



Display Enhancement Filters...

DURALAN II™

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.

DURALAN II™ ...

High Performance Windows, Lenses, Filters—Custom Fabricated to Meet Design Requirements

DURALAN II display filters are offered in a variety of colors, surface finishes, and thicknesses. A unique capability to embed graphics inside the filter laminate allows for printing that is protected from surface wear while maintaining a sharp distinct appearance. The ability to incorporate multicolor logos, masks, and other artwork designs in DURALAN II filter products provides users with an aesthetically pleasing, easy to maintain, display filter that is unsurpassed in the industry.

DURALAN II display enhancement filters are constructed of high performance plastics and can meet various compliance regulation requirements. They are available in a variety of surface finishes, depending on your application. All finishes were designed for anti-glare, maximum light transmission properties, and optimum durability. Standard filters for the smallest to the largest commercial displays are

available, in thicknesses from .007" to .400" and sizes up to 44" x 60". Silver Cloud applications specialists will assist you in selecting the right DURALAN II filter for your needs.



DURALAN II A/R Filters—Ideal for High Ambient Light Applications

The unique combination of custom laminated display filters with optically engineered anti-reflective coatings allows you to design the display lens for your application. The lens can have A/R coating on one or both sides for glare reduction and enhanced light transmission. DURALAN II A/R is ideal for high ambient light applications, including direct sunlight. DURALAN II A/R features include:

- Custom thicknesses .007" to .400" thick
- Sizes up to 23" x 60"
- Satin or smooth finishes available
- Improved light transmission
- Custom graphics, fabrication, and finishing
- Hydrophobic layer over A/R coating—allows easy cleaning and reduces fingerprinting



Typical A/R Properties

Reflectance	<0.7 (450-650nm)
Transmission (visible)	>91%
Absorption (550nm)	<3.5%
Haze	<1.5%
Hardness	>3H (ASTM Pencil Hardness)

Data reflects A/R properties only. Optical properties of the entire filter are dependent on laminate structure, thickness, and material used.

Highly Effective Shielding Materials

Filters can be designed to incorporate EMI/RFI shielding and ESD protection. Fine wire meshes and transparent conductive materials are used for EMI/RFI shielding applications. Wire meshes can be stainless steel or copper. Conductive films can be ITO or proprietary multilayer conductive coatings. Silver Cloud uses various methods of terminating for EMI/RFI shielding. Ask for Silver Cloud's EMI/RFI Design Guide for more information.

EMI/RFI Shielding

Wire Mesh	<1Ω/□ resistance offers most effective shielding • Lower light transmission
Conductive Films	Available 4 Ω/□ through 300 Ω/□ • Better light transmission





DURALAN II Lens Protectors for Touch Screens, LCDs, etc. Designed for After Market Sales

DURALAN II Screen or Lens Protectors are designed to protect fragile (and expensive) displays. They are especially effective for use on devices that are constantly being moved such as those used for counting inventory or collection of data for field analysis. Some of these devices include "pen-based" touch screens.

Typically, these filters are about .007" or .010" thick and have a hard-coated, anti-glare surface. One unique feature is our ability to screen print a thin adhesive strip around the perimeter. This adhesive, Silver Cloud's own proprietary formulation, offers both excellent bond and release properties. This is extremely beneficial when the screen protector needs replacement. It can be removed cleanly, without leaving a residue on the display.

Thickness	.007-.010"
Materials	Polyester or Polycarbonate
Surface	Anti-Glare or Anti-Reflection
Adhesive	Silver Cloud Proprietary or other

Specialty Materials and Custom Components

Silver Cloud can also supply filters with polarizers to improve contrast, light control films to restrict the viewing angle of the display, and special materials to shield against heat. Experienced Silver Cloud support personnel will help you choose the correct DURALAN II filter for your specific display application needs. DURALAN II filters can be incorporated into complete control and display panel assemblies that can include other components manufactured by Silver Cloud.

Special Materials

IR/Heat Shield	Reflects out 80% of IR light coming through lens • Keeps display cooler
Light Control Film	Directs the viewing angle of the display
Anti-Fog	Resists "fog" or condensation on Lens surface

The Anatomy of a Silver Cloud Lens

	Thickness	Material
Top Surface	.007" - .030"	Typically Polycarbonate with Hard Coat
Proprietary Bonding Process		
Core	.007" - .325"	Polycarbonate, Special Materials
Proprietary Bonding Process		
Bottom Surface	.007" - .030"	Typically Polycarbonate with Hard Coat

Materials Guide

Surface Coatings	
Anti-Reflective	<ul style="list-style-type: none"> Satin or gloss vacuum deposited surface used to cut down on ambient light Improves light transmission Best choice for outdoor use
Anti-Glare	<ul style="list-style-type: none"> Multiple gloss levels available Provides scratch resistant surface Suitable for indoor use Less expensive than Anti-Reflective
Core Materials	
Polycarbonate	<ul style="list-style-type: none"> Available in various thicknesses Flame Retardant Impact Resistant Maximize Design Flexibility
Specialty Materials	<ul style="list-style-type: none"> EMI/RFI shielding materials, including wire mesh or conductive films Light control/direction films I/R blocking films

Building a Better Lens—Silver Cloud's DURALAN II Provides Excellent Clarity, Durability, and Design Flexibility

Features	Benefits
Window Clarity	Upper and lower surfaces use factory coatings instead of hand applied spray coatings, providing greater consistency Proprietary Silver Cloud adhesives are laminated in a clean room environment to provide a clean, clear bond between layers
Graphic Durability	Your custom graphics are sandwiched internally to avoid scratching from the front or rear surface
Graphic Clarity	Custom graphics are printed near the top surface of the sandwich for easy viewing
Multiple Thicknesses	Because it is a "sandwich" of materials, nearly any thickness can be created
Multiple Surface Finishes	The front and rear surfaces can be designed with most any finish that is required
Final Fabrication	Filters can be fabricated to design specifications

DURALAN II™ Specifications

Taber Abrasion: ASTM D1044-85
(% haze change based on .060" clear core material)

Cycles	CLP-290	CLP-260	CLP-240	CLP-210
25	1.60%	.60%	2.90%	1.60%
50	2.50%	3.2%	4.20%	7.30%
100	5.80%	8.70%	12.40%	15.80%
200	13.00%	18.00%	20.90%	24.00%

Temperature: 160°F (72°C)

Humidity: 80% RH

Chemical Resistance: 24-Hour Watch Glass Soak*

Chemical	CLP-290	CLP-260	CLP-240	CLP-210
Acetic Acid	1	1	1	1
Acetone	1	2	2	2
Dimethyl Formamide	1	2	2	2
Ethyl Acetate	1	1	2	2
10% Hydrochloric Acid	1	1	1	1
Isopropyl Alcohol	1	1	1	1
MEK	1	2	2	2
Pine Oil	1	1	1	1
Ammonia	1	1	1	1
Toluol	1	1	2	2
Water	1	1	1	1
Windex®	1	1	1	1
Unleaded Gas	1	1	1	1
Oil 30w	1	1	1	1
Brine 33% Salt	1	1	1	1
THF	1	2	2	2
MeCl ₂	2	2	3	3
10% NaOH	2	2	2	2

Chemical Soak Watch Glass Rating

- 3 Major chemical attack such as wrinkle, blister, and destroy between five minutes and one hour
 - 2 Minor cosmetic defects such as craze, haze, and gloss change between one and 24 hours
 - 1 24-hour exposure OK
- * **24-Hour Watch Glass Soak Test**
is one of the industry's most stringent tests for chemical resistance.
Windex® is a registered trademark of S.C. Johnson and Son, Inc.

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Optical Properties

Surface	Gloss ¹	Lt. Trans. ²	Haze ²
CLP 290 High Gloss	87-93	90-93%	0.3-0.7%
CLP 260 High Gloss	57-63	88-93%	9-14%
CLP 240 Medium Gloss	37-43	80-85%	20-25%
CLP 210 Low Gloss	7-13	63-65%	45-50%

¹ Based on black background

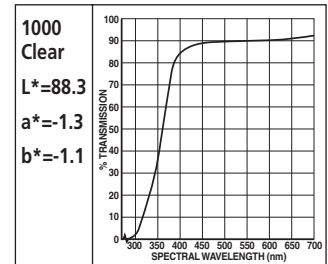
² These readings are based on .060" (1.52 mm) clear window/lens
Testing per ASTM D1003-61

Transmission Curves and L*, a*, b* Coordinates for Standard DURALAN II Materials, with CLP-260 Surface Finish and Standard .060" (1.52 mm) Thickness

The transmission curves are obtained using a Perkin-Elmer Lambda 3, UV/VIS Spectrophotometer in accordance with CIE 1976 USC Chromaticity Diagram.

Transmission curves on L*, a*, b* values are nominal and are to be used as design guidelines only.

- L = Lightness Scale
- a = Hue – Red and Green Scale
- b = Saturation – Blue and Yellow Scale



The technical information contained here is typical of test results of a particular design. Your application, including the entire assembly, may need to be evaluated and specifically designed to your requirements. Silver Cloud reserves the right to revise specifications without prior notice.

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