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3M Display Materials & Systems Division

Technical Data 2016

3M™ Contrast Enhancement Film

CEF28XX (8148-X) Series

Product Description

3M™ Contrast Enhancement Films (CEF) are specialized optically clear adhesives offering excellent clarity and adhesion to various transparent display substrates. 3M CEF28XX film is designed for applications that require soft CEF for filling thick ink step (lens border frame), ITO compatibility and high adhesion. 3M CEF28XX film is UV curable which makes it suitable for film touch panel and LCM bonding applications.

Construction

Product	3M CEF2801 film (8148-1)	3M CEF2802 film (8148-2)	3M CEF2803 film (8148-3)	3M CEF2804 film (8148-4)
Adhesive Type:	Acrylic	Acrylic	Acrylic	Acrylic
Adhesive Carrier:	None	None	None	None
Approximate Thickness:				
Release Liner:	50 um 2.0 mils Clear Polyester	50 um 2.0 mils Clear Polyester	50 um 2.0 mils Clear Polyester	50 um 2.0 mils Clear Polyester
Adhesive:	25 um 1.0 mil	50 um 2.0 mils	75 um 3.0 mils	100 um 4.0 mils
Release Liner:	*75, 100 or 125 um 3.0, 4.0, or 5.0 mils Clear Polyester*	*75, 100 or 125 um 3.0, 4.0, or 5.0 mils Clear Polyester*	*75, 100 or 125 um 3.0, 4.0, or 5.0 mils Clear Polyester*	*75, 100 or 125 um 3.0, 4.0, or 5.0 mils Clear Polyester*

Product	3M CEF2805 film (8148-5)	3M CEF2806 film	3M CEF2807 film	3M CEF2808 film	3M CEF2810 film
Adhesive Type:	Acrylic	Acrylic	Acrylic	Acrylic	Acrylic
Adhesive Carrier:	None	None	None	None	None
Approximate Thickness:					
Release Liner:	50 um 2.0 mils Clear Polyester	50 um 2.0 mils Clear Polyester	50 um 2.0 mils Clear Polyester	50 um 2.0 mils Clear Polyester	50 um 2.0 mils Clear Polyester
Adhesive:	125 um 5.0 mils	150 um 6.0 mils	175 um 7.0 mils	200 um 8.0 mils	250 um 10.0 mils
Release Liner:	*75, 100 or 125 um 3.0, 4.0, or 5.0 mils Clear Polyester*	*75, 100 or 125 um 3.0, 4.0, or 5.0 mils Clear Polyester*	*75, 100 or 125 um 3.0, 4.0, or 5.0 mils Clear Polyester*	*75, 100 or 125 um 3.0, 4.0, or 5.0 mils Clear Polyester*	*75, 100 or 125 um 3.0, 4.0, or 5.0 mils Clear Polyester*

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.

Performance to Environmental Conditions:

The following environmental tests were conducted in the 3M laboratory under the conditions specified without any appreciable deterioration in visible appearance (no bubbles, delamination, etc.). Sample construction is cover glass/3M CEF28 film/ hard-coated polarizer.

	Condition	Duration
High Temperature	+95°C	1000 hours
Low Temperature	-40°C	1000 hours
High Temp/Humidity-1	+65°C/90%RH	1000 hours
High Temp/Humidty-2	+85°C/85%RH	1000 hours
Thermal Shock	-40°C and +85°C (1 hour dwell, <1 min ramp time)	300 cycles
UV	.55 W/m^2 at 340nm, Daylight-Q filter	500 hours

Peel Adhesion:

ASTM D3330 modified, 180 degree peel from glass, 1 cm wide peel strips, 12 in/min (305 mm/min), 2.0 mil polyester backing, 3M CEF28XX film cured 3J/cm^2

Peel Adhesion to Glass		
Dwell Time	20 min dwell at 25°C/50%RH	3 days dwell at 25°C/50%RH
Units	N/cm	N/cm
3M CEF2802 film	7.1	11.1
3M CEF2806 film	9.0	14.5
3M CEF2810 film	9.9	15.8

Color:

Ultra Scan Pro (Hunter Lab), ASTM E308, D65/10°
3M CEF28XX film on LCD glass, uncured

3M CEF2802 film	3M CEF2806 film	3M CEF2810 film
L* = 97.0	L* = 96.9	L* = 97.0
a* = -0.01	a* = 0.00	a* = 0.00
b* = 0.15	b* = 0.17	b* = 0.20

Refractive Index: 3M CEF28XX film uncured and cured (3J/cm^2)

(+ 0.0005 Metricon measurements)

3M CEF28XX film			
	405 nm	532 nm	633 nm
Uncured	1.4879	1.4765	1.4717
Cured	1.4903	1.4783	1.4735

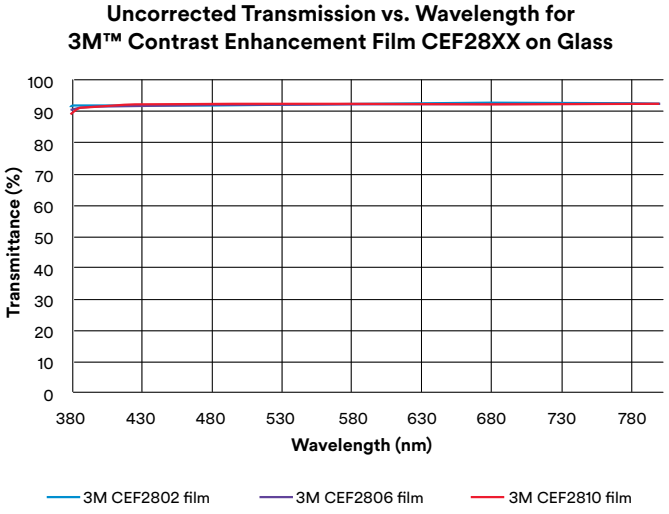
Haze:

Haze is measured according to ASTM D1003-92,
3M CEF28XX film on LCD glass, uncured.

3M CEF2802 film	3M CEF2806 film	3M CEF2810 film
0.1%	0.1%	0.2%

Transmission Curve:

3M™ Contrast Enhancement Film CEF28XX



Typical Electrical Properties of 3M™ Contrast Enhancement Film CEF28XX at Room Temperature

ASTM-D150-92. 3M CEF28XX film cured 3J/cm^2

Dielectric Constant:

3M CEF28XX film	
Frequency (kHz)	Dielectric Constant
100	4.2
500	3.9

Suggested Lamination Process

Step 1: Remove secondary liner, and then laminate 3M CEF28XX film to first adherent substrate by roller at room temperature

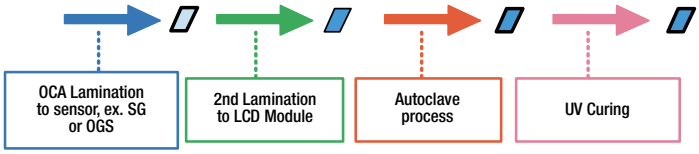
Recommendation: roller pressure 0.1 – 0.2 MPa, roller speed 0.5 – 1 m/min

Step 2: Remove primary liner, and then laminate 3M CEF28XX film/first adherent to second adherent by vacuum lamination

Recommendation: Vacuum condition < 50 Pa, pressure around 0.1 – 0.2 MPa

Step 3: Autoclave process recommendation: 30-60C/3-5kgf/cm^2/20-30min

Step 4: UV curing with minimum 3J/cm^2 dosage



UV Cure Guidance

- UV range: 340-375nm (max absorption = 342nm)
- Minimum UV dosage and intensity: 3 J/cm^2, 10 mW/cm^2
- Suggest using lower wavelengths of the UV-A spectra. Suitable UV sources would be Fusion D bulb and medium pressure Hg.
- LED sources, which output at longer UV-A wavelengths would be less ideal.

Storage

- Avoid applying pressure or resting objects on the product to prevent marking, denting, or deforming the surface.
- Wear gloves to prevent fingerprints or nail marks when handling.
- Product needs to be unpacked and handled in a clean-room facility.
- Product must be protected from light exposure.
- Store in sealed, foil bag under -20°C to 30°C and less than 70% relative humidity. If removed from cold storage, ensure no condensation on packaging.

Regulatory

For regulatory information about this product, please contact your 3M representative.

Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use

Many factors beyond 3M's control and uniquely within the user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for determining if the product is fit for a particular purpose and suitable for user's method of application.

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