3M™ Optically Clear Adhesives 8180 • 8182 • 8185 • 8187 • 8188 • 8189

Product Description

3M™ Optically Clear Adhesives:

8180 10.0 mil (254 microns) optically clear laminating adhesive for bonding smooth or textured, transparent substrates.

8182 2.0 mil (50 microns) optically clear laminating adhesive for bonding smooth or textured, transparent substrates.

8185 5.0 mil (125 microns) optically clear laminating adhesive for bonding smooth or textured, transparent substrates.

8187 7.0 mil (175 microns) optically clear laminating adhesive for bonding smooth or textured, transparent substrates.

8188 8.0 mil (200 microns) optically clear laminating adhesive for bonding smooth or textured, transparent substrates.

8189 9.0 mil (229 microns) optically clear laminating adhesive for bonding smooth or textured, transparent substrates.

Construction

Products	3M™ Optically Clear Adhesives					
	8180	8182	8185	8187	8188	8189
Adhesive Type:	Acrylic	Acrylic	Acrylic	Acrylic	Acrylic	Acrylic
Adhesive Carrier:	None	None	None	None	None	None
Approximate Thickness:						
Release Liner	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester
Adhesive	10.0 mils (254 microns)	2.0 mils (50 microns)	5.0 mils (125 microns)	7.0 mils 175 microns)	8.0 mils 200 microns)	9.0 mils 229 microns)
Release Liner	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester	2.0 mils (50 microns) Polyester

Available Sizes

Available in die-cut pieces only.

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.

Optical Performance to Environmental Conditions:

3M™ Optically Clear 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.

Substrate	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, 180 degree peel, 12 in./min.

305 mm/min. 2.0 mil polyester to various surfaces.

Products		3M™ Optically Clear Adhesives											
		8180		8182		8185		8187		8188		8189	
		(Oz/in)	(N/100mm)	(Oz/in)	(N/100mm)	(Oz/in)	(N/100mm)	(Oz/in)	(N/100mm)	(Oz/in)	(N/100mm)	(Oz/in)	(N/100mm)
20 min dwell at RT:	Stainless Steel	82	90	58	63	65	71	60	66	67	73	64	70
	Glass	90	98	59	65	69	76	67	73	80	88	79	86
	Acrylic	61	67	41	45	57	62	51	56	58	63	61	67
	Polycarbonate	57	62	42	46	50	55	47	51	43	47	45	49
72 Hour dwell at RT:	Stainless Steel	97	106	77	84	96	105	92	101	99	108	100	109
	Glass	97	106	72	79	84	92	85	93	97	106	90	98
	Acrylic	76	83	51	56	66	72	67	73	66	72	74	81
	Polycarbonate	73	80	53	58	71	78	65	71	64	70	72	79

Shear Adhesion:

ASTM D-3654 Procedure H

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

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Heat Aged (70°C) 500g, stainless steel	>10,000	>10,000	>10,000	>10,000	>10,000	>10,000

Typical Physical Properties and Performance Characteristics (continued)

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Color:

ASTM E 1164-07 / CIELAB

(BYK Gardner TCS Plus Spectrophotometer, Model 8870)

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L* = 97.12	L* = 97.11	L* = 97.12	L* = 97.12	L* = 97.11	L* = 97.13
a* = -0.05	a* = -0.02	a* = -0.05	a* = -0.04	a* = -0.05	a* = -0.05
b* = 0.20	b* = 0.15	b* = 0.19	b* = 0.18	b* = 0.18	b* = 0.19

Refractive Index:

(± 0.0005 measured for Sodium D line @ 25°C)

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1.473	1.475	1.473	1.473	1.473	1.474

Haze:

Haze was measured according to ASTM D1003-92

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0.8%	0.6%	0.8%	0.8%	1.1%	0.7%

Typical Physical Properties and Performance Characteristics (continued)

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Transmission:

ASTM E903, D1003, and E284

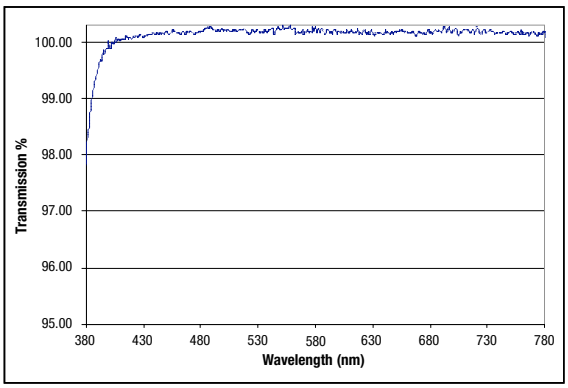
We calculate internal transmittance by correcting sample Transmittance (TLT) for the sample Reflectance (TLR) in accord with the definition of internal transmittance (τ_i) found in ASTM E284. This measurement is meant to show whether the sample has any absorptance in the visible range of the spectrum. A perfect sample with no absorptance would have a value of τ_i = 100 percent (± error of measurements, typically ± 0.5 %).

Internal Transmittance (**%TLT$_i$, τ_i**) is calculated as follows:

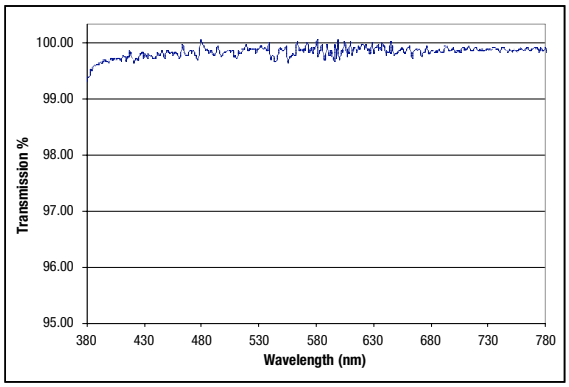
$$\% \text{ TLT}_i = [(\%\text{TLT}_s) / (\%\text{TLT}_{100} - \%\text{TLR}_s)] * 100$$

Transmittance vs. Wavelength

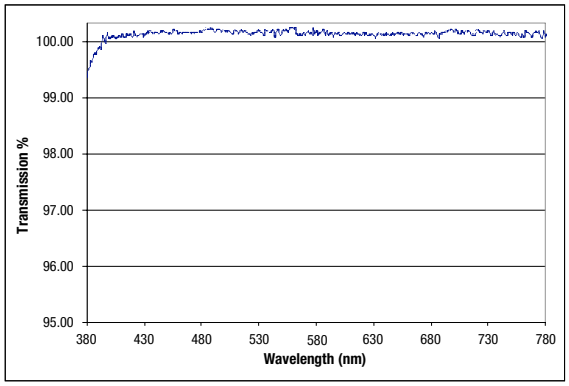
3M™ Optically Clear Adhesive 8180



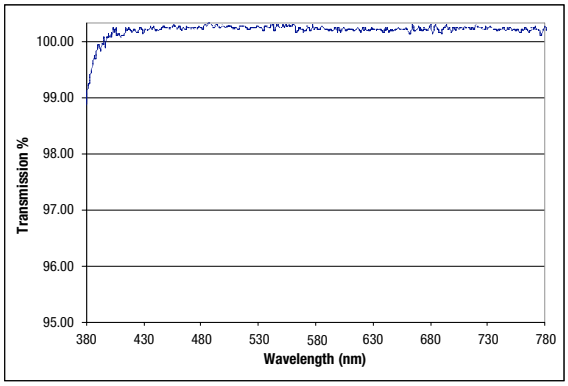
3M™ Optically Clear Adhesive 8182



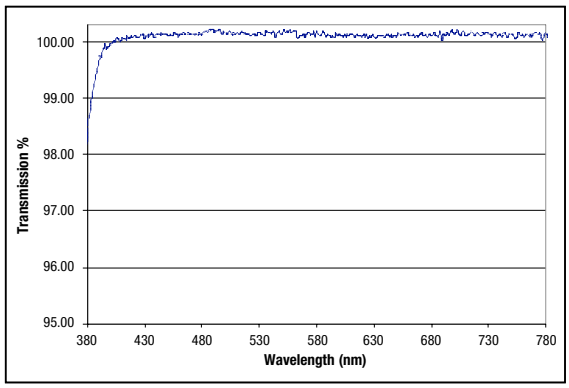
3M™ Optically Clear Adhesive 8185



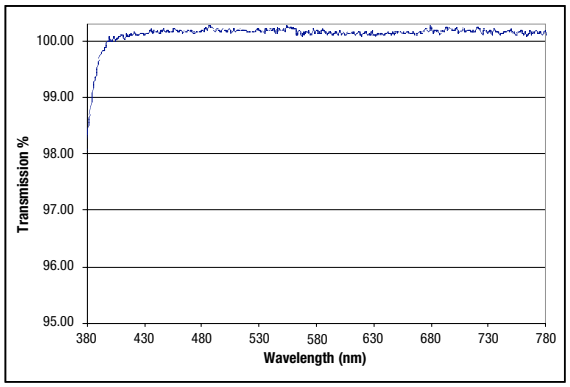
3M™ Optically Clear Adhesive 8187



3M™ Optically Clear Adhesive 8188



3M™ Optically Clear Adhesive 8189



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 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 a plastic bag is recommended.

Application Techniques

For maximum bond strength the surface should be thoroughly cleaned and dried. To obtain greatest benefit, laminations should be done in a class 10,000 cleanroom or better and using equipment 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.

Maximum bond strength is achieved after 72 hours of dwell time.

General Information

- Light transmission >99% when corrected for reflection losses.
- Non-birefringent when removed from carrier film.
- 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 Adhesives are coated and converted in a clean room.
- 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.
- Available in die-cut pieces only.

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.

Certification/Recognition

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, these products should not present a health and safety hazard. However, use or processing of the product in a manner not in accordance with the directions for use may affect their performance and present potential health and safety hazards.

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

RoHS: These products comply with the requirements of EU Directive 2002/95/EC and 2005/618/EC.

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 Markets Materials Division, 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: 1-800-364-3577. In Puerto Rico, phone: 1-787-750-3000. In Mexico, phone: 52-70-04-00.

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