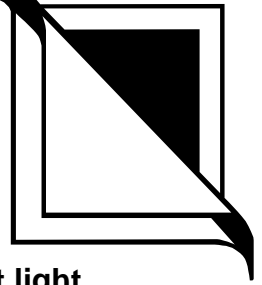


OptiGrafix™

Circular Polarizer Films

Summer 2005



For high performance suppression of internal reflection from external ambient light, OptiGrafix Circular Polarizer Films are the answer!

OptiGrafix Circular Polarizer Films (CPF) are a combination of Linear Polarizer and our QW or QWEP quarter wave retardation films. Our CPF are used to improve display visibility through contrast enhancement and glare reduction. Allowing a range of different type of displays to be used in bright ambient light settings. OptiGrafix CPF is ideal for improving the viewability for Liquid Crystal, Electro Luminescent, Plasma, Field Emissive Displays, Cathode Ray Tubes and Light Emitting Diode display technologies.

Grafix Plastics is a manufacturer of high quality quarter wave retarder film. We do not manufacture linear polarizer. Our CPFs are produced by laminating our retarder film to other manufacturers' linear polarizer. Therefore Grafix Plastics can offer a range of products and services related to circular polarizers:

Finished Circular Polarizer: Front Surface Options:

- ⇒ High Contrast, or Standard Contrast with Gloss surface
- ⇒ High Contrast with Anti-Glare surface
- ⇒ High Contrast, or Standard Contrast with Optical PSA

Finished Circular Polarizer: Rear Surface Options

- ⇒ Gloss Surface, No PSA
- ⇒ Optical PSA

Circular Polarizer Options

- ⇒ Finished Circular Polarizer (All Grafix supplied materials)
 - High Contrast Linear Base
 - Standard Contrast Linear Base (Exceeds 3M HNCP37)
 - Super High Contrast, Dye Based, and Ultra Thin Linear Base constructions available
- ⇒ Base Quarter Wave Film (QW or QWEP Grade Film)With or Without Optical Adhesive
- ⇒ Ready for lamination to linear polarizer
- ⇒ Lamination of our Quarter Wave Film, to customer supplied linear polarizer

OptiGrafix CPF Features

- ⇒ Thin Construction: .014"/350um
- ⇒ Uniform Birefringence Layer
- ⇒ Commercially Available (call for available sizes)
- ⇒ Custom Cutting Available

GRAFIX® Plastics

A Division of GRAFIX, Inc.

19499 Miles Rd. Cleveland, OH. 44128

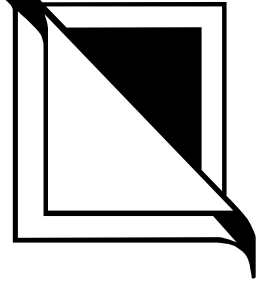
(800) 447-2349 (216) 581-9050 FAX (216) 581-9041

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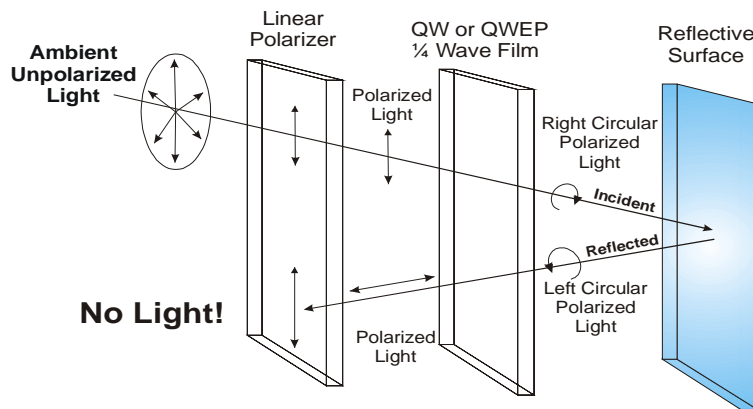
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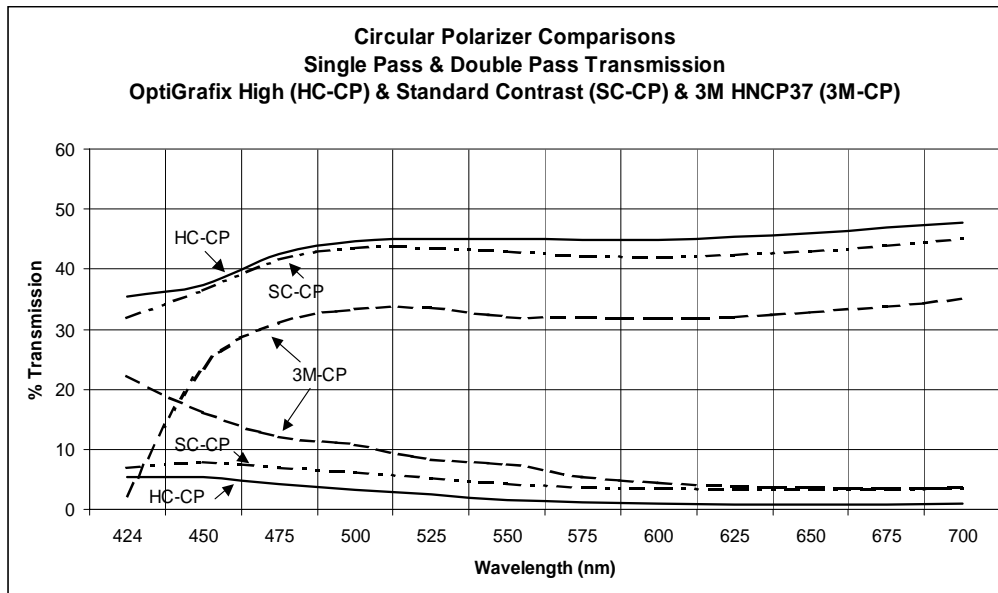


How Circular Polarizer Film Works

Improved viewing and contrast is achieved through the CPF cancelling out bright ambient light that is reflected off the surface of the display. The CPF achieves this effect through its multilayer construction. Bright unpolarized ambient light passes through the linear polarizer layer, thus turning into horizontal oriented light. As this light passes through the quarter wave layer, it becomes circularly polarized, spinning into the display surface. As the light is reflected off the surface of the display it is now spinning in the opposite direction. This reverse spinning light becomes linearly polarized again but its orientation is now 90 degrees different than the transmission axis of the linear polarizer. Because of its orientation the linear polarizer absorbs this reflected light, and cancels it out so it is not observed by the view.



Comparative Performance Curves



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