

June, 2014

## 3M™ Adhesive Transfer Tape 966

### Product Description

The 3M™ Adhesive Transfer Tapes with 3M™ High Temperature Acrylic 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.

### Product Features

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

- 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:
  - 62# Densified Kraft for die-cutting metal nameplates
  - 55# Densified Kraft for rotary die-cutting specialty labels
  - 58# Polycoated Kraft for moisture stability



# 3M™ Adhesive Transfer Tape 966

## 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  |         |
|---------------------|---|---------|
| Adhesive Thickness  | 0.06 mm   | 2.3 mil |
| Liner               | 62# Densified Kraft with "3M" printed in green  |         |
| Liner Thickness     | 3.6 mil   |         |
| 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. |         |

## Typical Performance Characteristics

### Additional Test notes

Use on "Low Surface Energy Plastics" such as Polypropylene is not recommended. Consider priming Low Surface Energy substrates with 3M™ Tape Primer 94 or utilizing other 3M™ Adhesive Transfer Tapes designed for Low Surface Energy substrates such as 3M™ Adhesive 300LSE, 300MP, 350 or 300.

| 90° Peel Adhesion |           |          |          | Dwell/Cure Time | Dwell Time Units | Temp C | Temp F | Environmental Condition | Substrate       | Backing             |
|-------------------|-----------|----------|----------|-----------------|------------------|--------|--------|-------------------------|-----------------|---------------------|
| 8.5 N/cm          | 78 oz/in  |          |          | 72              | hr               | 22C    | 72F    | 52%RH                   | Stainless Steel | 2 mil Aluminum Foil |
| 5.9 N/cm          | 54 oz/in  | 4.4 N/cm | 40 oz/in | 72              | hr               | 22C    | 72F    | 52%RH                   | ABS             | 2 mil Aluminum Foil |
| 53 oz/in          | 5.8 N/cm  |          |          | 20              | min              | 22C    | 72F    | 52%RH                   | Stainless Steel | 2 mil PET           |
| 15.9 N/cm         | 145 oz/in |          |          | Ultimate Bond   |                  |        |        |                         | Stainless Steel | 2 mil Aluminum Foil |
| 4.8 N/cm          | 44 oz/in  |          |          | 20              | min              | 22C    | 72F    | 52%RH                   | ABS             | 2 mil Aluminum Foil |

Property: 90° Peel Adhesion  
Method: ASTM D3330  
notes: 12 in/min (300 mm/min)

## Typical Performance Characteristics (continued)

| Static Shear | Test Condition            |
|--------------|---------------------------|
| 10000 min    | 2000 g @ Room Temperature |
| 10000 min    | 1000 g @ 70°C (158°F)     |
| 10000 min    | 1000 g @ 93°C (200°F)     |
| 10000 min    | 500 g @ 177°C (350°F)     |
| 10000 min    | 400 g @ 232°C (450°F)     |

Property: Static Shear

Method: ASTM D3654

notes: 1in x 1in size; test terminated after 10,000 minutes

## Available Sizes

| Property                | Values  |      | Attribute Modifier |
|-------------------------|---|------|--------------------|
| Standard Roll Length    | 180 yd  |      |                    |
| Minimum Available Width | 1 in  |      |                    |
| Maximum Available Width | 48 in   |      |                    |
| Core Size               | 76.2 mm   | 3 in | ID                 |
| Note                    | For other than standard sizes contact your 3M sales representative. |      |                    |

## Electrical and Thermal Properties

| Insulation Resistance       | Test Condition                  |
|-----------------------------|---------------------------------|
| $>1 \times 10^{15} \Omega$  | Before moisture resistance      |
| $1.5 \times 10^{11} \Omega$ | Cycle #4                        |
| $9.4 \times 10^{10} \Omega$ | Cycle #10                       |
| $9.7 \times 10^{12} \Omega$ | 24 hr after moisture resistance |

Property: Insulation Resistance

Method: MIL-I-46058C

notes: test voltage = 100 VDC

| Thermal Conductivity                   |             | Test Condition |
|--|-------------|----------------|
| 0.103 (btu-ft)/(h-ft <sup>2</sup> -°F) | 0.178 W/m/K | 105°F(41°C)    |
| 0.106 (btu-ft)/(h-ft <sup>2</sup> -°F) | 0.183 W/m/K | 160°F(71°C)    |
| 0.108 (btu-ft)/(h-ft <sup>2</sup> -°F) | 0.187 W/m/K | 214°F(101°C)   |

Property: Thermal Conductivity

Method: ASTM C518

**Electrical and Thermal Properties (continued)**

| Property                         | Values   |                              | Method    | Test Condition          |
|----------------------------------|--|------------------------------|-----------|-------------------------|
| Dielectric Constant              | 2.92   |                              | ASTM D150 | 1 KHz, Room Temperature |
| Dissipation Factor               | 0.025  |                              | ASTM D150 | 1 KHz, Room Temperature |
| Dielectric Strength              | 1100 V/mil                                       |                              | ASTM D149 | 500 vac, rms[60 hz/sec] |
| Volume Resistivity               | $4 \times 10^{15} \Omega\text{-cm}$              |                              | ASTM D257 | Room Temperature        |
| Surface Resistivity              | $>1 \times 10^{15} \Omega$                       | $>5.6 \times 10^{16} \Omega$ |           |                         |
| Coefficient of Thermal Expansion | $19.9 \times 10^{-5} \text{ m/m/}^\circ\text{C}$ |                              | ASTM D696 | First Heat(125 - 175°C) |
| Coefficient of Thermal Expansion | $58.4 \times 10^{-5} \text{ m/m/}^\circ\text{C}$ |                              | ASTM D696 | Second Heat(25 - 175°C) |

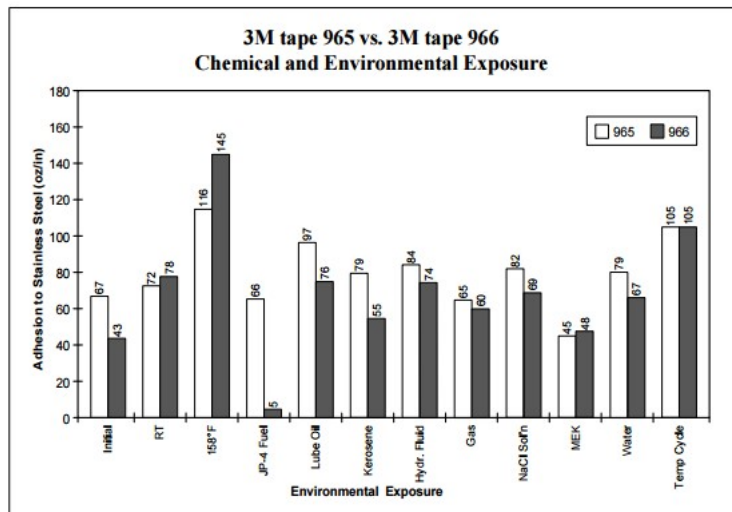
**Typical Environmental Performance****Chemical and Environmental Exposure**

The 3M™ High Temperature Acrylic 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.

Typical Environmental Performance (continued)



Environmental Resistance

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.

## Handling/Application Information

### 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.

### 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, 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.

### Storage and Shelf Life

Humidity controlled storage 60°F (16°C) to 80°F (27°C) and 40 to 60% R.H. and in a plastic bag.

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     | <a href="https://www.3m.com/3M/en_US/company-us/all-3m-products/~/3M-Adhesive-Transfer-Tape-966?N=5002385+3293241971&amp;rt=rud">https://www.3m.com/3M/en_US/company-us/all-3m-products/~/3M-Adhesive-Transfer-Tape-966?N=5002385+3293241971&amp;rt=rud</a> |
| Safety Data Sheet (SDS) | <a href="https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&amp;msdsLocale=en_US&amp;co=ptn&amp;q=966">https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&amp;msdsLocale=en_US&amp;co=ptn&amp;q=966</a> |

### Family Group

|                         | 941                  | 965                       | 966  | 9461P  | 9462P  |
|-------------------------|----------------------|---------------------------|--|--|--|
| Adhesive Thickness (mm) | 0.6                  | 0.6                       | 0.06   | 0.03   | 0.06   |
| Liner                   | 58# Polycoated Kraft | 55# Densified Kraft liner | 62# Densified Kraft with “3M” printed in green | 55# Densified Kraft with “3M” printed in green | 55# Densified Kraft with “3M” printed in green |

## ISO Statement

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

## Recognition/Certification

TSCA: These products are defined as articles under the Toxic Substances Control Act and therefore, are exempt from inventory listing requirements. Additional regulatory information for IATD products is available on the regs website: [www.3m.com/regs](http://www.3m.com/regs).

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, 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.

## Information

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