



# Adhesive Transfer Tapes with Adhesive 100

## 941, 941N, 965, 966, 9461P, 9461PC, 9462P

Technical Data

October, 2003

### Product Description

These 3M™ Adhesive Transfer Tapes with 3M™ Adhesive 100 are designed for temperature exposure to 450°F (232°C) for short periods of time and/or solvent resistance. They have exceptional shear values even at elevated temperatures. They also offer low “outgassing” properties, which is an important consideration for the aerospace, automotive and electronic industries.

### Construction

3M™ Adhesive Transfer Tapes 941, 941N, 966, 9461P, 9461PC and 9462P use the same 3M adhesive 100 and come with different liners for a variety of die cutting applications. 3M™ Adhesive Transfer Tape 965 uses a slightly modified 3M adhesive 100 to provide excellent resistance to jet fuel and other chemicals for identification labels on aircraft.

	Adhesive Thickness (mils)	Liner Material - Thickness
<b>3M tape 941</b>	2.3 (.06 mm)	58# Polycoated Kraft - 4.0 mils thick
<b>3M tape 941N</b>	2.3 (.06 mm)	83# Polycoated Kraft - 6.2 mils thick
<b>3M tape 966</b>	2.3 (.06 mm)	62# Densified Kraft - 3.8 mils thick with printed liner
<b>3M tape 9461P</b>	1.16 (.03 mm)	55# Densified Kraft - 3.2 mils thick with printed liner
<b>3M tape 9461PC</b>	1.16 (.03 mm)	58# Polycoated Kraft - 4.0 mils thick
<b>3M tape 9462P</b>	2.3 (.06 mm)	55# Densified Kraft - 3.2 mils thick with printed liner
<b>3M tape 965</b>	2.3 (.06 mm)	55# Densified Kraft - 3.2 mils thick with printed liner

**\*Note:** The caliper 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 1 mil and 2 mils, the coat weight (and theoretical caliper) has not changed.

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## 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.

**Adhesion Peel:** ASTM D-3330 (modified) (90 degree peel, 12"/min. [305 mm/min.] 2 mil aluminum)

### Metal (Stainless Steel)

3M™ Adhesive Transfer	20 minute dwell		72 hr. dwell		Ultimate bond	
	oz./in.	N/100mm	oz./in.	N/100mm	oz./in.	N/100mm
Tape 941	53	58	78	85	145	159
Tape 941N	53	58	78	85	145	159
Tape 965	45	49	72	79	116	127
Tape 966	53	58	78	85	145	159
Tape 9461P	48	53	85	93	119	130
Tape 9461PC	48	53	85	93	119	130
Tape 9462P	53	58	78	85	145	159

### High Surface Energy Plastic (ABS)

3M tape 941	44	48	54	59	40	44
3M tape 941N	44	48	54	59	40	44
3M tape 965	–	–	69	75	45	49
3M tape 966	44	48	54	59	40	44
3M tape 9461P	–	–	36	39	18	20
3M tape 9461PC	–	–	36	39	18	20
3M tape 9462P	44	48	54	59	40	44

Use on “Low Surface Energy Plastics” such as Polypropylene is not recommended. Consider other 3M™ Adhesive Transfer Tapes with 3M™ Adhesive 300, 300MP, 350 or 300LSE.

### Adhesive Static Shear

Values for all 3M™ Adhesive 100 family of tapes on Stainless Steel (1 x 1 inch test samples)

Room temperature	2000 gms for 10,000 minutes
158°F (70°C)	1000 gms for 10,000 minutes
200°F (93°C)	1000 gms for 10,000 minutes
350°F (177°C)	500 gms for 10,000 minutes
450°F (232°C)	400 gms for 10,000 minutes

**Note:** 3M tape 965 showed some slippage at evaluated temperatures above 200°F (93°C).

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**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.

**Typical Liner Release Values:** Liner release values may vary from lot to lot. Values stated are only typical or average values based on lots tested.

3M™ Adhesive Transfer	
Tape 941	23 gms/inch
Tape 941N	19 gms/inch
Tape 965	22 gms/inch
Tape 966	39 gms/inch
Tape 9461P	29 gms/inch
Tape 9461PC	35 gms/inch
Tape 9462P	30 gms/inch

**Environmental Performance**

The properties defined are based on the attachment of impervious faceplate materials (such as aluminum) to an aluminum test surface.

**Bond Build-up:** The bond strength of 3M™ Adhesive 100 increases as a function of time and temperature.

**Humidity Resistance:** High humidity has a minimal effect on adhesive performance. Bond strengths are generally higher after exposure for 7 days at 90°F (32°C) and 90% relative humidity.

**U.V. 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 in room temperature, the bond actually shows an increase in strength.

**Temperature Cycling Resistance:** Bond strength generally increases after cycling four times through:  
4 hours at 158°F (70°C)  
4 hours at -20°F (-29°C)  
16 hours at room temperature

**Chemical Resistance:** When properly applied, nameplate and decorative trim parts will hold securely after exposure to numerous chemicals including gasoline, oil, Freon™ TF, sodium chloride solution, mild acids and alkalis.

**Heat Resistance:** The 3M adhesive 100 is usable for short periods (minutes, hours) at temperatures up to 450°F (232°C) and for longer periods (days, weeks) up to 300°F (149°C).

**Low Temperature Service:** -40°F (-40°C). Parts should be tested for low temperature shock service.

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<b>Available Size</b>	<b>Core size:</b>	3M™ Adhesive Transfer Tapes are offered on a three inch paper core.
	<b>Minimum width:</b>	1 inch 3 inch for 3M™ Adhesive Transfer Tape 9462P
	<b>Maximum width:</b>	48 inches
	<b>Standard length:</b>	180 yards

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For other than standard sizes contact your 3M sales representative.

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- Features**
- Excellent bond to metal and high surface energy plastics.
  - Outstanding temperature and chemical resistance.
  - Two adhesive thicknesses: 1 mil for thin profile labels and 2 mil for rougher surfaces.
  - Low outgassing and low leachable chloride, important considerations for electronic and aerospace industries.
  - Available on various liners for specialized processing:
    - 60# Densified Kraft for die-cutting metal nameplates
    - 55# Densified Kraft for rotary die-cutting specialty labels
    - 58# Polycoated Kraft for polycarbonate graphics
    - 86# Polycoated Kraft for polycarbonate end tabs and plastic nameplates on a common sheet

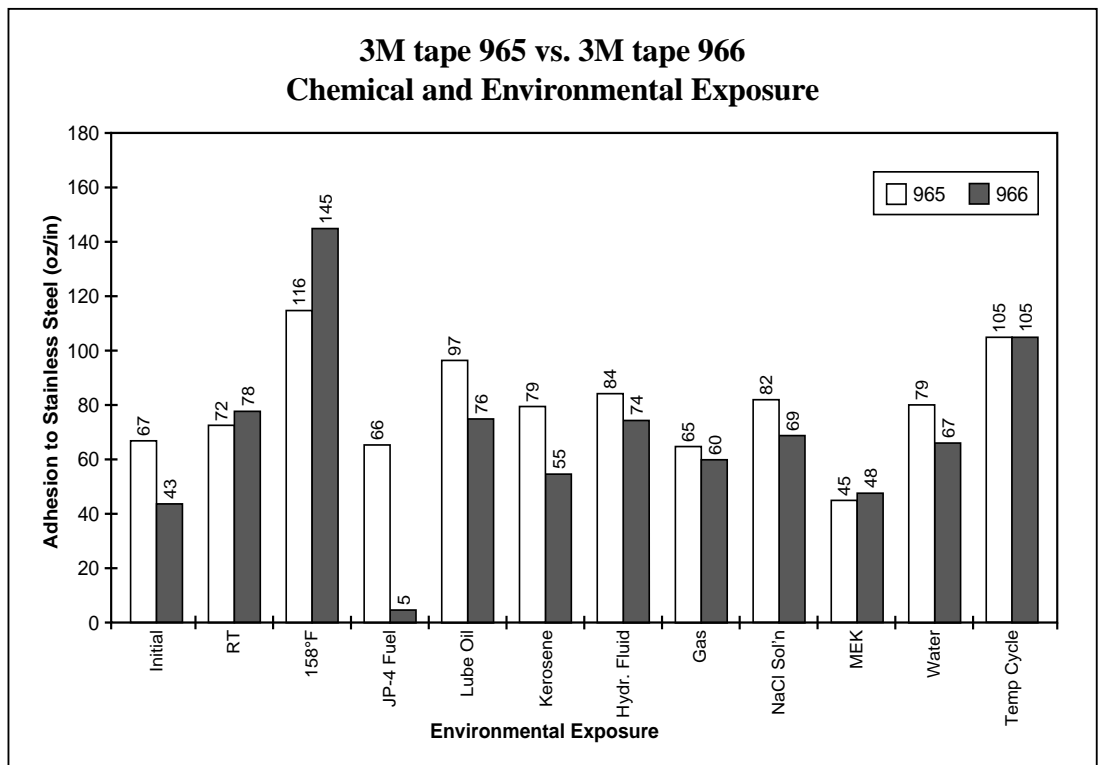
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## Chemical and Environmental Exposure

The 3M™ Adhesive 100 is well known in industry for environmental and chemical resistance. For many applications, any one of the products in this grouping will perform satisfactorily when exposed to different chemicals or temperatures. Jet fuels, however, are a challenge for pressure sensitive products. More specifically, the Aviation Turbine Fuel, Grade JP-4 (MIL H-T-5624), will attack many of the best adhesives within 72 hours. In response to the demands of this market and the corresponding military specification MIL-T-9906C, 3M™ Adhesive Transfer Tape 965 was developed as it differs slightly in chemistry from the rest of the 3M adhesive 100 family to provide the extra chemical resistance.

In addition to the added fuel resistance, 3M tape 965 retains all of the notable features of the adhesive 100: excellent adhesion to metals, good adhesion to high surface energy plastics, low outgassing, and excellent static shear values for room temperature and heated conditions. The chart below shows adhesion values (to stainless steel) of 3M™ Adhesive Transfer Tapes 965 and 966, with an emphasis on fuel and oil exposure. **The data represents representative or typical values and should not be used for specification purposes.**



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## Thermal and Electrical Properties for 3M tape 966

3M™ Adhesive Transfer Tape 966 was tested for the following properties; however, the results should be very similar for the other 3M™ Adhesive Transfer Tapes with 3M™ Adhesive 100.

<b>Thermal Conductivity (ASTM C518)</b>	.103 BTU-ft/ft <sup>2</sup> -hr-°F (@105°F) .106 BTU-ft/ft <sup>2</sup> -hr-°F (@160°F) .108 BTU-ft/ft <sup>2</sup> -hr-°F (@214°F) .178 Watt/m-K (@41°C) .183 Watt/m-K (@71°C) .187 Watt/m-K (@101°C)
<b>Coefficient of Thermal Expansion (ASTM-D696)</b> First heat (125-175°C) Second heat (25-175°C)	19.9 x 10 <sup>-5</sup> m/m/°C 58.4 x 10 <sup>-5</sup> m/m/°C
<b>Insulation Resistance (test voltage = 100 VDC, MIL-I-46058C)</b> Before moisture resistance Cycle #4 Cycle #10 24 hr after moisture resistance	>1.0 x 10 <sup>15</sup> ohms 1.5 x 10 <sup>11</sup> ohms 9.4 x 10 <sup>10</sup> ohms 9.7 x 10 <sup>12</sup> ohms
<b>Surface Resistance</b>	>1.0 x 10 <sup>15</sup> ohms
<b>Surface Resistivity</b>	>5.6 x 10 <sup>16</sup> ohms
<b>Volume Resistance</b>	3.9 x 10 <sup>11</sup> ohms
<b>Volume Resistivity (ASTM D257-92)</b>	4.0 x 10 <sup>15</sup> ohm-cm
<b>Dissipation Factor</b>	0.025 (@1 kHz)
<b>Dielectric Constant (ASTM D-150-92)</b>	2.92 (@1 kHz)
<b>Dielectric Strength (500 vac, rms. [60 Hz]/sec.) (ASTM D149-92)</b>	1100 volts/mil

## Application Techniques

For maximum bond strength the surface should be thoroughly cleaned and dried. Typical cleaning solvents are heptane or isopropyl alcohol.\*

Bond strength can also be improved with firm application pressure and moderate heat, (for metal surfaces only), from 100°F (38°C) to 130°F (54°C), causing the adhesive to develop intimate contact with the bonding surface.

**\*Note:** Carefully read and follow the manufacturer's precautions and directions for use when working with solvents. These cleaning recommendations may not be compliant with the rules of certain Air Quality Management Districts in California; consult applicable rules before use.

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## Application Ideas

Ideal tape application temperature range is 70°F to 100°F (21°C to 38°C) and application to surfaces at temperatures below 50°F (10°C) is not recommended for most pressure sensitive adhesives because the adhesive becomes too firm to adhere readily. However, once properly applied, low temperature holding is satisfactory. For more specific information, contact Customer Service at 1-800-223-7427.

The liner used for 3M™ Adhesive Transfer Tapes 9461P, 9461PC and 9462P is not intended to provide premium release characteristics. Testing is urged for applications where liner release is critical. These products are not recommended for use with non-transferable facestocks such as 3M™ Label Material 8070, 8071 or 8074 because of the potential for liner caused pre-destruct.

3M™ Adhesive Transfer Tape 965 has been specially modified to provide outstanding performance for fuel line identification labels, bar code labels for harsh environments and specially performance-engineered labels for automotive, aerospace and industrial markets. It also meets MIL-T-9906C specification requirements.

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## Dispenser Selection

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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## Storage

Store at room temperature conditions of 72°F (22°C) and 50% R.H. and in a plastic bag.

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## Shelf Life

Product retains its performance and properties for two years from date of manufacture.

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## For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-223-7427 or visit [www.3m.com/converter](http://www.3m.com/converter). Address correspondence to: 3M Industrial Adhesives and Tapes Division, Building 21-1W-10, 900 Bush Avenue, St. Paul, MN 55144-1000. Our fax number is 651-778-4244. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-787-750-3000. In Mexico, phone: 52-70-04-00.

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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:** 3M has not prepared a MSDS for these products which 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, the 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:** 3M™ Adhesive Transfer Tapes 941, 941N, 966 and 9462P have been recognized by Underwriters Laboratories Inc. under Standard UL 969 Marking and Labeling in File MH26206. For more information on the UL Certification, please visit the website at <http://www.3m.com/converter>, select UL Recognized Materials, and then select the specific product area.

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## Product Use

All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors 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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## Warranty and Limited Remedy

Unless stated otherwise in 3M's product literature, packaging inserts or product packaging for individual products, 3M warrants that each 3M product meets the applicable specifications at the time 3M ships the product. Individual products may have additional or different warranties as stated on product literature, package inserts or product packages. 3M MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's application. If the 3M product is defective within the warranty period, your exclusive remedy and 3M's and seller's sole obligation will be, at 3M's option, to replace the product or refund the purchase price.

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## Limitation of Liability

Except where prohibited by law, 3M and seller will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.



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



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