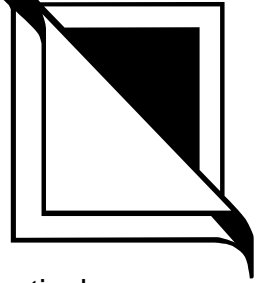


OptiGrafix™

CF & CFEP Grade Polymer Film

Optical Compensation Film



OptiGrafix™ CF and CFEP Grade Optical Polymer Films are uniaxial, chromatic optical compensation films, manufactured to fractional quarter wave levels of in-plane birefringence.

These single layer, high clarity, high transmission films are an economical solution to improving contrast and viewing angles of various Liquid Crystal Display modes. They can also be used to reduce off axis light leakage in cross polarizer applications.

CF Grade films are an excellent high clarity general purpose film for use in room temperature applications. CF Grade Films are manufactured to customer specified levels of birefringence:

	Available Thickness	OPD Range
⇒	.003": (70um)	25nm -100nm +/- 10nm
⇒	.005": (120um)	35nm - 100nm +/- 10nm
	Standard Widths: 20+", available up to 45+"	

CFEP Grade Films are high performance, with high heat resistance up to 85° C. This grade of retarder contains no silica or additional additives so transparency is maximized while haze and light scattering is minimized. This film will not yellow over time, and can withstand high lux and temperature exposure without shifts in its optical properties. CFEP Grade Films are manufactured to customer specified levels of birefringence:

	Available Thickness	OPD Range
⇒	.0032"(80um), .005"(120um):	10nm - 100nm +/- 10nm
	Standard Widths: 20+", available up to 45+"	
	(all values measured @ 560nm +/- 5nm)	

Product Features:

- ⇒ Very Uniform Birefringence
- ⇒ Single Layer Construction
- ⇒ High Clarity, Low Hazy, Excellent Light Transmission
- ⇒ High Gloss Surface
- ⇒ Minimal Hard Defect Count
- ⇒ Good Dimensional Stability
- ⇒ Commercially Available
- ⇒ Cost Effective Alternative to Existing Retarder Film Products

GRAFIX® Plastics

A Division of GRAFIX, Inc.

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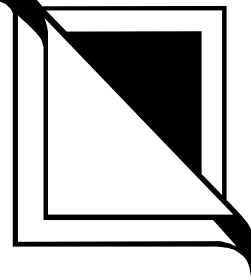
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Properties based on .003" Gloss/Gloss Base Film properties of other gauges and finishes of may vary.
The following technical information and data should be considered representative or typical only,
and not used for specification purposes.



TYPICAL OPTICAL PROPERTIES

Property	CF Grade Value	CFEP Grade Values	Units	Test Method
Phase Uniformity:	< 5	<5	%	
Transparency:	>90	>93	%	ASTM D1476
Hazy	1.1	<1	%	ASTM D1003
Gloss	137	140	%	20° ASTM D523
	145	145	%	60° ASTM D523
	122	115	%	85° ASTM D523
Refractive Index	1.485	1.485		ASTM D542

TYPICAL PHYSICAL PROPERTIES

Property	CF Grade Value	CFEP Grade Values	Units	Test Method
Specific Gravity	1.31	1.31		
Softening Temp.	65°	85°	°C	
Linear Heat Shrinkage 80°C @ 85% RH for 20 Hrs..	1.17	0	%	ASTM D1204-4
Water Vapor Permeability	685	685	g/m ² /day	
Gas Permeability - O ₂	1800	1800	g/m ² /day	
Yield Strength MD	65.4	65.4	Yield/Nmm ²	ASTM D882-91
	61.5	61.5	Yield/Nmm ²	ASTM D882-91
Tensile Strength	58.6	58.6	Yield/Nmm ²	ASTM D882-91
Elongation at Break	47.2	47.2	%	ASTM D882-91
Modulus of Elasticity MD	975	975	Nmm ²	ASTM D882-91
Mullen Bursting Strength	72.5	72.5	PSI	BS 4768

Important Notice: Grafix makes no warranties, express or implied, including but not limited to any implied warranty of merchantability of fitness for a particular purpose. The user is responsible for determining whether the Grafix product is fit for a particular purpose and suitable for the user's method of application. Please remember that many factors can affect the use and performance of an OptiGrafix optical film product in a particular application. Given the variety of factors that can affect the use and performance of a Grafix product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the Grafix product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

Limitation of Remedies and Liability: If the Grafix product is proven to be defective, THE EXCLUSIVE REMEDY, AT GRAFIX'S OPTION, SHALL BE TO REFUND THE PURCHASE PRICE OF OR TO REPAIR OR REPLACE THE DEFECTIVE GRAFIX PRODUCT. Grafix shall not otherwise be liable for loss or damages, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including, but not limited to, contract, negligence, warranty or strict liability.

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