

February, 2008

3M™ Ultra High Temperature 100 HT Adhesive Transfer Tape 9085

Product Description

3M™ Ultra High Temperature 100HT Adhesive Transfer Tape 9085 utilizes a high performance and low outgassing adhesive system having excellent heat resistance in high temperature environments. Not only does it have excellent holding power, but also its adhesion strength is significantly higher than typical pressure sensitive tapes.

This adhesive transfer tape is ideal for use in many industrial applications subjected to higher temperature environments. Typical examples are for automotive under-hood applications that require both higher processing and operating temperatures. Other areas include printed circuit boards and heat sink bonding in many electronics applications subjected to high solder reflow temperatures.



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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

Property	Values	
Color	Clear	
Adhesive Type	Acrylic Adhesive System	
Adhesive Thickness	0.13 mm	5 mil
Density	0.98 g/cm ³	0.04 lb/in ³
Liner	55# Densified Kraft	
Liner Thickness	0.08 mm	3.2 mil
Liner Color	White, with green "3M" print	

Typical Performance Characteristics

Peel Adhesion		Test Condition
10.5 N/cm	96 oz/in	Room Temperature
8.8 N/cm	80 oz/in	@ 225°F(107°C)
7 N/cm	64 oz/in	@ 300°F(149°C)
5.3 N/cm	48 oz/in	@ 350°F(177°C)
1.8 N/cm	16 oz/in	@ 450°F(230°C)

Property: Peel Adhesion

Method: ASTM D3330

notes: Both tapes made from the same adhesive system and are thermoplastic in nature, becoming softer as temperature increases and firmer as temperature decreases. As the adhesive becomes firmer, the adhesion performance generally increases. At low temperatures (lower than -40°F [-40°C]), the tapes become very firm and glassy; the ability to absorb impact energy is reduced. In contrast, adhesion strength reduces with increasing temperatures. Typical adhesive strength properties at different temperatures are shown below. (Note: Samples were conditioned at the desired temperature for two minutes before testing at that temperature.)

Normal Tensile (T-Block)		Test Condition
345 kPa	50 lb/in ²	Room Temperature
70 kPa	10 lb/in ²	@ 225°F(107°C)
70 kPa	10 lb/in ²	@ 300°F(149°C)
70 kPa	10 lb/in ²	@ 350°F(177°C)
35 kPa	5 lb/in ²	@ 450°F(230°C)

Property: Normal Tensile (T-Block)

Method: ASTM D897

Substrate: Aluminum

notes: Both tapes made from the same adhesive system and are thermoplastic in nature, becoming softer as temperature increases and firmer as temperature decreases. As the adhesive becomes firmer, the adhesion performance generally increases. At low temperatures (lower than -40°F [-40°C]), the tapes become very firm and glassy; the ability to absorb impact energy is reduced. In contrast, adhesion strength reduces with increasing temperatures. Typical adhesive strength properties at different temperatures are shown below. (Note: Samples were conditioned at the desired temperature for two minutes before testing at that temperature.)

Typical Performance Characteristics (continued)

Relative High Temperature Operating Ranges		Test Condition
280 °C	540 °F	Short Term (minutes, hours)
177 °C	350 °F	Long Term (days, weeks)

Property: Relative High Temperature Operating Ranges

Static Shear	Test Condition
1000 g	Hold weight listed @ Room Temperature for 10,000 min
1000 g	Hold weight listed @ 93°C (200°F) for 10,000 min
1000 g	Hold weight listed @ 121°C (250°F) for 10,000 min
1000 g	Hold weight listed @ 150°C (300°F) for 10,000 min
1000 g	Hold weight listed @ 175°C (350°F) for 10,000 min

Property: Static Shear

Method: ASTM D3654

Substrate: Aluminum

notes: Both tapes made from the same adhesive system and are thermoplastic in nature, becoming softer as temperature increases and firmer as temperature decreases. As the adhesive becomes firmer, the adhesion performance generally increases. At low temperatures (lower than -40°F [-40°C]), the tapes become very firm and glassy; the ability to absorb impact energy is reduced. In contrast, adhesion strength reduces with increasing temperatures. Typical adhesive strength properties at different temperatures are shown below. (Note: Samples were conditioned at the desired temperature for two minutes before testing at that temperature.)

Overlap Shear Strength	Test Condition
550 kPa	Room Temperature
210 kPa	@ 225°F(107°C)
170 kPa	@ 300°F(149°C)
100 kPa	@ 350°F(177°C)
70 kPa	@ 450°F(230°C)

Property: Overlap Shear Strength

Method: ASTM D1002

Substrate: Stainless Steel

notes: Both tapes made from the same adhesive system and are thermoplastic in nature, becoming softer as temperature increases and firmer as temperature decreases. As the adhesive becomes firmer, the adhesion performance generally increases. At low temperatures (lower than -40°F [-40°C]), the tapes become very firm and glassy; the ability to absorb impact energy is reduced. In contrast, adhesion strength reduces with increasing temperatures. Typical adhesive strength properties at different temperatures are shown below. (Note: Samples were conditioned at the desired temperature for two minutes before testing at that temperature.)

Available Sizes

Property	Values
Note	Subject to Minimum Order Requirements
Standard Length	54.9 m 60 yd
Normal Slitting Tolerance	± 0.8 mm ± 1/32 in

Available Sizes (continued)

Maximum Length		Width
54.9 m	60 yd	1/2 in width
110 m	120 yd	1/2 in to 1 in widths
110 m	120 yd	1 in to 3 in
165 m	180 yd	3 in and wider

Property: Maximum Length

Electrical and Thermal Properties

Property	Values		Method
Insulation Resistance	$>1 \times 10^6 \text{ M}\Omega/\text{in}^2$		ASTM D1000
Thermal Conductivity	0.16 W/m/K	1.1 (btu-in)/(h-ft ² -°F)	ASTM C177

Dielectric Strength	Test Condition
3000 V	Room Temperature
N/A V	125°C
N/A V	175°C

Property: Dielectric Strength
Method: ASTM D149

Additional Typical Performance Characteristics

Coefficient of Thermal Expansion: $770 \times 10^{-6} \text{ m/m/}^\circ\text{C}$

Weight Loss and Outgassing Performance

Property	Values	Test Condition	Notes
Isothermal TGA Analysis	0.64 %	@ 300°F (149°C)	The testing is done using a constant temperature Thermogravimetric Analysis (TGA). Samples were analyzed by tested in a TA Instruments 2950 HI-RES Modulated Thermogravimetric running under air atmosphere in standard mode. The sample temperature was increased from ambient to the desired temperature using the instruments highest heating rate and maintained at that temperature for 3.5 hours. Results are reported as percent weight loss based on the original weight of the sample.
Isothermal TGA Analysis	1.09 %	@ 350°F (177°C)	The testing is done using a constant temperature Thermogravimetric Analysis (TGA). Samples were analyzed by tested in a TA Instruments 2950 HI-RES Modulated Thermogravimetric running under air atmosphere in standard mode. The sample temperature was increased from ambient to the desired temperature using the instruments highest heating rate and maintained at that temperature for 3.5 hours. Results are reported as percent weight loss based on the original weight of the sample.

Ramped TGA Analysis	Test Condition
0.15 %	@ 225°F (107°C)
0.21 %	@ 300°F (149°C)
0.26 %	@ 350°F (177°C)

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Weight Loss and Outgassing Performance (continued)

Ramped TGA Analysis	Test Condition
0.61 %	@ 450°F (230°C)
1 %	@ 500°F (260°C)
5 %	@ 585°F (307°C)

Property: Ramped TGA Analysis

notes: The testing is done using a constant temperature Thermogravimetric Analysis (TGA). Samples were analyzed by tested in a TA Instruments 2950 HI-RES Modulated Thermogravimetric running under air atmosphere in standard mode. The sample temperature was increased from ambient to a high temperature above 1,000°F (537°C) at a rate of 10°C per minute. Results are reported as percent weight loss at the desired temperature points based on the original weight of the sample.

Handling/Application Information

Application Techniques

Bond strength is dependent upon the amount of adhesive-to-surface contact developed. Firm application pressure helps develop better adhesive contact and improve bond strength.

To obtain optimum adhesion, the bonding surfaces must be clean, dry, and well unified. Some typical surface cleaning solvents are isopropyl alcohol/water mixture or heptane.*

Ideal tape application temperature range is 70°F to 100°F (21°C to 38°C). Initial tape application to surfaces at temperatures below 50°F (10°C) is not recommended because the adhesive becomes too firm to adhere readily. However, once properly applied, low temperature holding is generally satisfactory.

*Note: Be sure to follow the manufacturer's precautions and directions for use when using solvents.

Storage and Shelf Life

Store in original cartons at 70°F (21°C) and 50% relative humidity.

If stored under proper conditions, product retains its performance and properties for 24 months from date of manufacture.

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Information

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Trademarks

3M is a trademark of 3M Company.

References

Safety Data Sheet (SDS)

https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&msdsLocale=en_US&co=ptn&q=9085

Family Group

	9082	9085	9085UV
Relative High Temperature Operating Ranges (°C) Test Condition: Short Term (minutes, hours)	280	280	280
Relative High Temperature Operating Ranges (°C) Test Condition: Long Term (days, weeks)	177	177	177
Color	Clear	Clear	Clear

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3M™ Ultra High Temperature 100 HT Adhesive Transfer Tape 9085

Family Group (continued)

	9082	9085	9085UV
Adhesive Type	Acrylic Adhesive System	Acrylic Adhesive System	Acrylic Adhesive System
Adhesive Thickness (mm)	0.05	0.13	0.13
Liner	55# Densified Kraft	55# Densified Kraft	58# Polycoated Kraft
Liner Thickness (mm)	0.08	0.08	0.1
Liner Color	White, with green "3M" print	White, with green "3M" print	Brown

ISO Statement

This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001 standards.

