High Temperature PSA Solutions for Electronic Component Attachments

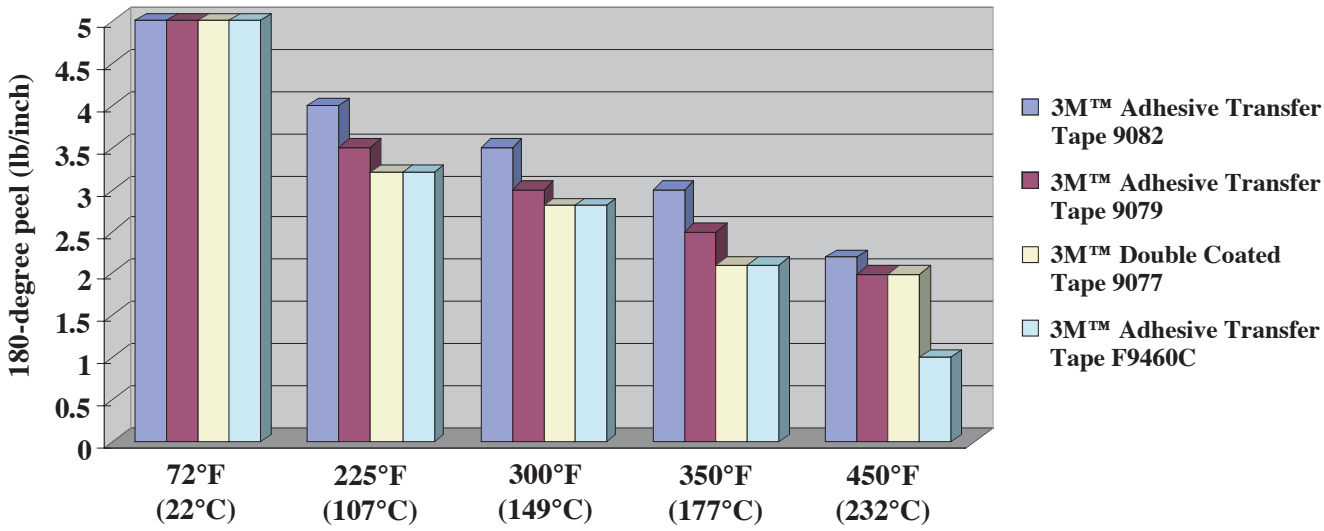
Technical Bulletin **February, 2007**

This technical bulletin presents a comparative performance at high temperatures of various pressure sensitive adhesive tapes. Of particular interest is the thermal stability performance on adhesion strength, weight loss, and long-term and short-term survival temperature tolerances. This technical bulletin deals with high temperature applications, for example, PCB attachment for lead-free electronic components would require high temperature rated adhesives able to resist temperatures higher than 260°C (500°F).

Three types of 3M high temperature adhesive systems are currently used in many industrial applications and are designated as 100MP, 100HT & 100HTL, respectively. This bulletin provides a quick summary on the selected adhesive products with emphasis on their high temperature performance. The objective is to help engineers to select the right solution to meet specific design requirements. For more detailed adhesive performance and properties, refer to the data pages.

Note: The data presented in this technical bulletin are best estimates for the current product constructions, and they should not be used for specifications purpose.

(1) Peel Adhesion versus Temperature on Aluminum (per ASTM D3330 for 180-degree Peel Adhesion with a dwell time of 2 minutes at testing temperatures)



(2) Product Constructions & Suggested Maximum Temperature Tolerances

Adhesive Family	Adhesive Products	Liner and Adhesive Description	Maximum Temperature Tolerances		
			Adhesive		Liner
			Long Term (Hours, Days)	Short Term (Minutes)	Short Term (Minutes)
100MP Acylic	3M™ Adhesive Transfer Tape F9460PC	Liner: 0.004" thick 58# Polycoated Kraft Paper Adhesive: 0.002" thick	150°C (300F)	230°C (450°F)	125°C (260°F)
	3M™ Adhesive Transfer Tape F9469PC	Liner: 0.004" thick 58# Polycoated Kraft Paper Adhesive: 0.005" thick	150°C (300°F)	230°C (450°F)	125°C (260°F)
	3M™ Adhesive Transfer Tape F9473PC	Liner: 0.004" thick 58# Polycoated Kraft Paper Adhesive: 0.010" thick	150°C (300°F)	230°C (450°F)	125°C (260°F)
100HT Acylic	3M™ Adhesive Transfer Tape 9082	Liner: 0.031" thick Densified Kraft Paper Adhesive: 0.002" thick	175°C (350°F)	280°C (540°F)	230°C (450°F)
	3M™ Adhesive Transfer Tape 9085	Liner: 0.031" thick Densified Kraft Paper Adhesive: 0.005" thick	175°C (350°F)	280°C (540°F)	230°C (450°F)
100HTL Acylic	3M™ Adhesive Transfer Tape 9079	Liner: 0.035" thick High Temperature Paper Adhesive: 0.002" thick	175°C (350°F)	275°C (530°F)	260°C (500°F)
	3M™ Double Coated Tape 9077	Liner: 0.035" thick High Temperature Paper Adhesive: 0.002" thick	175°C (350°F)	275°C (530°F)	260°C (500°F)

(3) Weight Loss at High Temperatures (Isothermal TGA Analysis)

The testing is done using a constant temperature Thermogravimetric Analysis (TGA). Samples wereanalyzed 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 (22°C) to the desired temperature using the instruments highest heating rate and maintained at that temperature for the designated dwell time. Results are reported as percent of total weight loss (% TWL).

Adhesive Family	Adhesive Products	Aging Condition (Temperature & Dwell Time)		
		150°C (300°F) for 3.5 hours	175°C (350°F) for 3.5 hours	130°C (265°F) for 10 hours
100MP Acrylic	3M™ Adhesive Transfer Tape F9460PC	> 1%	> 10%	> 5%
	3M™ Adhesive Transfer Tape F9469PC	> 1%	> 10%	> 5%
	3M™ Adhesive Transfer Tape F9469PC	> 1%	> 10%	> 5%
100HT Acrylic	3M™ Adhesive Transfer Tape 9082	< 1%	< 1.5%	< 1%
	3M™ Adhesive Transfer Tape 9085	< 1%	< 2%	< 1%
100HTL Acrylic	3M™ Adhesive Transfer Tape 9079	< 1%	< 2%	< 1%
	3M™ Double Coated Tape 9077	< 2%	< 3%	< 2%

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3M Center, Building 21-1W-10, 900 Bush Avenue
St. Paul, MN 55144-1000
800-223-7427 • 651-778-4244 (fax)
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