

SILVER CLOUD

**MANUFACTURING CO.
GRAPHICS AND ELECTRONICS**

• *Division of XYMOX TECHNOLOGIES, INC.*

DURALAN II™

**Filter Windows and Lenses
EMI/RFI Shielding**

Engineering Design Guide

Duralan II™
Display Filter

Duralan II™
Display Filter

DURALAN II™ High Performance EMI/RFI shielded filters from Silver Cloud Manufacturing offer designers of today's electronic equipment many solutions in helping their equipment to comply with today's stringent demands for EMI/RFI and ESD protection, as well as providing Optical Clarity, Contrast Enhancement, Anti-glare, and Scratch Resistance.

DURALAN II filters are specified by OEMs for a wide variety of applications in the computer, medical instrumentation, telecommunications, business machines, and process control equipment markets.

Silver Cloud's technology includes the use of a variety of engineered materials combined with proprietary laminating techniques and a half century of experience to produce its state-of-the-art DURALAN II product line. These products can be customized to match virtually any filter requirement for today's display technology. The use of specifically developed filter materials and Silver Cloud's unique ability to embed shielding components, graphics, multicolor logos, masks, and other artwork designs, delivers a product that is unsurpassed in the industry.

The following information is intended to assist and guide designers and engineers in specifying an optimized DURALAN II product to meet the requirements of their equipment. Each section covers a specific topic in sufficient detail to provide the basis upon which the designer can make a judgement as to material selection and mounting/termination methods.

The data contained within this Design Guide is deemed to be typical for the type of materials described. It is based on tests and published literature which are believed to be accurate and reliable. However, Silver Cloud assumes no warranty, either expressed or implied, as to either suitability or compatibility of the products or materials to any specific application since the performance of these materials is dependent upon the application with its many related variables. Data contained within this Design Guide is subject to change without notice.

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DURALAN II™ Technical Specifications

RFQ–For your convenience a removable request for quotation form is provided at the rear of this guide.

Much information has been published on total shielding effectiveness (SE) as an aid in reducing electromagnetic interference (electrical noise). The attenuation of the electromagnetic field is referred to as its shielding effectiveness. Electromagnetic compatibility (EMC) may be achieved by reducing the electromagnetic interference (EMI) and/or radio frequency interference (RFI), below the threshold level that disrupts the normal operation of an electronic system. An electronic system can be both an emitter and susceptor. An EMI emitter generates unwanted noise; a susceptor responds to unwanted noise.

Shielding requirements for display windows can vary from moderate to severe. Any barrier placed between an emitter and a susceptor that diminishes the field strength of the interference is an EMI shield. The standard unit of measurement for SE is the decibel (dB). The decibel is expressed as the ratio of electromagnetic field strength on one side of a shielding barrier to the field strength on its opposite side.

The losses in field strength (absorption and reflection) from a shield are a function of the barrier material properties: permeability, conductivity, and thickness, as well as the distance from the emitter to the shield. Charts 1-1 and 1-2 show the shielding effectiveness in decibel attenuation for the different barrier materials used in Silver Cloud's DURALAN II filters. These numbers are the result of tests performed by the material suppliers.

Actual SE may differ, depending on several variables, such as how a shield component is installed, how it is tested, and the environment in which it is tested. EMC testing should be done with our shielded filter installed on a completed assembly at a location where the end certification is to be received, to guarantee EMC compliance of the design.

In most shielding applications, SE below 20 dB (10:1 reduction EMI) is considered marginal due to long-term environmental effects on the mating surfaces of enclosures and shielding gaskets and barriers.

STAINLESS STEEL

Stainless steel mesh is the most often used wire mesh for optical shielded panels. It combines high light transmission with high EMI shielding. Lower mesh counts and thinner wire diameters allow for more light transmittance. Higher mesh counts and thicker wire diameters give better EMI attenuation. If greater attenuation is required, wire meshes can be supplied with conductive platings to enhance shielding capabilities. Stainless steel mesh is slightly reflective. This can be minimized by either plating, then blackening, or by laminating the mesh behind our DURALAN II color absorbing optical tinted materials. Other advantages of stainless steel meshes are high resolution, high tensile strength, and very good uniformity. For clear lenses typically used for LCD displays, silver plated, blackened stainless steel is the preferred shielding choice.

COPPER

Copper is a very conductive wire mesh in its untreated state. It is also very reflective. This can be minimized by either plating, to darken the mesh, or by laminating the mesh behind our DURALAN II color absorbing tinted materials to reduce the reflection. Copper is much softer than stainless steel. For optical purposes, the wire is usually only drawn down to 0.0022" diameter. This is because of its low tensile strength and low ductility which makes finer wires impractical to weave. The thicker wires limit the light transmission which makes copper optically inferior. Because of lower tensile strength and inferior optical properties, copper meshes are not as popular as stainless steel meshes. The advantages of copper mesh are high EMI shielding, high conductivity, and lower cost.

Available plain weave wire meshes from Silver Cloud:

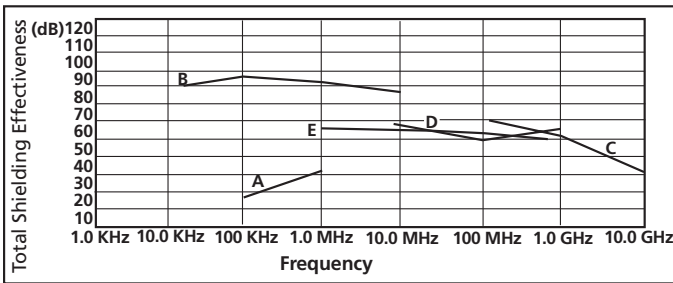
Wire Type	Count	Diameter	% Open
304 S/S	50	.0012"	52.3
304 S/S	80	.0012"	81.7
304 S/S	100	.0012"	77.4
316 S/S	100	.0022"	60.8
Copper	80	.0020"	70.6
Copper	100	.0022"	60.8

SECTION 1—Transparent Conductive Coated Films/ Shielding Effectiveness

Transparent Conductive Coated Films

Plastic film coated with a transparent conductive coating is another material offered by Silver Cloud for shielded windows. These coatings combine high visible light transmission, uniform electrical conductivity, and excellent environmental stability. Also, there is no matrix of wires to interfere with a display as with the mesh. On the other hand, conductive coatings generally have lower shielding and less consistent attenuation than wire mesh. It is usually the case that the more conductive the coating, the more reflective and less transparent it will be. Silver Cloud offers various standard conductive films for display windows ranging from 2.5 to 300 ohms per square. The visual light transmission of various conductive films is shown in Chart 1-4.

Chart 1-1
Shielding effectiveness of
Stainless Steel Wire Mesh

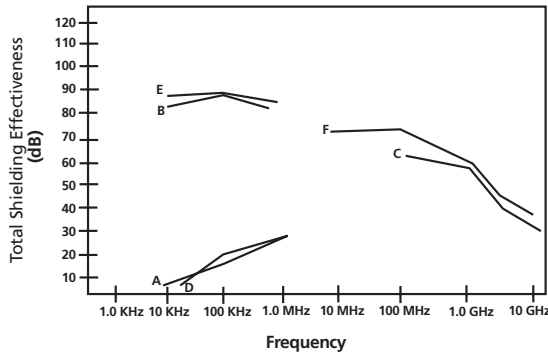


- A- 304 S.S. 80 x 80 x .0012 wire dia. - H Field (Magnetic)
- B- 304 S.S. 80 x 80 x .0012 wire dia. - E Field (Electric)
- C- 304 S.S. 80 x 80 x .0012 wire dia. - Plane Wave
- D- 304 S.S. 100 x 100 x .0012 wire dia. - Near E Field
- E- 304 S.S. 100 x 100 x .0012 wire dia. - Far Field (Plane Wave)

Shielding Effectiveness

Since the shielding effectiveness is a function of the resistivity of the transparent coating which, in turn, is a function of the optical transmission, there are trade-offs in performance. Charts 1-1, 1-2, and 1-3 summarize the general shielding effectiveness ranges at specific frequencies for both the wire meshes and transparent conductive coated films.

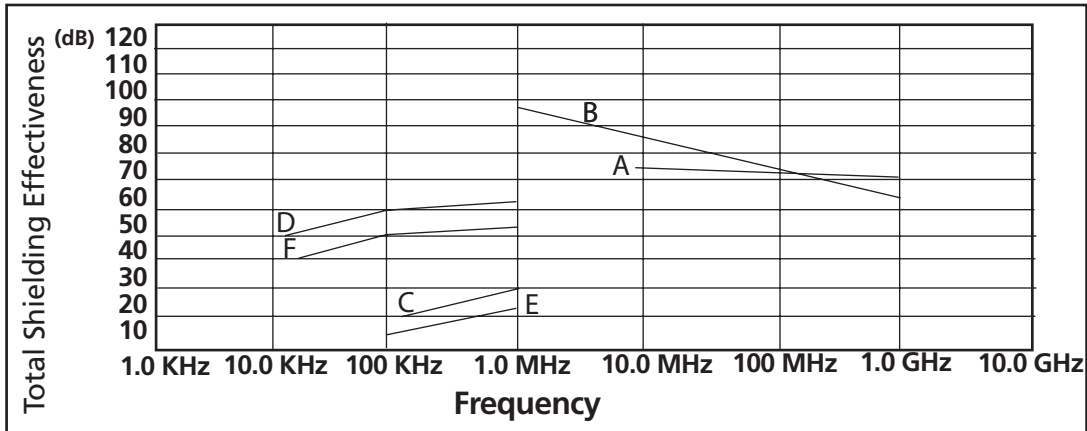
Chart 1-2
Shielding effectiveness of
Silver Plated Stainless Steel Mesh



- A. 80x80 type 304 SS with .0012 wire dia., silver plated and blackened (H-Field)
- B. 80x80 type 304 SS with .0012 wire dia., silver plated and blackened (E-Field)
- C. 80x80 type 304 SS with .0012 wire dia., silver plated and blackened (Plane Wave)
- D. 100x100 type 304 SS with .0012 wire dia., silver plated and blackened (H-Field)
- E. 100x100 type 304 SS with .0012 wire dia., silver plated and blackened (E-Field)
- F. 100x100 type 304 SS with .0012 wire dia., silver plated and blackened (Plane Wave)

Note: Typical shielding performance is based on independent laboratory test results per Mil STD 275. Actual shielding performance is dependent on user application.

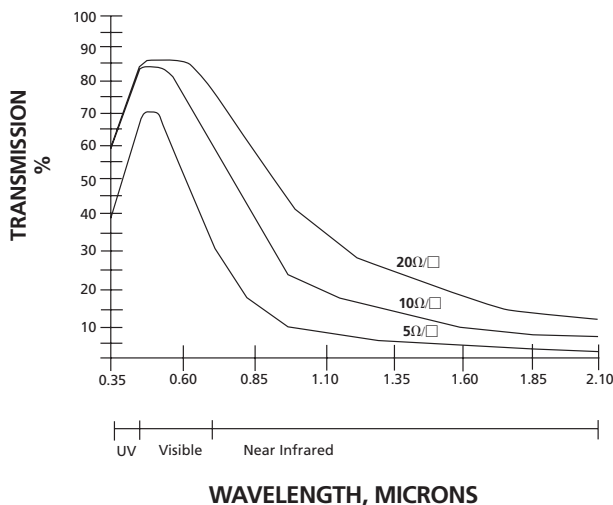
Chart 1-3 EMI/RFI Shielding Effectiveness of Copper Mesh and 60 and 300 ohm Transparent Conductive Windows



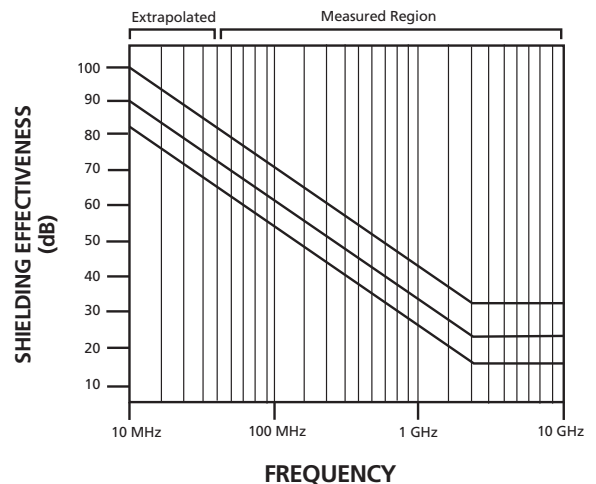
- A—Copper 80 x 80 x .0022 dia. wire - Near E Field
- B—Copper 80 x 80 x .0022 dia. wire - Far Field (Plane Wave)
- C—Transparent Conductive Film (60 ohm) - H Field (Magnetic)
- D—Transparent Conductive Film (60 ohm) - E Field
- E—Transparent Conductive Film (300 ohm) - H Field (Magnetic)
- F—Transparent Conductive Film (300 ohm) - E Field

Chart 1-4 Shielding Effectiveness and Spectral Characteristics of 5, 10, and 20 ohms per Square Conductive Display Window

SPECTRAL CHARACTERISTICS



SHIELDING EFFECTIVENESS



Note: Typical shielding performance is based on independent laboratory test results per Mil-Std-205. Actual shielding performance is dependant upon user application.

Note: All coatings on 5 mil PET.

Optical Performance

DURALAN II filters offer the designer several options to meet the needs of most of today's display applications. For optical performance information, in terms of clarity/haze, surface finishes, and light transmission, refer to Silver Cloud's DURALAN II Product Bulletin.

Clarity/Haze

Each of the components in the filter design impact the optical clarity of the finished part. The polycarbonate, either clear or tinted, surface finish, the shielding component, and the adhesive system contribute to the overall optical clarity.

Wire mesh inherently by virtue of its geometric pattern, can partially obstruct pixels and for that reason, Silver Cloud can orient the mesh at an optimal angle (typically at 45 degrees) with respect to the normal x-y direction of alpha-numeric character segments. This typically permits maximum clarity for wire mesh-type filters.

On the other hand, display filters using transparent conductive films do not have this same consideration, due to their very nature.

Surface Finish

Surface finish likewise contributes to overall performance with our CLP 290 High Gloss surface being the best and the lower gloss, CLP 210 finish being less. Our CLP 260 finish is often selected and is the best surface to reduce glare while maintaining satisfactory clarity.

In addition to our standard hard-coated surface finishes, various Anti-Reflective (A/R) surfaces are available for improved light transmission and sunlight readability.

Light Transmission

Light transmission is a function of color, surface finish, type of shielding component, special effects layers, and total part thickness. Refer to the DURALAN II Product Bulletin for specific data.

IN SELECTING THE OPTIMIZED DURALAN II FILTER PRODUCT FOR YOUR APPLICATION, CONSULT WITH OUR EXPERIENCED SUPPORT PERSONNEL FOR ASSISTANCE.

Fabrication

Various methods are used for the fabrication of DURALAN II filters. They depend on quantity, material thickness, tolerances required for the finished part, and the appearance requirements (i.e., edges that are exposed in the final application are required to have a more “finished” look than for parts where the edges are hidden by a bezel, frame or enclosure).

Cost of fabrication is dependent on methods used, the number of multiples that can be processed at one time, and the type of tooling used.

In considering part cost, subsequent operations such as deburring, applying adhesive, and packaging requirements can be significant cost drivers along with the obvious customer specification criteria.

Fabrication Methods & Typical Tolerances

Perimeter Finishing:

- CNC Routing: $\pm .005''$ (.127 mm) for material thickness $.030''$ (.872 mm) to $.250''$ (6.35 mm)
- Diecutting: $\pm .015''$ (.381 mm) for material thickness up to $.050''$ (1.27 mm)
- Sawcutting: $\pm .015''$ (.381 mm) for material thickness $.050''$ (1.27 mm) to $.250''$ (6.35 mm)
- Shearing: $\pm .010''$ (.254 mm) for material up to $.030''$ (.762 mm) $\pm .015''$ (.381 mm) for material up to $.050''$ (1.27 mm)
- Hard Tooling: $\pm .005''$ (.127 mm) for material thickness up to $.050''$ (1.27 mm)

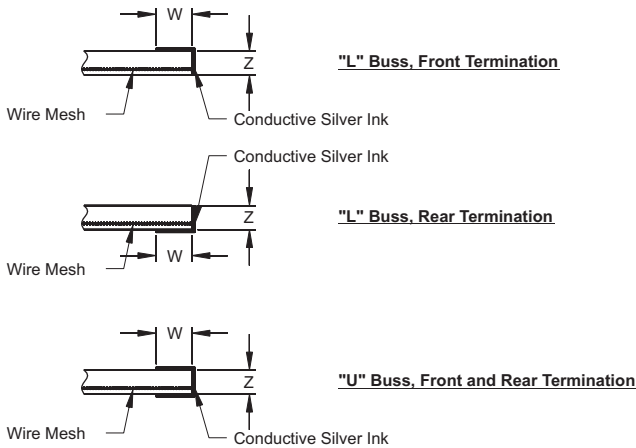
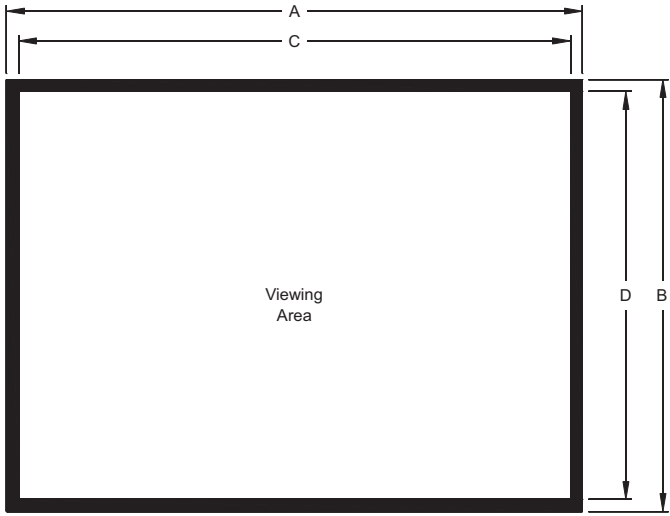
Internal Holes & Cutouts:

- Routing/Milling: $\pm .005''$ (.127 mm) for material thickness $.030''$ (.862 mm) to $.250''$ (6.35 mm)
- Diecutting: $\pm .010''$ (.254 mm) for material thickness up to $.040''$ (1.02 mm)
- CNC Punching: $\pm .007''$ (.178 mm) for material thickness up to $.040''$ (1.02 mm)

Other Options:

- Counterboring
- Countersinking
- Drilling
- Milling
- Press-in fasteners
- Tapped holes
- PSA application (various types of adhesives are used per the application requirements)

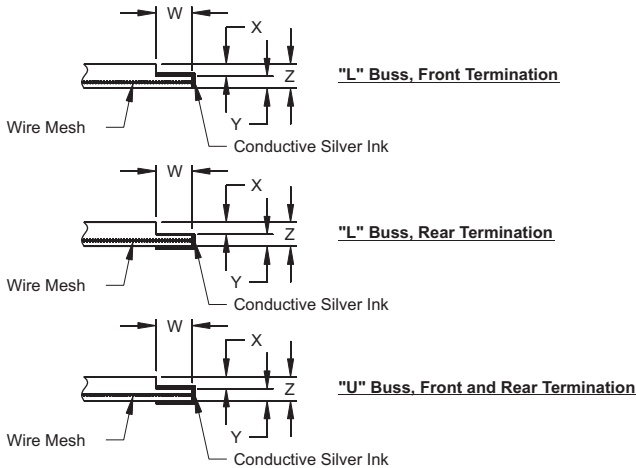
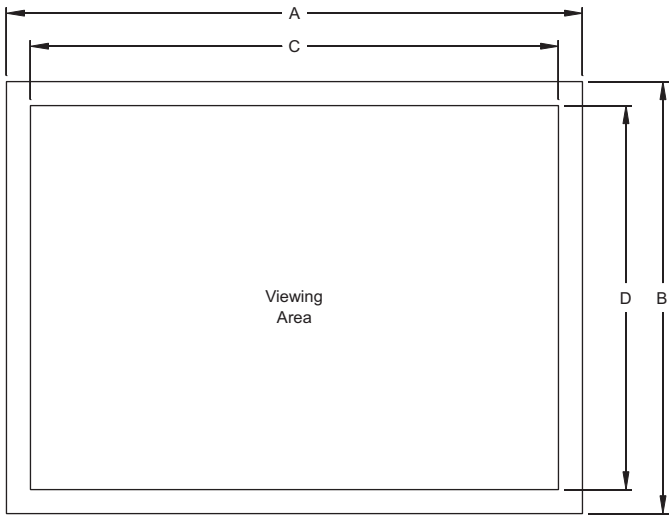
Embedded Wire Mesh Construction



Dimension Guidelines (inches)

A		B		C		D	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
1.5	20.0	1.5	15.0	1.00<A	.100<A	1.00<B	.100<B
W		X		Y		Z	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
.050	.500	N/A	N/A	N/A	N/A	.030	.250

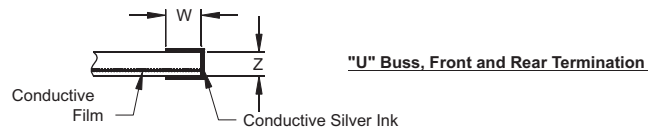
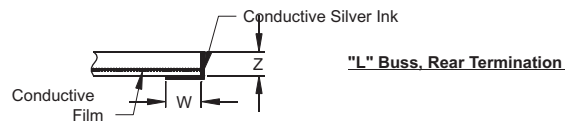
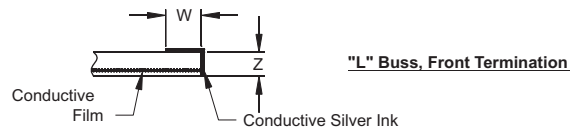
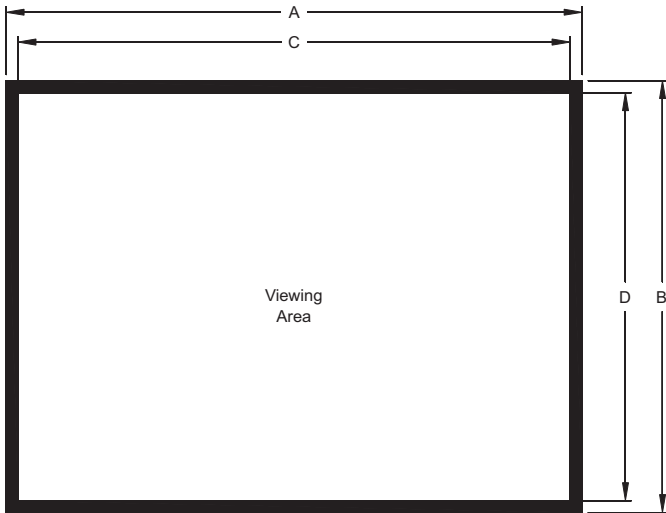
Embedded Wire Mesh with Milled Edge Construction



Dimension Guidelines (inches)

A		B		C		D	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
1.5	20.0	1.5	15.0	1.00<A	.400<A	1.00<B	.400<B
W		X		Y		Z	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
.200	.500	.010	.020<Z	.020	.010<Z	.050	.250

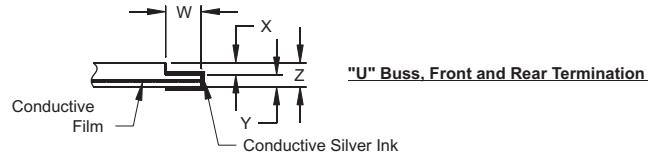
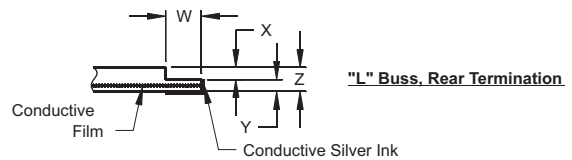
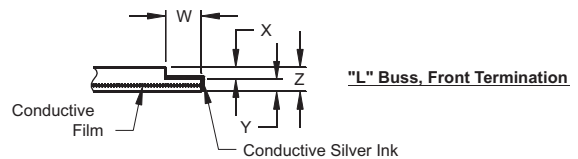
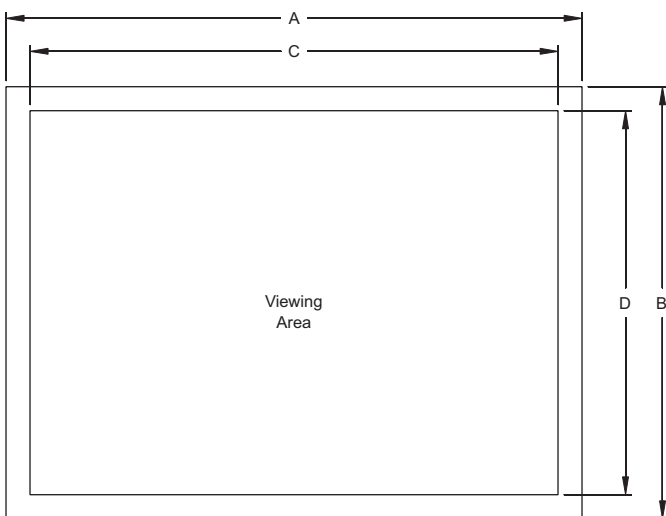
Embedded Conductive Film Construction



Dimension Guidelines (inches)

A		B		C		D	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
3.0	14.0	2.0	10.0	1.00-A	.375-A	1.00-B	.375-B
W		X		Y		Z	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
.187	.500	N/A	N/A	N/A	N/A	.030	.250

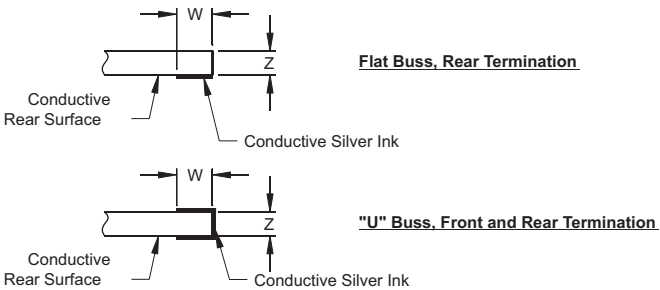
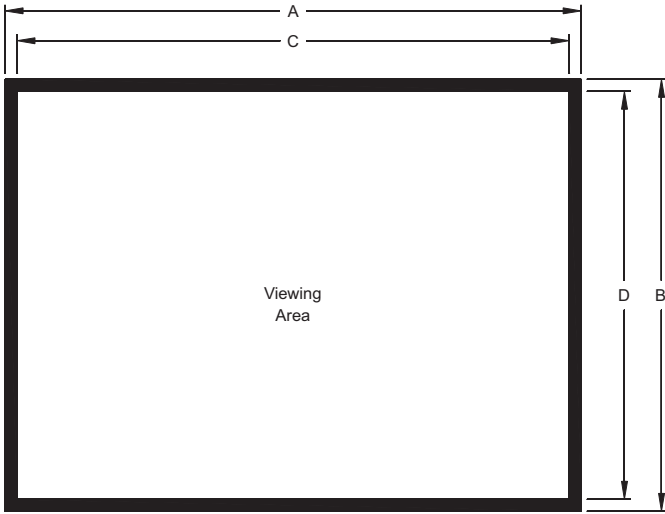
Embedded Conductive Film with Milled Edge Construction



Dimension Guidelines (inches)

A		B		C		D	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
3.0	14.0	2.0	10.0	1.00-A	.375-A	1.00-B	.375-B
W		X		Y		Z	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
.187	.500	.010	.020-Z	.020	.010-Z	.030	.250

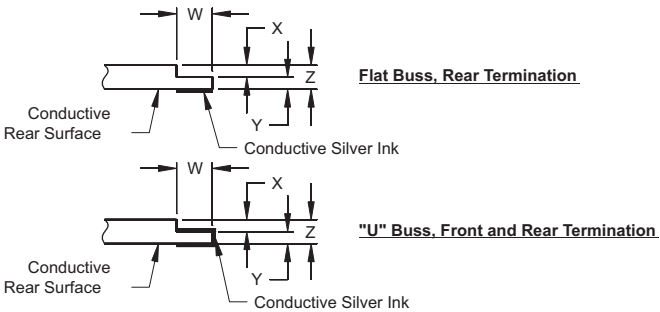
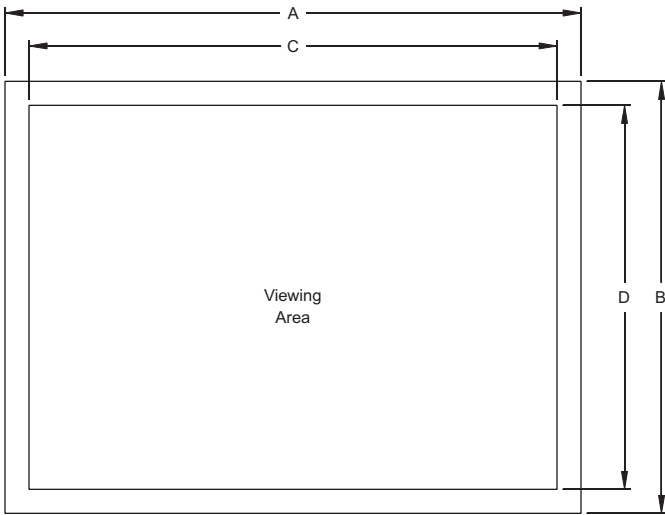
Exposed Conductive Film Construction



Dimension Guidelines (inches)

A		B		C		D	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
3.0	14.0	2.0	10.0	1.00<A	.375<A	1.00<B	.375<B
W		X		Y		Z	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
.187	.500	N/A	N/A	N/A	N/A	.030	.250

Exposed Conductive Film with Milled Edge Construction



Dimension Guidelines (inches)

A		B		C		D	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
3.0	14.0	2.0	10.0	1.00<A	.375<A	1.00<B	.375<B
W		X		Y		Z	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
.187	.500	.010	.020<Z	.020	.010<Z	.030	.250

Mounting and Assembly Methods

A number of factors contributes to a window's shielding performance; one of the most significant is its termination method or installation arrangement. Silver Cloud has categorized window shielding terminations into the methods listed below. An optimized design may employ combinations of these methods.

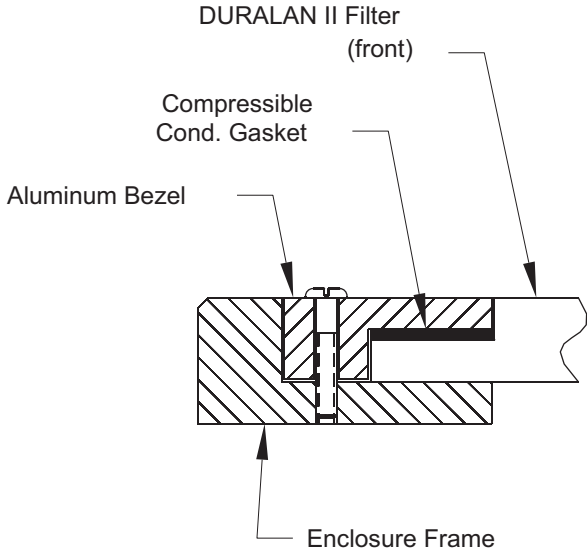
- Extending Wire Mesh
- Conductive Tapes
- Mechanical Fasteners
- Conductive Adhesives
- Conductive Buss
- Conductive Foam Gasket

Within each method, there is a range of options in which a DURALAN II shielded window can be terminated electrically to the mating portion of the EMI/RFI enclosure of a system. It is important to understand that a particular method impacts not only the shielding performance of the window, but also the cost. In addition to the fabrication cost drivers mentioned in Section Three, raw material cost is an important factor.

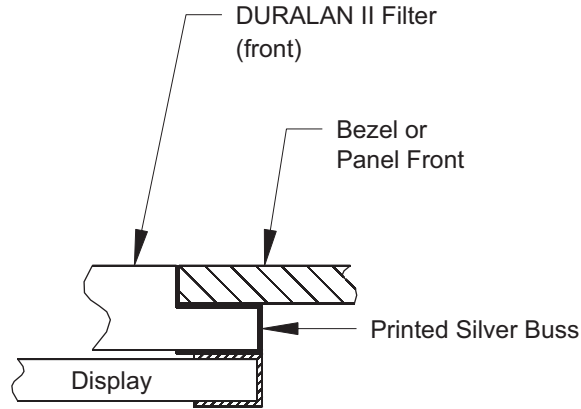
Silver Cloud can offer some unique methods of termination in addition to some of the more industry standard styles. The illustrations in this section are presented to assist our customers in selecting the best design for a particular application, relative to performance and cost.

Extending Wire Mesh

Wire mesh can be laminated into the filter and the portion extending beyond the filter edge can be folded around the edge and adhered to either the front or rear surface. This method is only recommended for low volumes or for very special applications. This method is typically the most expensive.

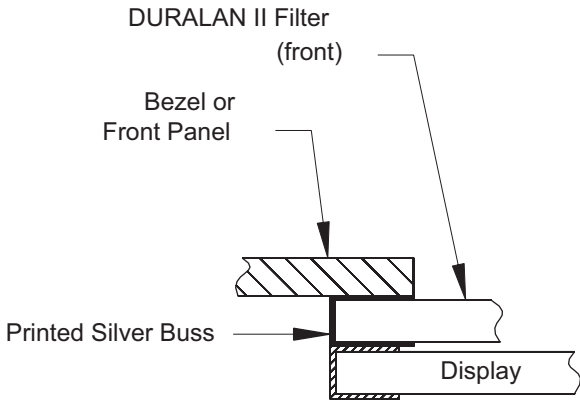


Flush Mounted Filter
(Fig. 5-1)



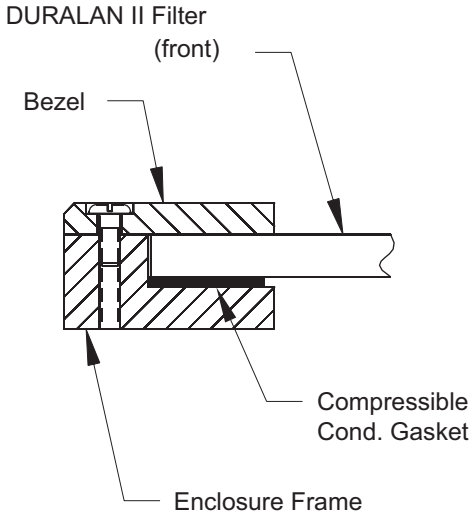
Display frame mounted to apply pressure to conductive edges of filter (printed silver buss)

Flush Mounted Filter
(Fig. 5-2)



Display frame mounted to apply pressure to conductive edges of filter (printed silver buss)

Recess Mounted Filter
(Fig. 5-3)



Recess Mounted Filter
(Fig. 5-4)

Absorption—loss or conversion of electromagnetic energy into other forms during passage through matter. Usually measured in decibels (dB).

Acrylic—A thermoplastic material derived from acrylic acid which is hard and brittle with good dielectric and excellent optical properties.

Anti-Reflective Coating (A/R)—A thin layer of transparent material applied to an optical surface (window) to reduce the reflection and to increase the transmittance.

Attenuation—Ratio of radiant energy loss to total radiant energy. Usually expressed in decibels (dB).

Chemical Resistance—The resistance of a DURALAN II filter to deteriorating effects resulting from exposure to chemicals of specified type under specified conditions.

Clarity—The characteristic of a transparent material such that distinct images may be observed through it. Usually expressed in terms of Light Transmission and Haze Value Correlation.

Color—The attribute of visual experience having hue, saturation, and brightness (or lightness).

Conductive Buss—A conductive silver ink applied around the perimeter edge of the panel. The bussed surface makes contact with the window's ground plan and terminates the panel to the ground plane of the electronic enclosure. An electrical ground is established through direct contact with the buss via a conductive adhesive interlayer or through the use of a conductive gasket between the buss and the enclosure.

Contrast—The difference in tone between the lightest and darkest areas of an image.

Die Cutting—the impress of a steel rule die into the surface of a sheet to separate the sheet into the form(s) dictated by the shape of the die. A common method of fabrication of thin gauge plastic materials.

DURALAN II™—The product trade name given by Silver Cloud Manufacturing to its proprietary line of display filters, window, and lens products.

Decibel (dB)—A tenth of a bel. A dimensionless unit for expressing the ratio of two values of power. One bel is equivalent to the log of the ratio of two powers ($\log P_1/P_2$) one decibel is the equivalent to 0.1 bel ($10 \log_{10} P_1/P_2$).

Also used to express ratios of the magnitude of two voltages or two currents with common impedances: voltage, $10 \log (E_1/E_2)^2$ or $20 \log E_1/E_2$; current, $10 \log (I_1/I_2)^2$ or $20 \log (I_1/I_2)$.

Electric Field—The high impedance component of an electromagnetic wave. An E-Field induces a voltage gradient on a shield and is measured in volts per meter.

Electrical Noise—Any unwanted disturbance within a dynamic electrical system, such as spurious signal or undesired electromagnetic radiation which modifies the transmitting, receiving, or signal processing of the desired data.

Electromagnetic Compatibility (EMC)—The ability of electronic equipment, system, or subsystem to operate in the intended operational environment without causing or suffering unacceptable performance because of unintentional electromagnetic radiation.

Electromagnetic Interference (EMI)—Any level of electromagnetic radiation, periodic or random, narrow or broadband, which can interfere with the operation of electronic equipment.

Electromagnetic Radiation (EMR)—The emission and/or propagation of energy through a medium from vibrating charged particles. A combination of oscillating electric and magnetic fields which propagate through space at the velocity of light.

Electro Static Discharge (ESD)—The rapid migration of an accumulated electrical charge, in an attempt to reach equilibrium. Usually expressed in quantities of voltage.

Environmental Seal—Exclusion of contamination by sealing gaskets, caulks or potting compounds.

Field Strength—The magnitude of an electromagnetic field expressed as volts/meter, amperes/meter or watts/square meter.

Filter—A term used to describe Silver Cloud's laminated DURALAN II product that improves the viewing of displayed images, while at the same time, providing EMI/RFI protection. Commonly referred to as windows or lenses.

Gasket, EMI—A material, or combination of materials, which conducts electrical current and is used to ensure a continuous low-impedance contact between two surfaces, such as a filter to an enclosure.

Giga—A metric prefix to represent 10^9 or 1,000,000,000. Abbreviated G.

Glare—Gloss which exhibits high haze characteristics and does not allow viewing of reflected surface.

Gloss—Directional reflection which is responsible for reflected highlights or images of objects being seen as being reflected from the front surface.

Gloss Level—The term used by Silver Cloud to rate the relative degree of shine or luster of the viewable surface of its DURALAN II products. Silver Cloud uses a 60 Gardner Glossmeter for these measurements.

Ground Straps—A component device to serve as an electrical drain, connection, or termination. The use of ground straps satisfies low level shielding applications in which the panel is not stationary, for instance, when the panel itself is an opening door. A ground strap allows the window to move and not lose electrical contact. For low level RF shielding requirements, four straps are typically used.

Hardcoating—The treatment applied to either the front or top surface or, in some instances, both front and rear surfaces, of a DURALAN II filter, to prevent the surface from scratching and to protect it from harsh chemicals.

Haze—The resultant effect of light scattering in a polished surface or in the bulk of material due to defects and chemical changes.

Hertz—A unit of frequency equal to one cycle per second.

Hue—The perceptual term for a specific aspect of color, such as red, yellow, green or blue.

Index of Refraction—The ratio of the velocity of light in air to the velocity of light in a refractive material for a given wavelength.

Indium Tin Oxide (ITO)—A transparent conductive coating applied to clear transparent substrates such as polyester or polycarbonate film. When used in this form, it can function as an EMI/RFI shield.

Kilohertz (kHz)—A unit of frequency equal to 1,000 (10^3) cycles per second.

Laminate—A layered construction, such as Silver Cloud's DURALAN II product, which is produced using a proprietary laminating process.

Light Transmission—The percentage measurement of a material's ability to allow a particular light source to pass through it in a linear fashion.

Louver—A light control film added to a DURALAN II filter, that functions as a "vertical blind" in front of the display. Light is blocked from reaching the display, thus it cannot be reflected back to the viewer. With a louver, there is a trade-off and the viewing angle is somewhat restricted. The amount is dependent on the angle and type of louver.

Magnetic Field (H-Field)—The low impedance component of an electromagnetic wave. An H-Field induces a current on a shield and is measured in amperes per meter.

Ohm—A unit of electrical resistance equal to the resistance of a circuit element in which a constant potential difference of one volt produces a current of one ampere.

Ohms/Square—A unit of a material's area surface resistivity.

Plane Wave—An electromagnetic wave whose electric field to magnetic field ratio is equal to 120π (377).

Polycarbonate—A thermoplastic material with high impact strength, absorption, and good dielectric and optical properties. LEXAN® is polycarbonate film or sheet manufactured by General Electric Company and is used by Silver Cloud in their DURALAN II filter windows and lenses.

Polyester—A thermoplastic material with good dielectric and chemical resistance properties.

Pressure Sensitive Adhesive (PSA)—An adhesive material, typically in the range of 1/2 mil to 5 mils in thickness and used to bond together 2 or more layers of material. Firm pressure must be applied to increase the flow and contact of the adhesive with the substrate. Time and temperature increases the surface contact and adhesion values.

Radio Waves (or Hertzian Waves)—Electromagnetic waves in the frequency range from 10 kHz to 100 GHz.

Reflection—The redirection of electromagnetic energy at an air to a medium or metal boundary of a shield or optical element.

Shield—Electrically conductive materials placed around a system circuit, component, or cable to suppress the effect of an electromagnetic field within or beyond definite regions.

Shielding Effectiveness—The effectiveness of a given material as a shield under a specific set of conditions, measured in decibels (dB).

Surface Resistivity—The resistance of a material between two opposite sides of a unit square of its surface, commonly expressed in ohms per square.

Susceptibility—The undesired response of electronic equipment to emissions, interference, or transients, or to signals other than those to which the equipment is intended to respond.

Tabor Abrasion—The term used to describe the test method (ASTM D1044-85) used by Silver Cloud to evaluate the inherent ability of a surface to inhibit deterioration or destruction by friction.

Transparent Conductive Coating—The thin, transparent, vacuum-deposited coating typically of Indium Tin Oxide (ITO) or for special applications, gold (Au) or silver (Ag), on one of the layers of a DURALAN II display filter.

Wavelength—In a periodic wave, the distance between points of corresponding phase of two consecutive cycles. The wavelength (λ) is related to the propagation velocity (C) and the frequency (f) by the formula $\lambda = C/f$

Window Lens—A term used by Silver Cloud to sometimes describe its DURALAN II type product, where it is used to enhance the user's view or for protection of a display device.

Silver Cloud Manufacturing Company

Request for Quotation Form—DURALAN II™ Filters

525 Orange Street, Millville, NJ 08332 • 856/825-8900 • Fax: 856/825-8969

Company _____

Name/Title _____

Tel. & Ext. _____

Fax _____

E-mail _____

Address _____

City/State/Zip _____

Date Required _____

Quantities to Quote _____

Dimensions (in) _____

Thickness (in) _____

Customer to receive via:

Fax Mail E-mail

Is there a CAD file available? Yes No

Are drawings available? Yes No

Color & Finish: Clear Transparent color

Screen Printing:

Yes No # of colors _____

Front: 290 High Gloss 260 Hi Satin
 240 Med Satin 210 Low Gloss
 Anti-Reflective Coating (Premium)

Rear: 290 High Gloss 260 Hi Satin
 240 Med Satin 210 Low Gloss
 Anti-Reflective Coating (Premium)

Fabrication:

Finished Edges Only Holes

Cutouts Special Milling

Application Requirements:

Flammability Rating Implosion/Shatter

EMI/RFI Shielding ESD Shielding

UV/IR Blocking

Temperature: Usage

High ____°F Low ____°F

Special _____

Temperature: Storage

High ____°F Low ____°F

Special _____

dB Reduction Requirements _____

Shielding Requirements:

Conductive Coating

5 ohm 10 ohm 60 ohm

Wire Mesh

Blackened Copper Blackened Steel Stainless

50 x 50 OPI 80 x 80 OPI 100 x 100 OPI

Grounded from: Front Rear

Silver Buss Bar: U-bar L-bar

Is a conductive gasket or adhesive required?

Yes No

Type or P/N _____

Display:

Color Monochrome LCD VF

CRT EL LED AMLCD

Briefly describe application environment:

Is this part to be mounted in a bezel or enclosure?

Yes No

If Yes, can a sample be obtained? Yes No

Describe your delivery requirements for this product (i.e.:
prototype, testing, production, yearly quantities, life span)

SILVER CLOUD

MANUFACTURING CO.
GRAPHICS AND ELECTRONICS

• *Division of XYMOX TECHNOLOGIES, INC.*

