



# Optically Clear Laminating Adhesives

8141 • 8142 • 8161 • 9483

Technical Data

June, 2006

Product Description	3M™ Optically Clear Adhesives:
	<b>8141</b> 1.0 mil (25 micron) optically clear laminating adhesive for bonding smooth transparent substrates.
	<b>8142</b> 2.0 mil (50 micron) optically clear laminating adhesive for bonding smooth or textured transparent substrates.
	<b>8161</b> 1.0 mil (25 micron) optically clear laminating adhesive for bonding smooth transparent substrates. Easy to convert with improved bubble resistance in lamination exposed to high temperature and humidity.
	<b>9483</b> 5.0 mil (125 micron) optically clear laminating adhesive for bonding wide web (up to 48") applications and high stress laminates.

Construction	Products	Adhesive 8141	Adhesive 8142	Adhesive 8161	Adhesive 9483
Adhesive Type:		Acrylic	Acrylic	Acrylic	Acrylic
Adhesive Carrier:		None	None	None	None
Approximate Thickness:					
Release Liner		2.0 mil (50 microns) Polyester	2.0 mil (50 microns) Polyester	2.0 mil (50 microns) Polyester	3.0 mil (75 microns) Polypropylene
Adhesive		1.0 mil (25 microns)	2.0 mil (50 microns)	1.0 mil (25 microns)	5.0 mil (125 microns)
Release Liner		2.0 mil (50 microns) Polyester	2.0 mil (50 microns) Polyester	2.0 mil (50 microns) Polyester	3.0 mil (75 microns) Polyester

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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.*

### Refractive Index:

(± .0005 measured at 633 nm)

**Adhesive 8141** 1.4742    **Adhesive 8142** 1.4749    **Adhesive 8161** 1.4740    **Adhesive 9483** 1.4740

### Haze:

Haze was measured according to ASTM D1003.

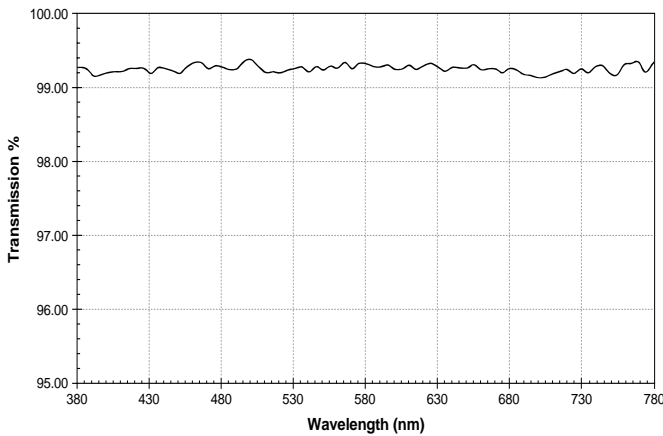
Adhesive 8141	Adhesive 8142	Adhesive 8161	Adhesive 9483
0.1%	0.3%	0.8%	0.7%

### Transmission:

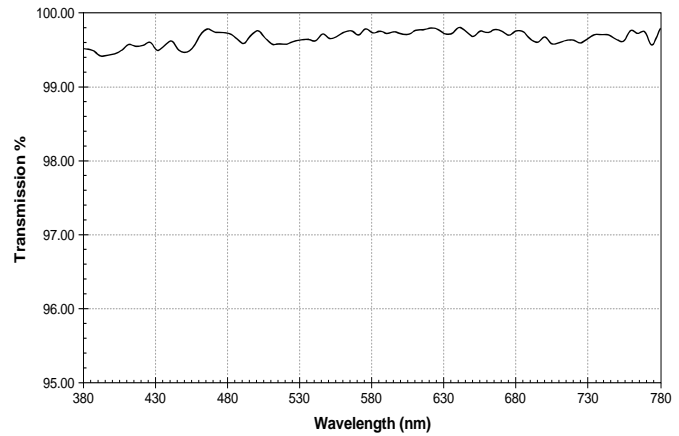
ASTM E903, D1003, and E284

## Reflective-Corrected Total Luminous Transmittance vs Wavelength

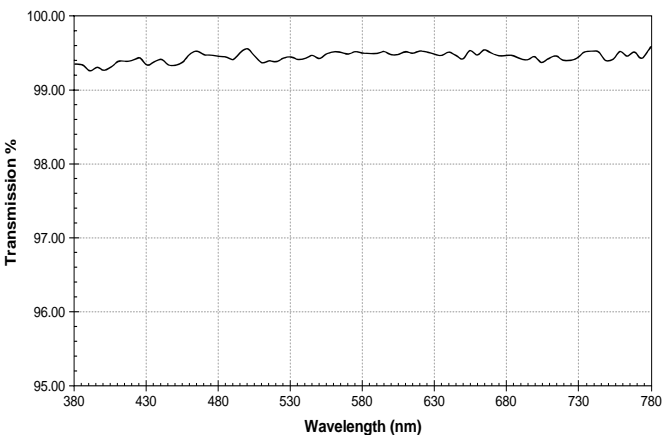
**3M™ Optically Clear Laminating Adhesive 8141**



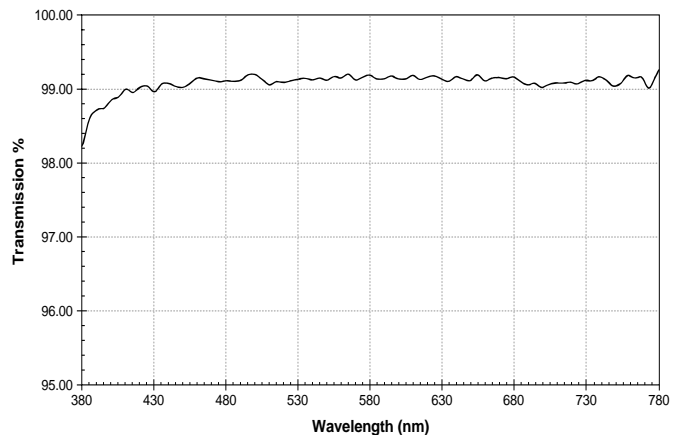
**3M™ Optically Clear Laminating Adhesive 8142**



**3M™ Optically Clear Laminating Adhesive 8161**



**3M™ Optically Clear Laminating Adhesive 9483**



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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.*

**Optical Performance to Environmental Conditions:**

3M™ Optically Clear Laminating Adhesives have withstood the following environmental tests conducted in the 3M laboratory under the conditions specified without any appreciable deterioration in visible appearance, physical integrity or optical performance. Over the entire test duration there was no significant change in transmission over the visible spectrum.

Description	Condition	Duration
High Temperature	+85°C	500 hours
Low Temperature	-40°C	500 hours
High Temp/Humidity	+70°C at 90% R.H.	500 hours
Thermal Shock	One hour at -40°C followed by one hour at +85°C	200 cycles
UV	ASTM G-26 Type, B, BH	500 hours

**Peel Adhesion:**

ASTM D3330 modified, 90° peel

	Substrate	Adhesive 8141 <sup>1</sup>	Adhesive 8142 <sup>1</sup>	Adhesive 8161 <sup>2</sup>	Adhesive 9483 <sup>2</sup>
Initial (20 minute dwell)	Glass	22 oz/in (24 N/100mm)	38 oz/in (42 N/100mm)	61 oz/in (68 N/100mm)	98 oz/in (107 N/100mm)
	Acrylic	42 oz/in (46 N/100mm)	56 oz/in (61 N/100mm)	53 oz/in (58 N/100mm)	62 oz/in (68 N/100mm)
	Polycarbonate	38 oz/in (42 N/100mm)	51 oz/in (56 N/100mm)	40 oz/in (44 N/100mm)	49 oz/in (54 N/100mm)
72 Hour Room Temperature	Glass	26 oz/in (28 N/100mm)	32 oz/in (35 N/100mm)	70 oz/in (77 N/100mm)	156 oz/in (171 N/100mm)
	Acrylic	46 oz/in (50 N/100mm)	63 oz/in (69 N/100mm)	54 oz/in (59 N/100mm)	75 oz/in (82 N/100mm)
	Polycarbonate	42 oz/in (46 N/100mm)	59 oz/in (65 N/100mm)	60 oz/in (66 N/100mm)	41 oz/in (45 N/100mm)

<sup>1</sup>90 degree peel, 12 in./min. 305 mm/min. 2.0 mil polyester to various surfaces

<sup>2</sup>90 degree peel, 12 in./min. 305 mm/min. 2.0 mil aluminum to various surfaces

**Shear Adhesion:**

ASTM D-3657

1/2" x 1" Overlap, minutes to failure

	Adhesive 8141	Adhesive 8142	Adhesive 8161	Adhesive 9483
Heat Aged 500 gram, stainless steel	>10,000	>10,000	>10,000	>10,000

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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.*

### Chemical Resistance:

When properly applied, 3M™ Optically Clear Laminating Adhesives can withstand splashes of numerous chemicals including acetone, isopropyl alcohol, and cleaners.

### Water Resistance:

Immersion in water has no appreciable effect on the bond strength at room temperature.

### Relative Temperature Resistance:

Short Term High Temperature 350°F (177°C)

Long Term High Temperature 185°F (85°C)

Long Term Low Temperature -40°F (-40°C)

### Shelf Life:

Product retains its performance and properties for two years from date of manufacture if properly stored at room temperature conditions of 72°F (22°C) and 50 relative humidity. Storage in plastic bag is recommended.

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## Available Sizes

Available Lengths (subject to minimum order requirements):

Maximum Length 8141/8142/8161/9483	180 yards or 540 feet
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Available Widths (subject to minimum order requirements):

Maximum width - 3M™ Optically Clear Laminating Adhesives 8141/8142/8161	24 inches
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Maximum width - 3M™ Optically Clear Laminating Adhesive 9483	48 inches
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Normal Slitting Tolerance	± 1/32 in. (0.8 mm)
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Core Size	3.0 in. (76.2 mm)
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## Application Techniques

For maximum bond strength the surface should be thoroughly cleaned and dried. To obtain greatest benefit, laminations should be done in the cleanest environment possible with static charge elimination.

Bond strength can be improved with firm application pressure and moderate heat causing the adhesive to develop intimate contact with the bonding surface.

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## General Information

- Light transmission >99% when corrected for reflection losses.
- Haze level < 1%.
- Free of birefringence with no film carrier.
- High temperature, humidity, and UV resistance.
- Long term durability without yellowing, delaminating, or degrading.
- High cohesive and peel strength for reliably bonding most transparent substrates.
- 3M™ Optically Clear Laminating Adhesives 8141, 8142 and 8161 are coated and converted in a clean room. 3M™ Optically Clear Laminating Adhesive 9483 is coated using clean practices.
- 3M optically clear adhesives are inspected to reduce the occurrence of bubbles, dirt, gels and other optical distortions.
- Wound on plastic cores and wrapped in plastic to eliminate paper fiber contamination.
- Two film liners for optimum adhesive smoothness and differential release for ease of processing and protection from contamination.
- 3M™ Optically Clear Laminating Adhesives are available in other thicknesses. Please contact 3M to discuss your application if you require a thickness that is not included in this data page.

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## Application Ideas

- Touchscreens- for bonding film and glass laminates.
- Transparent graphic overlays.
- Projection screens.
- Avionics/military displays.
- Optical management films for LCD

### Processing:

#### Laminating

Recommended nip roll or roller platen press type laminator to maintain optical aesthetics when laminated. Hand lamination not advised. Use best process control standards possible to control variables. (See **3M Laminating Technical Bulletin** for additional information.)

#### Die-cutting

Use high precision, tight tolerance tooling designed to cleanly cut film and pressure-sensitive adhesive.

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## For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-251-8634. Address correspondence to: 3M Electronics, Building 21-1W-10, 900 Bush Avenue, St. Paul, MN 55144-1000. Our fax number is 651-778-4244 or 1-877-369-2923. In Canada, phone: 1-800-634-3577. In Puerto Rico, phone: 1-787-750-3000. In Mexico, phone: 52-70-04-00.

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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

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## Limitation of Liability

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### 3M Electronics

3M Center, Building 21-1W-10, 900 Bush Avenue  
St. Paul, MN 55144-1000  
1-800-251-8634 phone  
651-778-4244 fax  
www.3M.com/electronics



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