



3M™ Laminating Adhesives 467MP & 468MP

DESCRIPTION.....	1
INTENDED APPLICATIONS	1
APPLICATION TECHNIQUES	2
PRODUCT CONSTRUCTION	2
PHYSICAL PROPERTIES & PERFORMANCE CHARACTERISTICS.....	3
MECHANICAL AND THERMAL PROPERTIES.....	4
SHELF LIFE AND STORAGE	5
RELATED LITERATURE.....	5
CONTACT INFORMATION	6

DESCRIPTION

Adhesive Transfer Tape 467MP and 468MP are popular choices for graphic attachment and membrane switch applications because they have excellent quality, consistency and durability.

These products offer 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: the adhesive can withstand splashes of organic solvents, weak acids and bases and salt water, cleaning solutions, germicides, disinfectants, oils, etc.

In addition, these perform well after exposure to humidity and hot/cold cycles and provides some initial repositionability when bonding to plastic parts (not metal) which allows graphic parts to be lifted and repositioned if initial alignment is incorrect.

INTENDED APPLICATIONS

Application to high surface energy substrates (HSE). On an HSE substrate, adhesive spreads out to “wet” the surface to be bonded. The higher the surface energy, the better the bond performance. Most popular applications are for appliance, transportation and automotive, electronics and general industrial for name plates, graphic overlaps:

- 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.

- High speed processing of parts in the medical, telecommunications and electronics markets (medical components, durable labels, flexible circuits).
- Lamination to industrial foams for rotary die-cutting of small gaskets for industrial and electronics markets.

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 and can interfere with the performance of a pressure-sensitive adhesive.

Note: Carefully read and follow the manufacturer's precautions and directions for use when working with solvents. These cleaning recommendations may not be in compliance 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 (15.6°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.

When bonding a thin, smooth, flexible material to a smooth surface, it is generally acceptable to use 3M 467MP. If a texture is visible on one or both surfaces, the 3M 468MP would be suggested. If both materials are rigid, it may be necessary to use a thicker adhesive to successfully bond the components.

PRODUCT CONSTRUCTION

Product Number	Adhesive Type/Color ¹	Adhesive Thickness ² (mils, mm)	Liner Color, Type, Print	Liner Caliper / Liner Release ³
3M Adhesive Transfer Tape 467MP	200MP/Clear	2.3 mils (0.06 mm)	Tan, 58#, Polycoated Kraft, "3M 467MP 200MP Adhesive"	4.2 mils 50 grams/inch
3M Adhesive Transfer Tape 468MP	200MP/Clear	5.2 mils (0.13 mm)	Tan, 58#, Polycoated Kraft, "3M 468MP 200MP Adhesive"	4.2 mils 50 grams/inch

¹ The adhesive color is transparent with a very slight yellow cast. The yellow cast is not typically visible in a single adhesive layer.
² The thickness listed is based on a calculation from manufacturing controlled adhesive coat weights using a density of 1.012 g/cc.
³ Typical liner release value, in grams/inch, tested at 90 ipm.

PHYSICAL PROPERTIES & 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	467 MP 2 mil (0.002 inches)		468 MP 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	467 MP 2 mil (0.002 inches)		468 MP 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

III. Relative High Temperature Operating Ranges

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

IV. Low Temperature Performance

The glass transition temperature for 467MP and 468MP 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. The lowest service temperature is -40°F (-40°C).

Note: 467MP and 468MP are not recommended for low energy plastics (polypropylene, polyethylene, powder coated paints).

V. Static Shear

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

Temperature	Load	Minutes to Failure	
		467 MP 2 mil (0.002 inches)	468 MP 5 mil (0.005 inches)
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+

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

Test	467 MP 2 mil (0.002 inches)	468 MP 5 mil (0.005 inches)
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)

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	467 MP 2 mil (0.002 inches)	468 MP 5 mil (0.005 inches)
Insulation Resistance (test voltage = 100 VDC) Mil-I-46058C	$>1 \times 10^{10}$ ohms	$>1 \times 10^{10}$ ohms
Dielectric Strength – (500 vac, rms [60 hz/sec]) volts/mil ASTM D149-92	880 volts/mil	600
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 ² -hr-F 0.17 watt/m-K	0.101 BTU-ft /ft ² -hr-F 0.18 watt/m-K
Coefficient of Thermal Expansion - first heat ASTM D 696 - second heat	28×10^{-5} m/m/C 72×10^{-5} m/m/C	-6×10^{-5} m/m/C 92×10^{-5} m/m/C

SHELF LIFE AND STORAGE

Laminating adhesives should be used within 24 months from the manufacturing date and must be stored at 70° F (21° C) and at 50% relative humidity.

RELATED LITERATURE

Refer to Product Bulletins of relevant foils and materials for product-specific handling, production, and finishing information.

CONTACT INFORMATION

For help with questions concerning Gerber products, please call your distributor or Gerber Customer Service at 1-800-222-7446 or (860) 644-1551. Visit us on the Internet at www.gerbertechnology.com/signage to learn more about our many other foils, materials and equipment.

When sold by Gerber, use only the corresponding Gerber Product Bulletin to determine product details, including but not limited to appropriate uses, warranty and processing.

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