwell @ 15 min	6 - 13			
65°C Dwell @ 15 min	14 - 22			
Room Temp Dwell @ 72 hrs	19 - 31			
65°C Temp Dwell @ 72 hrs	16 - 33			
Static Shear test of holding 1000g @ Room Temp using 1 in^2	PASS	PASS	PASS	3M test method: SS & PET Hold weight 1 week
Static Shear test of holding 500g @ 70°C using 1 in^2	PASS	PASS	PASS	3M test method: SS & PET Hold weight 1 week

Shelf Life

Product shelf life is 2 years from date of manufacture when stored at room temperature conditions (72°F [22°C] and 50% RH) in the products original packaging.

Available Sizes

Width: Maximum width 22 inches.

Length: Multiples of 36 yds. 108 yds. maximum.

Custom Sizes: Contact your local 3M sales representative for information and availability of custom sizes (width and length) or die cut parts.

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 substrate can conform to the other substrates.

4.) Application pressure guideline table for 3M™ Thermally Conductive Adhesive Transfer Tapes 9882, 9885, and 9890.

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

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 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.

Application Guidelines (continued)

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 9882, 9885, and 9890 are designed to provide a preferential heat-transfer path between heat-generating and cooling devices (e.g., fans, heat pipes and heat sinks).

General Information

Product selection table for 3M™ Thermally Conductive Materials.

Product	Thickness (mm)	Bulk Thermal Conductivity (W/m-K)	Typical Applications
3M™ Thermally Conductive Tapes			
8805	0.127	0.6	Applications requiring thin bonding with good thermal transfer; CPU, flex circuit and power transformer bonding to heat sinks and other cooling devices. Superior tack and wetting properties.
8810	0.25		
8815	0.375		
8820	0.50		
9889FR	1.0	0.5	Applications requiring gap filling and bonding with good thermal transfer; plasma display, IC packages and PCB bonding to heat sinks, metal cases and other cooling devices.
3M™ Thermally Conductive Pads			
5516/5516S	0.5, 1.0, 1.5, 2.0	3.1	Applications requiring gap filling and superior thermal performance without bonding. IC package and PCB thermal interfacing with heat sinks or other cooling devices and metal cases.
5519/5519S	0.5, 1.0, 1.5, 2.0	4.9	
5591S	0.5, 1.0, 1.5, 2.0	1.0	
5592/5592S	0.5, 1.0, 1.5, 2.0	1.1	
5595/5595S	0.5, 1.0, 1.5, 2.0	1.6	
3M™ Thermally Conductive Pads (Acrylic)			
5589H	1.0, 1.5	2.0	These pads use an acrylic elastomer for applications that require a non-silicone thermal pad. Provides IC package and PCB thermal interfacing with heat sinks or other cooling devices, and metal cases.
5590H	0.5, 1.0, 1.5	3.0	
3M™ Thermally Conductive Epoxy Adhesives			
TC-2707	—	0.7	Applications requiring high adhesive strength, good surface wet-out, gap filling and good thermal transfer. Provides IC package and PCB thermal interfacing with heat sinks or other cooling devices.
TC-2810	—	1.0	
DP-190 Gray	—	0.4	

Only the "S" versions are available in 0.5 mm thicknesses.

"S" designation signifies a polyester film on one side to provide a non-tacky surface.

"H" designation signifies a product with one one-tacky surface without the use of PET film.

Certification/Recognition

MSDS: 3M has not prepared a MSDS for these products which are not subject to the MSDS requirements of the Occupational Safety and Health Administration's Hazard Communication Standard, 29 C.F.R. 1910.1200(b)(6)(v). When used under reasonable conditions or in accordance with the 3M directions for use, these products should not present a health and safety hazard. However, use or processing of the product in a manner not in accordance with the directions for use may affect their performance and present potential health and safety hazards.

TSCA: These products are defined as articles under the Toxic Substances Control Act and therefore, are exempt from inventory listing requirements.

UL: These products have been recognized by Underwriters Laboratories Inc. per UL 746C.

RoHs Complaint/REACH Compliant: These products comply with the European Union's "Restriction of Hazardous Substances" (RoHs) initiative and with European REACH regulations 2002/95/EC and 2005/618/EC.

For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-866-599-4227. Address correspondence to: 3M, Electronics Markets Materials Division, 3M Center, Building 225-3S-06, St. Paul, MN 55144-1000. Our fax number is 651-778-4244 or 1-877-369-2923. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-787-750-3000. In Mexico, phone: 52-70-04-00.

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