

November, 2013

3M™ Membrane Switch Product with Adhesive 200MP 7997MP

Product Description

Finite Element Analysis (FEA) data is available for this product at: 3m.com/FEA

3M™ High Performance Acrylic Adhesive 200MP is a popular choice and industry standard, for graphic attachment and general industrial joining applications. It provides outstanding adhesion to metal and high surface energy plastics. This adhesive provides some initial repositionability for placement accuracy when bonding to plastics. It also performs well after exposure to humidity and hot/cold cycles and provides the assurance the switch will perform through difficult environmental conditions and millions of actuations.

Product Features

- Up to 400°F short-term heat resistance
 - Excellent solvent resistance
 - Excellent shear strength to resist slippage and edge lifting
- 3M™ Single Coated Membrane Switch Spacers offer:
- Smooth adhesive layer for consistent actuation and excellent sealability of switch
 - High adhesive strength to resist moisture penetration, and environmental conditions
 - High cohesive strength to resist lifting and separation especially in harsh environments
 - High temperature resistance to resist splitting in harsh environments
 - High chemical resistance to resist contamination of contacts in harsh environments
 - Heat stabilized polyester for dimensional stability through broad temperature range
 - Moisture stable liners for easy, layflat processing
 - Easy liner release – for fast, consistent processing



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	
Carrier Thickness	0.13 mm	5 mil
Adhesive Carrier	Polyester Film (PET)	
Adhesive Thickness	0.05 mm	2 mil
Liner	94# Polycoated Kraft Paper (PCK)	
Liner Thickness	0.18 mm	7 mil

Typical Performance Characteristics

90° Peel Adhesion		Method	Dwell/Cure Time	Temp C	Temp F	Substrate	Backing	Notes	Dwell Time Units	Environmental Condition
2.6 N/cm		ASTM D3330	Initial	23C	72F	Stainless Steel	2 mil PET	12 in/min (300 mm/min)		
24 oz/in		ASTM D3330	Initial	72F	50%RH	Stainless Steel	2 mil PET		23C	
25.4 N/cm	232 oz/in	ASTM D3330 (modified)	72	70C	158F	Stainless Steel	PET Film	12 in/min (300 mm/min)	hr	50%RH
3.5 N/cm		ASTM D3330 (modified)	Initial			Aluminum	PET Film			
32 oz/in		ASTM D3330	Initial	23C	72F	Aluminum	2 mil PET	12 in/min (300 mm/min)		50%RH
8.2 N/cm	75 oz/in	ASTM D3330	72	23C	72F	Aluminum	2 mil PET	12 in/min (300 mm/min)	hr	50%RH
28.7 N/cm	262 oz/in	ASTM D3330 (modified)	72	70C	158F	Aluminum	PET Film		hr	50%RH
4.3 N/cm	39 oz/in	ASTM D3330 (modified)	Initial			PET	PET Film	12 in/min (300 mm/min)		
7.2 N/cm	66 oz/in	ASTM D3330 (modified)	72	23C	72F	PET	PET Film		hr	50%RH
28.1 N/cm	257 oz/in	ASTM D3330 (modified)	72	70C	158F	PET	PET Film		hr	50%RH
3.9 N/cm	36 oz/in	ASTM D3330 (modified)	Initial			Polycarbonate (PC)	PET Film	12 in/min (300 mm/min)		

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Typical Performance Characteristics (continued)

90° Peel Adhesion	Adhesion	Method	Dwell/Cure Time	Temp C	Temp F	Substrate	Backing	Notes	Dwell Time Units	Environmental Condition
14.8 N/cm	135 oz/in	ASTM D3330 (modified)	72 hr @ 158°F(70°C)			Polycarbonate (PC)	PET Film			
94 oz/in	10 N/cm	ASTM D3330	72	23C	72F	Stainless Steel	2 mil PET	12 in/min (300 mm/min)	hr	50%RH
7.4 N/cm	68 oz/in	ASTM D3330	72	23C	72F	Polycarbonate (PC)	2 mil PET	12 in/min (300 mm/min)	hr	50%RH

Property: 90° Peel Adhesion

Property	Values	Method	Substrate	Backing	Test Condition	Notes
Tensile Strength	6273 lb/in	ASTM D2370	Stainless Steel	PET Film		
Static Shear	10,000+ min	ASTM D3654	Stainless Steel	PET Film	1000 g @ Room Temperature	0.5 in ²
Static Shear	10,000+ min	ASTM D3654	Stainless Steel	PET Film	500 g @ 70°C (158°F)	0.5 in ²

Electrical and Thermal Properties

Property	Values	Method	Test Condition	Notes
Insulation Resistance	$6.5 \times 10^{12} \Omega$	Mil-I-46058C	100VDC, 60 sec	
Dissipation Factor	0.008	ASTM D150		
Dielectric Strength	1700 V/mil	ASTM D149		Short time method (air)
Volume Resistivity	$4.8 \times 10^{15} \Omega\text{-cm}$	ASTM D257	Room Temperature	
Surface Resistivity	$>5.6 \times 10^{16} \Omega$	ASTM D257	Room Temperature	
Coefficient of Thermal Expansion	$2.8 \times 10^{-4} \text{ m/m/}^\circ\text{C}$	ASTM D696	First Heat(125 - 175°C)	

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Environmental Resistance

Humidity Resistance – High humidity has a minimal effect on adhesive performance. Bond strength shows no significant reduction after exposure for 7 days at 90°F (32°C) and 90% relative humidity.

UV Resistance – When properly applied, nameplates and decorative trim parts are not adversely affected by outdoor exposure.

Water Resistance – Immersion in water has no appreciable effect on the bond strength. After 100 hours at room temperature, the high bond strength is maintained.

Temperature Cycling Resistance – High bond strength is maintained after cycling four times through:

- 4 hours at 158°F (70°C)
- 4 hours at -20°F (-29°C)
- 4 hours at 73°F (22°C)

Chemical Resistance – When properly applied, nameplate and decorative trim parts will hold securely after exposure to numerous chemicals including oil, mild acids and alkalis.

Bond Build-up: The bond strength of 3M™ High Performance Acrylic Adhesive increases as a function of time and temperature as the adhesive further wets the surface and reaches maximum bond strength after 72 hours at room temperature.

Temperature/Heat Resistance: 3M™ High Performance Acrylic Adhesive on polyester carriers is usable for short periods (minutes, hours) at temperatures up to 300 °F (149°C) and for intermittent longer periods (days, weeks) up to 250°F (121°C).

Lower Temperature Service Limit: -40°F (-40°C).

Handling/Application Information

Application Ideas

- 3M™ Single Coated Membrane Switch Spacers are ideal for circuit layers, metal dome placement and lead protection

Storage and Shelf Life

It is suggested that products are stored at room temperature conditions of 70°F (21°C) and 50% relative humidity.

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

Trademarks

3M is a trademark of 3M Company

References

Property	Values
3m.com Product Page	https://www.3m.com/3M/en_US/company-us/all-3m-products/~/3M-Membrane-Switch-Spacer-Single-Coated-7997MP?N=5002385+3293242038&rt=rud
Safety Data Sheet (SDS)	https://www.3m.com/3M/en_US/company-us/SDS-search/results?gsaAction=msdsSRA&msdsLocale=en_US&co=ptn&q=7997MP

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Family Group

	7953MP	7956MP	7957MP	7959MP	7961MP	9045MP	7945MP	9057MP	9059MP	9061MP	7993MP	7995MP	7997MP	9056MP
Carrier Thickness (mm)	0.01	0.05	0.08	0.13	0.18	0.03	0.03	0.08	0.13	0.18	0.03	0.08	0.13	0.05
Adhesive Carrier	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)	Polyester Film (PET)
Adhesive Thickness (mm)	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Liner											94# Polycoated Kraft Paper (PCK)	94# Polycoated Kraft Paper (PCK)	94# Polycoated Kraft Paper (PCK)	
Liner Thickness (mm)											0.18	0.18	0.18	

ISO Statement

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

Recognition/Certification

TSCA: This product is defined as an article under the Toxic Substances Control Act and therefore, it is exempt from inventory listing requirements

MSDS: 3M has not prepared a MSDS for this product which is not subjected 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, this product 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 its performance and present potential health and safety hazards.

UL: These products have been recognized by Underwriters Laboratories, Inc. under UL 746C and UL 969. For more information on the UL Certification, please visit the website at <http://www.3M.com/converter>, select UL Recognized Materials, then select the specific product area.

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