



# High Performance Adhesive Transfer Tapes with 3M™ Adhesive 200MP

Technical Data

March, 2001

## Product Description

3M™ adhesive 200MP is a popular choice for graphic attachment and membrane switch applications because it has excellent quality, consistency and durability. In addition, as a result of 3M's innovative, proprietary process, 3M adhesive 200MP also offers the following excellent performance characteristics.

Clarity (virtually free of vapor inclusions that are commonly found in adhesives produced by the traditional solvent coating technique).

Excellent high temperature performance as well as excellent shear strength (that minimizes edge lifting and slippage of parts).

Excellent resistance to harsh environments; this adhesive can withstand splashes of organic solvents, weak acids and bases and salt water, cleaning solutions, germicidals, disinfectants, oils, etc. In addition, it performs well after exposure to humidity and hot/cold cycles.

Provides some initial repositionability when bonding to plastic parts (not metal). This allows graphic parts to be lifted and repositioned if initial alignment is incorrect.

Finally, this adhesive family is provided with a variety of liner configurations to help ensure excellent process flexibility.

## Constructions

Product Number	Adhesive Type/Color <sup>1</sup>	Adhesive Thickness <sup>2</sup> (mils, mm)	Liner Color, Type, Print	Liner Caliper <sup>3</sup> /Liner Release <sup>4</sup>
467MP	200MP/ Clear	2.3 mils 0.06 mm	Tan, 58#, Polycoated Kraft, "Scotch™ 467MP Hi Performance Adhesive"	4.0 mils 50 grams/inch
468MP	200MP/ Clear	5.2 mils 0.13 mm	Tan, 58#, Polycoated Kraft, "Scotch™ 468MP Hi Performance Adhesive"	4.0 mils 50 grams/inch
467MPF	200MP/ Clear	2.3 mils 0.06 mm	Clear, Polyester (PET), No Print	2.0 mils 20 grams/inch
468MPF	200MP/ Clear	5.2 mils 0.13 mm	Clear, Polyester, No Print	2.0 mils 20 grams/inch
7952MP	200MP/ Clear	2.3 mils 0.06 mm	1) Tan, 58#, Polycoated Kraft, "Scotch™ 467MP Hi Performance Adhesive" 2) Tan, 58# PCK	1) 4.0 mils 50 grams/inch 2) 4.0 mils 12 grams/inch

# 3M™ High Performance Adhesive Transfer Tapes with 3M™ Adhesive 200MP

## Constructions (continued)

Product Number	Adhesive Type/ Color <sup>1</sup>	Adhesive Thickness <sup>2</sup> (mils, mm)	Liner Color, Type, Print	Liner Caliper <sup>3</sup> / Liner Release <sup>4</sup>
7955MP	200MP/ Clear	5.2 mils 0.13 mm	1) Tan, 58#, Polycoated Kraft, "Scotch™ 468MP Hi Performance Adhesive" 2) Tan, 58# PCK	1) 4.0 mils 50 grams/inch 2) 4.0 mils 12 grams/inch
7962MP	200MP/ Clear	2.3 mils 0.06 mm	1) Tan, 83#, Polycoated Kraft, "Scotch™ 467MP Hi Performance Adhesive" 2) Tan, 58# PCK	1) 6.2 mils printed 50 grams/inch 2) 4.0 mils 12 grams/inch
7965MP	200MP/ Clear	5.2 mils 0.13 mm	1) Tan, 83#, Polycoated Kraft, "Scotch™ 468MP Hi Performance Adhesive" 2) Tan, 58# PCK	1) 6.2 mils printed 50 grams/inch 2) 4.0 mils 12 grams/inch
9172MP	200MP/ Clear	2.3 mils 0.06 mm	1) Clear HDPE Film, No Print 2) Tan, 58# Polycoated Kraft, No Print	1) 3.0 mils 50 grams/inch 2) 4.0 mils 7 grams/inch
9172PT	200MP/ Clear	2.3 mils 0.06 mm	1) Clear PET Film, No Print 2) Tan, 58# Polycoated Kraft, No Print	1) 2.0 mils 40 grams/inch 2) 4.0 mils 7 grams/inch
9185MP	200MP/ Clear	5.2 mils 0.13 mm	1) Clear HDPE Film, No Print 2) Tan, 58# Polycoated Kraft, No Print	1) 3.0 mils 70 grams/inch 2) 4.0 mils 7 grams/inch
9188	200MP/ Clear	5.2 mils 0.13 mm	1) Clear HDPE Film, No Print 2) Tan, 83# Polycoated Kraft, No Print	1) 3.0 mils 50 grams/inch 2) 6.2 mils 20 grams/inch
9667MP	200MP/ Clear	2.3 mils 0.06 mm	Tan, 83#, Polycoated Kraft "Scotch™ Laminating Adhesive"	6.2 mils 60 grams/inch
9668MP	200MP/ Clear	5.2 mils 0.13 mm	Tan, 83#, Polycoated Kraft "Scotch™ Laminating Adhesive"	6.2 mils 70 grams/inch
9676	200MP/ Clear	2.3 mils 0.06 mm	1) White Polypropylene (PP), No Print 2) Tan, 58# Polycoated Kraft, No Print	1) 3.5 mils 45 grams/inch 2) 4.0 mils 20 grams/inch

Note 1: The adhesive color is transparent with a very slight yellow cast. The yellow cast is not typically visible in a single adhesive layer.

Note 2: The thickness listed is based on a calculation from manufacturing controlled adhesive coat weights using a density of 1.012 g/cc. While past data pages have listed nominal thicknesses of 2 and 5 mils, the coat weight (and theoretical caliper) has not changed.

Note 3: Where two liners are listed (double-lined products, useful for selective die-cutting), liner 1) is the primary (stays with the die-cut part); liner 2) is the secondary (removed first). The polycoat on one side of the heavy lined products (83#) was changed to balance the liner. This balanced sheet will provide an improvement to the flatness of products made using the heavy liner.

Note 4: Typical liner release value, in grams/inch, tested at 90 ipm.

For additional "double coated" product constructions (adhesive/carrier/adhesive) using 3M™ adhesive 200MP, please refer to the data page for 3M™ Membrane Switch Spacers (70-0707-1195-0).

# 3M™ High Performance Adhesive Transfer Tapes with 3M™ Adhesive 200MP

## Constructions (continued)

### Liner Configuration Guide:

General purpose steel rule die-cutting	58# polycoated kraft (PCK)
Steel rule cutting nested or multi-up nameplates on common sheet	83# PCK
Kiss cutting, steel rule	83# PCK
Rotary die-cutting	polyester (PET)
Selective die-cutting (cut adhesive before laminate)	double-lined
Thermoforming	HDPE, white PP
Part inspection	HDPE, PET
Embossed parts	white, PP, HDPE
Metal parts (punch press)	polyester or DK added

The polycoated kraft liners are more resistant to humidity curl and wrinkling than standard plain paper liners. The film liners are the most resistant to the negative effects of humidity.

### Adding Liners for 3M™ Adhesive 200MP:

1. Rotary processing, adhesive only, on a densified kraft liner. In this process the adhesive will stay with the 58# PCK liner, leaving adhesive die-cuts dispensable from the 3M™ densified kraft liner 4994. outside of 3M™ liner 4994<sup>5</sup>
2. Rotary processing for finished parts. It is most efficient to use 3M™ Adhesive Transfer Tapes 467MPF or 468MPF. If a densified kraft (DK) liner is necessary, the adhesive should be first laminated to the substrate with pressure. After lamination, remove the 58# PCK liner and laminate the inside of the 3M™ liner 4994 (DK). Current process limitations prevent the supply of the 3M™ adhesive 200MP on a DK liner. inside of 3M liner™ 4994<sup>5</sup>

Note 5: The outside of 3M™ liner 4994 has the most premium silicone release (easiest release). Typical release, of the outside of 3M™ liner 4994, from 3M™ adhesive 200MP after lamination (both before and after heat aging) is 5-10 grams/inch. For slightly higher liner release, typical values for the inside of the 3M™ liner 4994 are 15-20 grams/inch when laminated to the 3M™ adhesive 200MP.

## 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.**

### I. Adhesion to Stainless Steel

ASTM D3330 modified (90° peel, 2 mil aluminum foil backing)

Dwell	2 mil (0.002 inches)		5 mil (0.005 inches)	
	ounces/inch	N/100mm	ounces/inch	N/100mm
15 minute room temperature (RT)	47	51	66	72
72 hour RT	82	90	118	129
72 hour 158°F (70°C)	168	184	181	198
72 hour RT - 180° peel, 2 mil al foil	77	84	133	146

### II. Adhesion to Other Surfaces

ASTM D3330 modified (90° peel, 2 mil aluminum foil backing)

Dwell	2 mil (0.002 inches)		5 mil (0.005 inches)	
	ounces/inch	N/100mm	ounces/inch	N/100mm
72 hour RT aluminum	77	84	115	126
72 hour RT ABS	62	68	68	74
72 hour RT acrylic	61	67	67	73
72 hour RT glass	80	88	92	101
72 hour RT polycarbonate	58	63	65	71
72 hour RT rigid PVC (unplasticized)	52	57	69	76

# 3M™ High Performance Adhesive Transfer Tapes with 3M™ Adhesive 200MP

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.**

### III. Relative High Temperature Operating Ranges

Short term (minutes/hours)	400°F (204°C)
Long term (days/weeks)	300°F (149°C)

### IV. Static Shear

ASTM D3654 - 1" x 1" sample area - aluminum foil to stainless steel

Temperature	Load	Minutes to Failure	
		2 mil	5 mil
70°F (21°C)	2000 grams	10,000+	10,000+
200°F (93°C)	1000 grams	10,000+	10,000+
350°F (177°C)	500 grams	10,000+	10,000+
450°F (232°C)	400 grams	60	75
450°F (232°C)	200 grams	10,000+	10,000+

### V. Shelf Life of Tape in Roll Form

24 months from the manufacturing date when stored at 70°F (21°C) and 50% relative humidity.

### VI. Adhesion Retention after Immersion and Exposure (percent retention)

Control is 24 hour RT dwell on stainless steel, 2 mil al foil backing, 90° peel, 12 ipm

	2 mil	5 mil
Control adhesion value in ounces/inch	101 oz./inch	149 oz./inch
gasoline - 1 hour RT immersion	89%	83%
MEK - 1 hour RT immersion	64%	66%
weak acid - 4 hour RT immersion	86%	86%
weak base - 4 hour RT immersion	84%	83%
oil (10W30) - 72 hour, 120°F (49°C) immersion	146%	141%
water - 100 hours, 70°F (21°C)	105%	116%
salt water (5%) - 72 hours, 70°F (21°C)	105%	93%
warm/humid - 7 days, 90°F (32°C) and 90% relative humidity	131%	101%
UV cabinet - 30 days, 70°F (21°C)	147%	93%
Temperature Cycle - *Three cycles	148%	158%
*One cycle is 4 hours, 158°F (70°C); 4 hours, -20°F (-29°C); 16 hours, 70°F (21°C)		

### VII. Low Service Temperature

The glass transition temperature for 3M™ adhesive 200MP is -31°F (-35°C). Many applications survive below this temperature (factors affecting successful applications include: materials being bonded, dwell at RT before cold exposure and stress below the TG [i.e. expansion/ contraction stresses, impact]). Optimum conditions are: bonding high surface energy materials, longer time at RT before cold exposure and little or no stress below the Tg.

Note 6: The 3M™ adhesive 200MP is not recommended for low energy plastics (polypropylene, polyethylene, powder coated paints). For these surfaces please refer to 3M™ adhesives 300, 350, 300LSE and 300MP. The 3M™ adhesive 300LSE has been used more frequently as the bond areas in applications become smaller. It offers the smooth, high performance characteristics of the 3M™ adhesive 200MP with higher adhesion to plastic. The 3M™ adhesive 300LSE is ideal for polyethylene, polypropylene, powder coated paints and for applications where the bonded area to plastic is less than 1/2" wide.

# 3M™ High Performance Adhesive Transfer Tapes with 3M™ Adhesive 200MP

## Electrical, Mechanical and Thermal Properties

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

Property	2 mil, 200MP (467MP was tested)	5 mil, 200MP (468MP was tested)
Insulation Resistance (test voltage = 100 VDC) Mil-I-46058C	>1 x 10 <sup>10</sup> ohms	>1 x 10 <sup>10</sup> ohms
Dielectric Strength – (500 vac, rms [60 hz/sec]) ASTM D149-92	880 volts/mil	600 volts/mil
Breakdown Voltage	1,760 volts	3,000 volts
Dielectric Constant (at 1 KHz) ASTM D 150-92	3.40	4.06
Dissipation Factor	0.021	0.022
Tensile Lap Shear – Peak Load ASTM D1002-72 (0.5 square inch on #6061 aluminum)		55 lbs.
Tensile Lap Shear – Peak Stress ASTM D1002-72		109 PSI
Tensile Strength and Elongation ASTM D2370-82		51 PSI 1915%
Thermal Conductivity (ASTM C 518, results listed are at 109°F)	0.098 BTU-ft/ ft <sup>2</sup> -hr-F 0.17 watt/m-K	0.101 BTU-ft/ ft <sup>2</sup> -hr-F 0.18 watt/m-K
Coefficient of Thermal Expansion - first heat ASTM D 696	28 x 10 <sup>-5</sup> m/m/C	-6 x 10 <sup>-5</sup> m/m/C
	- second heat 72 x 10 <sup>-5</sup> m/m/C	92 x 10 <sup>-5</sup> m/m/C

## Specifications

Please specify a) 200MP, 2 mil or b) 200MP, 5 mil rather than the exact product number based on the liner configuration. The converter will select the product with the necessary liner configuration to meet the delivery requirements.

3M™ adhesive 200MP meets the following customer specifications:

	2 mil	5 mil
Coat weight <sup>7</sup> (grains/4" x 6") (grams/ft <sup>2</sup> )	14 ± 12% 5.4 ± 12%	32 ± 12% 12.4 ± 12%
Face Adhesion <sup>8</sup> (exposed side) ounces/inch	30 minimum	37 minimum
Back Adhesion <sup>8</sup> (liner side) ounces/inch	30 minimum	37 minimum

Note 7: The amount of adhesive supplied, for pressure-sensitive adhesives, is controlled by the adhesive coat weight, not the adhesive caliper. Pressure-sensitive adhesives are compressible which results in high error for caliper measurements. The caliper listed in the Constructions section (page 1) has been calculated using a density of 1.012 g/cc (testing caliper is not part of the standard release testing because of the error described.)

Note 8: ASTM D3330, 15 minute dwell on stainless steel. For this adhesive family, the adhesion will be much higher with longer dwells on stainless steel and other high surface energy materials (please refer to the typical Physical Properties section in this document to see performance on other materials after longer dwells).

# 3M™ High Performance Adhesive Transfer Tapes with 3M™ Adhesive 200MP

Available Sizes	Master Size	Slit Width (minimum)	Roll Length <sup>9</sup>	Core Size	Slit Tolerance
467MP 468MP	48", 54" 60"	1/2"	60-360 yards	3"	± 1/32"
467MPF 468MPF	54"	1/2"	60-360 yards	3"	± 1/32"
7952MP 7955MP 7962MP 7965MP	48"	24" x 36" sheets (100/case)	If roll form: 360 yards	If roll form: 6" cores	If roll form: ± 1/32"
9172MP 9185MP 9676MP	48"	1"	60-360 yards	3"	± 1/32"
9667MP 9668MP	54"	1"	60-360 yards	3"	± 1/32"
9188	54"	1"	180 yards	3"	± 1/32"

Note 9: Roll lengths vary by product slit width (the customer service department has more detailed information, 1-800-328-1681).

## Application Techniques

For maximum bond strength (during installation of the final part) the surface should be thoroughly cleaned and dried. Typical cleaning solvents are heptane (for oily surfaces) or isopropyl alcohol for plastics. Use reagent grade solvents since common household materials like rubbing alcohol frequently contain oils to minimize the drying affect on skin. These oils can interfere with the performance of a pressure-sensitive adhesive. Consult solvent manufacturer's MSDS for proper handling and storage instructions. Also, use disposable wipes that do not contain oils to remove the cleaning solvents. This cleaning recommendation may not be compliant with the rules of certain Air Quality Management Districts in California; consult applicable rules before use.

It is necessary to provide pressure during lamination (1.5-20 pli recommended) and during final part installation (10-15 psi) to allow the adhesive to come into direct contact with the substrate. Using a hard edged plastic tool, which is the full width of the laminated part, helps to provide the necessary pressure at the point of lamination. Heat can increase bond strength when bonding to metal parts (generally this same increase is observed at room temperature over longer times, weeks). For plastic parts, the bond strength is not enhanced with the addition of heat.

The ideal adhesive application temperature range is 60°F (21°C) to 100°F (38°C). Application is not recommended if the surface temperature is below 50°F (10°C) because the adhesive becomes too firm to adhere readily. Once properly applied, at the recommended application temperature, low temperature holding is generally satisfactory (please refer to section VII of the Typical Physical Properties and Performance Characteristics).

When bonding a thin, smooth, flexible material to a smooth surface, it is generally acceptable to use 2 mils of adhesive. If a texture is visible on one or both surfaces, the 5 mil adhesive would be suggested. If both materials are rigid, it may be necessary to use a thicker adhesive to successfully bond the components. 3M™ VHB™ Acrylic Foam Tapes may be required (please refer to the data page for 3M™ VHB™ Tapes, 70-0709-3830-6).

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## Application Equipment

- 1) Wide web lamination  
To apply adhesives in a wide web format, lamination equipment is required to ensure acceptable quality. To learn more about working with pressure-sensitive adhesives please refer to technical bulletin #70-0704-1430-8, Lamination Techniques for Converters of Laminating Adhesives.
- 2) To apply narrow strips of adhesive  
Manual Dispensers - P-52, P-56  
Define Length Dispensers - M-96  
Semiautomatic Dispensers - S-625 w/attachment, T-646

For assistance in helping you determine the best dispenser for your application, contact your local 3M sales representative, or the toll free 3M sales assistance number at 1-800-362-3550.

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## Application Ideas

- Long term bonding of graphic nameplates and overlays (“subsurface” printed polycarbonate or polyester) to metal and high surface energy plastics in the aerospace, medical and industrial equipment, automotive, appliance and electronic markets.
- Bonding metal nameplates and rating plates in the aerospace, medical and industrial equipment, automotive, appliance and electronic markets.
- Bonding graphic overlays for membrane switches and for bonding the complete switch to the equipment surface.

# 3M™ High Performance Adhesive Transfer Tapes with 3M™ Adhesive 200MP

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## For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-362-3550 or visit [www.3m.com/bonding](http://www.3m.com/bonding). Address correspondence to: 3M Bonding Systems Division, 3M Center, Building 220-7E-01, St. Paul, MN 55144-1000. Our fax number is 651-733-9175. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-809-750-3000. In Mexico, phone: 5-728-2180.

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## Certification/ Recognition

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

**MSDS:** These products 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 products in a manner not in accordance with the directions for use may affect their performance and present potential health and safety hazards.

**UL:** Many of these products have been recognized by Underwriters Laboratories Inc. under Standard, UL 969, Marking and Labeling Systems Materials Component. For more information on the UL Certification, please visit the 3M website at <http://www.3m.com/converter>.

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## Important Notice

3M MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of application. Please remember that many factors can affect the use and performance of a 3M product in a particular application. The materials to be bonded with the product, the surface preparation of those materials, the product selected for use, the conditions in which the product is used, and the time and environmental conditions in which the product is expected to perform are among the many factors that can affect the use and performance of a 3M product. Given the variety of factors that can affect the use and performance of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

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## Limitation of Remedies and Liability

If the 3M product is proved to be defective, THE EXCLUSIVE REMEDY, AT 3M'S OPTION, SHALL BE TO REFUND THE PURCHASE PRICE OF OR TO REPAIR OR REPLACE THE DEFECTIVE 3M PRODUCT. 3M shall not otherwise be liable for loss or damages, whether direct, indirect, special, incidental, or consequential, regardless of the legal theory asserted, including, but not limited to, contract, negligence, warranty, or strict liability.

ISO 9002

This Bonding Systems Division product was manufactured under a 3M quality system registered to ISO 9002 standards.

**3M**

**Bonding Systems Division**

3M Center, Building 220-7E-01  
St. Paul, MN 55144-1000



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