

3M™ Contrast Enhancement Film

CEF05XX (8146-X) Series

- Excellent durability in reliability testing
- Easy use, general purpose

Product Description

3M™ Contrast Enhancement Films (CEF) are specialized optically clear adhesives offering excellent clarity and adhesion to various transparent display substrates. 3M™ CEF05XX is a bare ITO compatible and easy to convert adhesive with no UV curing required. It is recommended for glass cover lens to sensor or sensor to sensor bonding.



Construction

Product	3M CEF0501 (8146-1)	3M CEF0502 (8146-2)	3M CEF0503 (8146-3)	3M CEF0504 (8146-4)	3M CEF0505 (8146-5)
Adhesive Type:	Acrylic	Acrylic	Acrylic	Acrylic	Acrylic
Adhesive Carrier:	None	None	None	None	None
Approximate Thickness:					
Release Liner:	75 um (3.0 mils) Clear Polyester				
Adhesive:	25 um (1.0 mil)	50 um (2.0 mils)	75 um (3.0 mils)	100 um (4.0 mils)	125 um (5.0 mils)
Release Liner:	75 um (3.0 mils) Clear Polyester				

The 3M family of optically clear adhesives for electronic displays are usually available in two forms. 3M OCA come in roll good form. 3M Contrast Enhancement Films (CEF) are available in die-cut form.

Product	3M CEF0506 (8146-6)	3M CEF0507 (8146-7)	3M CEF0508 (8146-8)	3M CEF0510 (8146-10)	3M CEF0512 (8146-12)
Adhesive Type:	Acrylic	Acrylic	Acrylic	Acrylic	Acrylic
Adhesive Carrier:	None	None	None	None	None
Approximate Thickness:					
Release Liner:	75 um (3.0 mils) Clear Polyester				
Adhesive:	150 um (6.0 mils)	175 um (7.0 mils)	200 um (8.0 mils)	250 um (10.0 mils)	300 um (12.0 mils)
Release Liner:	75 um (3.0 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.

Durability 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.). No polarizer discoloration was observed for high temperature and thermal shock conditions. Sample construction is cover glass/3M CEF05XX/polarizer on glass.

	Condition	Duration
High Temperature	+95°C	1000 hours
Low Temperature	-40°C	1000 hours
High Temp/Humidity	+85°C/85%RH	1000 hours
Thermal Shock	-40°C and +95°C (1 hour dwell, <1 min ramp time)	200 cycles

Optical 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, haze <1%, b* <1). Sample construction is 3M CEF05XX on LCD glass.

	Condition	Duration
High Temperature	+105°C	1000 hours
UV	.35 W/m ² at 340nm, Boro-soda lime filter	500 hours

Peel Adhesion:

ASTM D3330 modified, 180 degree peel from float glass,
1 cm wide peel strips, 12 in/min (305 mm/min), 2.0 mil
polyester backing

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 CEF0502 (1841-2)	9.7	10.3
3M CEF0504 (1841-4)	10.9	11.4
3M CEF006 (1841-6)	12.4	13.2
3M CEF0510 (1841-10)	15.4	16.0

Color:

Ultra Scan Pro (Hunter Lab)
ASTM E308, D65/10°

3M CEF0502 (1841-2)	3M CEF0504 (1841-4)	3M CEF006 (1841-6)	3M CEF0510 (1841-10)
L* = 96.9	L* = 96.9	L* = 96.9	L* = 96.9
a* = -0.01	a* = -0.03	a* = -0.03	a* = -0.02
b* = 0.16	b* = 0.16	b* = 0.17	b* = 0.18

Refractive Index:

3M CEF05XX
(+ 0.0005 Metricon measurements)

3M CEF05XX (1841-X)		
405 nm	532 nm	633 nm
1.4981	1.4860	1.4809

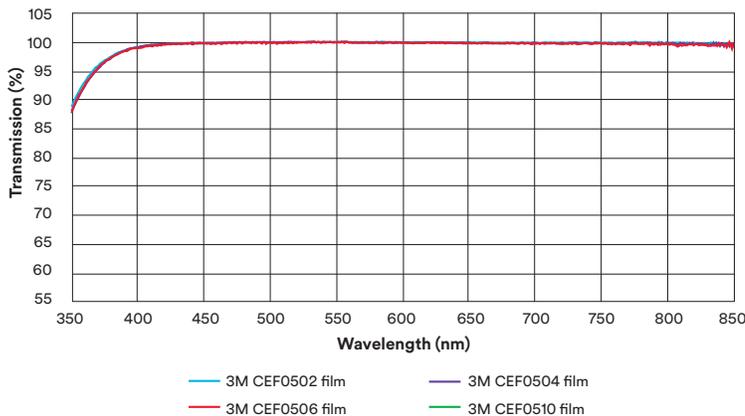
Haze:

Haze is measured according to ASTM D1003-92

3M CEF0502 (1841-2)	3M CEF0504 (1841-4)	3M CEF0506 (1841-6)	3M CEF0510 (1841-10)
0.1%	0.1%	0.2%	0.2%

Transmission Curve:

Transmission vs. Wavelength (Corrected for Reflection Loss of LCD) for 3M CEF05XX on Glass



Typical Electrical Properties at Room Temperature

ASTM-D150-92, 3M CEF05XX (1841-X)

Dielectric Constant:

3M CEF05XX (1841-X)	
Frequency (kHz)	Dielectric Constant
100	4.11
500	3.72

Suggested Lamination Process

Step 1: Remove secondary liner, and then laminate 3M CEF05XX (1841-X) to first adherent substrate by roller at room temperature

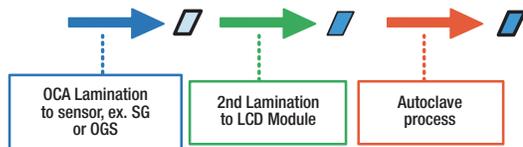
Recommendation: roller pressure 0.1 – 0.2 MPa, roller speed 0.5 – 1 m/min

Step 2: Remove primary liner, and then laminate 3M CEF05XX (1841-X)/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/cm²/20-30min



Storage

- Store in original packaging or plastic bag.
- 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.



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- Product needs to be unpacked and handled in a clean-room facility.
- CEF should be properly stored at room temperature conditions of 22 ± 8°C and 50 ± 20% relative humidity

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 user's method of application.

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