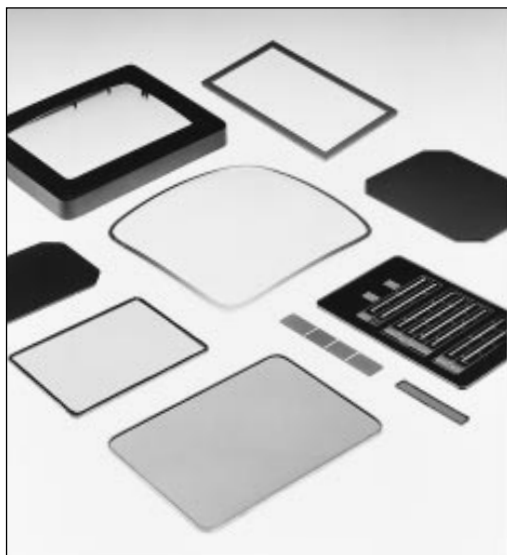


EMI Shielded Windows & Contrast Enhancement Filters



WIN-SHIELD™ Optical Products—Shielded Windows and Contrast Enhancement Filters

Chomerics produces a wide selection of performance-tested glass and plastic windows for visual displays requiring EMI radiation or susceptibility shielding.

These windows have been designed into commercial and military equipment to provide highly effective electromagnetic shielding while providing exceptional optical clarity and image resolution.

Chomerics' prototype-to-production capability includes an extensive line of spectrally-matched filters to meet stringent contrast enhancement performance requirements for both flat and curved configurations. By offering the best combination of EMI shielding and contrast enhancement, we've become a major supplier to manufacturers who must meet FCC and EU (European Union) requirements on digital devices.

Windows can be produced in glass, plastic, or combinations of both. EMI shielding is provided by knitted or woven wire mesh, laminated between the glass or plastic substrates, or by deposited conductive coatings. Standard construction is shown in Figure 1. Shielding effectiveness is determined by the size of the wire screen openings, electrical contact between intersecting wires and the materials, and techniques employed to terminate the wire at the frame edge. Refer to Figures 2 and 3.

Our Applications Engineering staff and EMI Testing facilities provide the expertise necessary to design shielded window assemblies to meet specific requirements, and to verify performance. Our conductive adhesives, paints, tapes, gaskets and frames enable us to provide complete assemblies ready-to-mount.

Table 1

STANDARD COMPONENTS FOR WIN-SHIELD™ OPTICAL PRODUCTS	
Substrate materials	acrylic, polycarbonate, polyester, glass
Shielding materials	woven wire mesh, electrically conductive transparent coatings –Indium Tin Oxide, Silver Oxide
Shielding termination	conductive busbar foil, tape, extended mesh, conductive adhesive, conductive gasket
Anti-glare control	non-glare dispersive surface etch or coating on plastic and glass, multilayer anti-reflection coating on glass
Contrast enhancement	laminated broadband, high contrast narrow band, or sunlight readable spectrally matched filters, circular polarizers
Size Limit and Thickness Range	Stainless Steel 24 x 24 in. (61 x 61 cm) 31-185 mils (0.8-4.7 mm) Copper 24 x 36 in. (61 x 91 cm) 31-185 mils (0.8-4.7 mm) AgF8 Film or Indium Tin Oxide 48 x 48 in. (122 x 122 cm) 7-8 mils (.175-.200 mm)

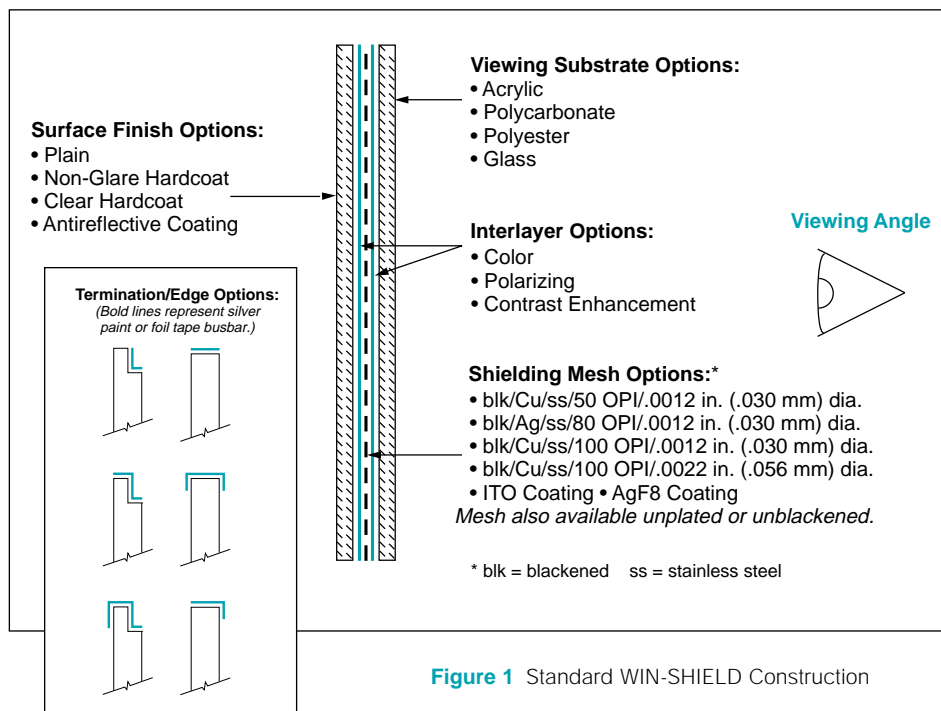


Figure 1 Standard WIN-SHIELD Construction

EMI Shielding Performance

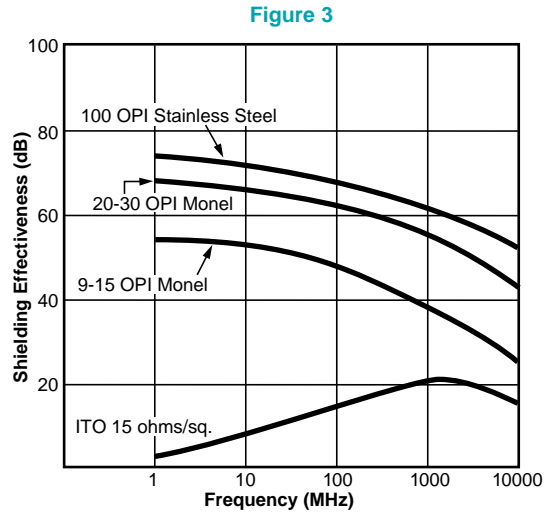
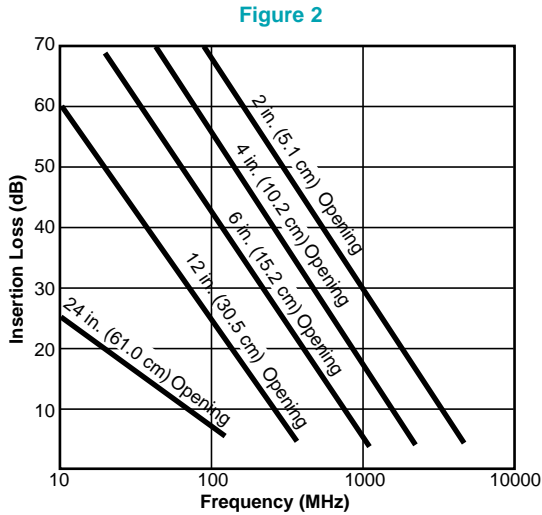


Figure 2 illustrates amount of insertion loss typically achieved through open apertures ranging from 24 in. to 2 in. (61 cm to 5.1 cm) square (per MIL-STD-285). Typical insertion losses of various window materials (properly terminated) are shown in **Figure 3**. To determine total shielding effectiveness attained for any size opening with any window materials, add the appropriate curves in Figures 1 and 2 together.

Contrast Filters

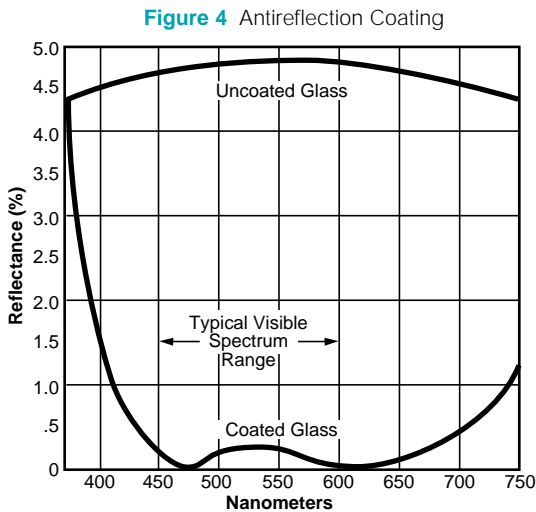


Figure 4 demonstrates the amount of glare reduction achieved with $\leq 0.35\%$ MIL-C-14806A anti-reflection coating compared to uncoated glass.

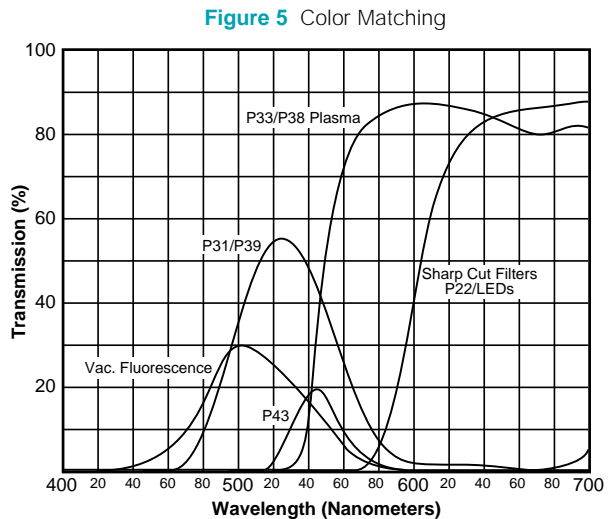


Figure 5 illustrates the light output of Chomerics' color filters. These filters are designed to match the peak wavelength of a display while selectively absorbing white light to achieve the greatest amount of display contrast.

WIN-SHIELD™ AgF8 Conductive Film

WIN-SHIELD™ AgF8 Conductive Film

Chomerics' AgF8 conductive film is a multi-layer, silver oxide-based thin film coating applied to a heat stabilized, optical quality polyester film. AgF8 film provides high visible light transmission and significant infrared reflectance.

The silver coating also provides high electrical conductivity, making AgF8 film a good EMI shielding material from 1 MHz to 1 GHz, suitable for use in most display applications. The attenuation profile, ignoring aperture effects, is shown in Table 2.

AgF8 conductive film is an ideal EMI shielding medium for applications where optical quality cannot be specified. Examples include high resolution CRT displays, multi-color displays, LCDs and EL displays. AgF8 conductive film will reflect heat for temperature-sensitive LCD applications.

Ordering Procedure

AgF8 coating is available as an unsupported film, in lengths up to 500 ft. (150 m). Nominal thickness is

0.008 inch (0.2 mm) and maximum width is 48 inches (122 cm). It can also be laminated to acrylic, polycarbonate or glass, and combined with circular polarizers and dichroic (color) filters.

Contact our Applications Engineering Department to review your requirements.

Table 1

WAVELENGTH (NM)	LIGHT TRANSMISSION (%)	REFLECTION (%)
400	60	10
500	82	6
550	82	5
600	80	6
650	76	10
1200	35	55
1500	20	74

Table 2

FREQUENCY	ATTENUATION (dB)
1 MHz (E-Field)	100
10 MHz (E-Field)	60
100 MHz (E-Field)	54
1 GHz (Plane Wave)	24
10 GHz (Plane Wave)	19



Table 3

TYPICAL PROPERTIES	
Surface Resistance, ohms/sq.	8-12
Visible Light Transmission, %	80
Thickness, inch (mm)	.007-.008 (0.175-0.200)
Environmental Stability Humidity: 140°F (60°C), 95% RH Dry Heat: 212°F (100°C) Saturated NaCl	120 hrs. with no change in resistance

Typical Applications

