

19.

**SHIELDED
WINDOWS.**



GENERAL INFORMATION

Shielded windows consist of one or more window layers with a conductive intermediate layer.

They are applicable for all visual display systems, e.g. in meters and monitors.

Due to the variety of possibilities, our standard is custom-made production.

Customizations



FEATURES AND BENEFITS

The window should be selected according to following criteria:

- Window material.
- Color of material.
- Dimensions.
- Anti-reflectivity.
- Intermediate layers.
- Construction.
- Gasket type.
- Frame finish.
- Shielded windows are generally used for all kinds of electric displays, e.g. LCD, LED, plasma and displays.

Orientation of the mesh:

- 90° - 45° - 30° - 15°.

PRINCIPLES OF OPERATION

WINDOW MATERIAL

Glass, plexiglass (acryl), makrolon (polycarbonate) and PVC can be selected.

COLOR

Base color of all materials is transparent/clear. However, for some applications it may be more advantageous to color the material yellow, green, red or amber.

The base material for acrylic windows is colored, whereas for glass windows, the adhesive foil between the panels is colored.

Please consider that with colored materials, the light transmission will be affected.

DIMENSIONS

Outer dimensions: there is no standard outer dimension, all windows are custom-made.

Material thickness: the material thickness for glass starts from 0.8 - 1.2 mm, for acrylic from 0.8 mm and for polycarbonate from 1.5 mm. The variety of available material thicknesses helps to meet almost all customer requirements. For a final glass-glass window, the shielding mesh and the adhesive add 0.8 mm to the thickness when laminated together.

ANTI-REFLECTIVITY

All materials can be supplied with anti reflective surface to avoid glaring and to enhance contrast.

Different procedures can be used.

Anti-reflectivity for glass

Multi-layer coating per MIL SPEC 675 B (less than 0,6% remaining reflection).

Single-layer coating per DIN 58197 (less than 1,5% remaining reflection).

Chemical etching: 5% reflection (R11G or GW 80).
9% reflection (R19G or GW 100).
13% reflection (R27G or GW 120).

Anti-reflectivity for plastics

Chemical etching is the standard procedure for a good anti reflectivity with plastics which comes out very strong.

A special coating, giving a scratch resistance in addition to anti reflectivity, can influence the intensity of reflectivity.

INTERMEDIATE LAYERS

The intermediate layer for EMI/RFI shielding is a woven microstructure mesh. Mesh materials are copper, stainless steel or silver plated stainless steel.

The mesh can be blackened so as to enhance contrast on the display. This does not affect the shielding performance. To avoid interferences between mesh grid pattern and monitor or display ("Moiré fringes"), simply change the orientation of the mesh by turning it a little. The number of openings per inch (opi) determine the shielding effectiveness, but also the light transmission.

In applications with a very high resolution display which does not allow the use of a mesh, a highly conductive, transparent foil can be laminated onto the glass, or it can be equipped with a conductive ITO coating.

CONSTRUCTION

The window consists of a carrier with a laminated mesh on the rear or laminated between two carriers, depending on the application.

The mesh overlaps the carrier to serve as contact area for the gasket or installation.

Plastic will be laminated either with adhesives or with high temperatures.

Glass will be laminated in a vacuum with double sided adhesive foils. Please note that a fully laminated glass window using a PVB interlayer (PVB = Polyvinyl Butyral) as an adhesive cannot be cleaned with solvents, because the solvent will damage the PVB interlayer.

GASKET TYPE

To achieve shielding effectiveness, a good contact between mesh and enclosure is required. The contact can either be established in a direct way or by means of a conductive gasket. When selecting the gasket, you should consider the environmental seal (IP-protection etc.) characteristics that have to be met by the finished product.

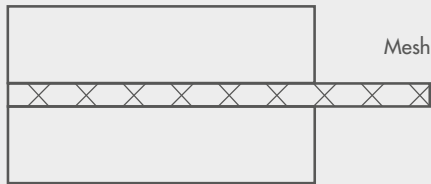
FRAME FINISH

Windows can be supplied from the factory as complete units. The finish is made according to customer specification and facilitates the assembly. The appropriate gasket is integrated in the frame to provide a good contact between mesh and enclosure.

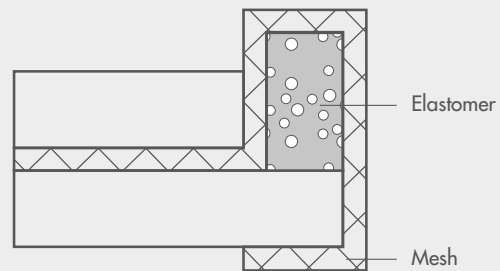
SELECTION OF MESH

Mesh	Surface	Open. Per inch	Wire Diameter (mm)	Max Size Available (mm)	Open area (%)	Mesh Type
Copper	Blackened	70	0.07	1200 x 1000	65	1
Copper	Blackened	100	0.05	1200 x 1000	64	2
Stainless Steel	Bright	100	0.025	1200 x 1000	81	3
Silver plated Stainless Steel	Blackened	100	0.025	700 x 700	81	4
Silver plated Stainless Steel	Blackened	165	0.05	700 x 700	46	5
Silver plated Stainless Steel	Blackened	200	0.025	700 x 700	64	6

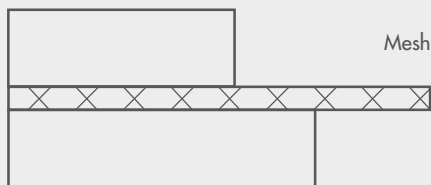
SCHEMATIC ILLUSTRATION



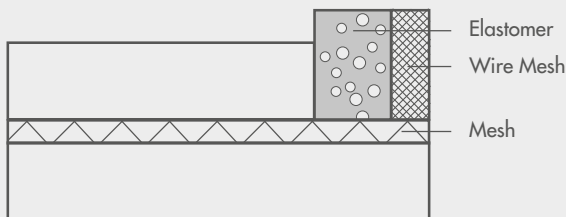
Plain Ending



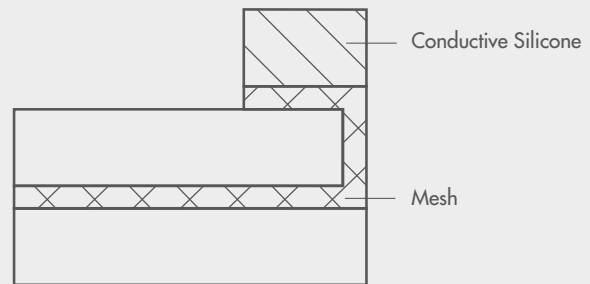
Step Construction with Mesh Over Elastomer Core



Step Construction

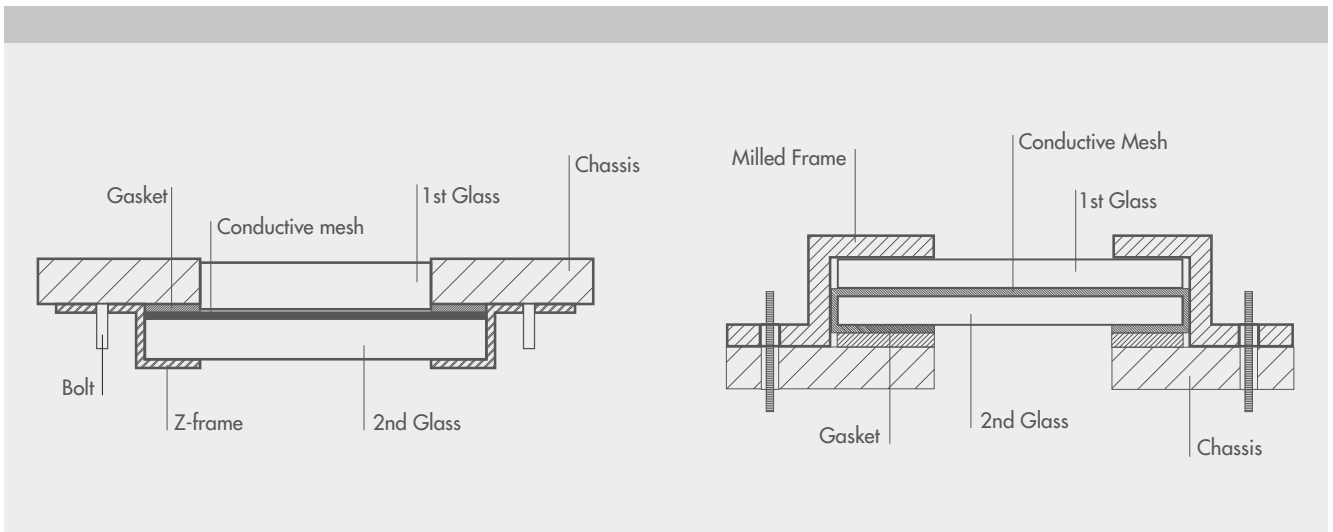


Step Construction with RF-Gasket



Plain End with Conductive Silicone Gasket

ASSEMBLY EXAMPLE



SHIELDED ACRYLIC WINDOW

GENERAL DESCRIPTION

A micro-structure wire mesh is stretched in a mould and then cast into acrylic. Due to a special moulding technique, the wire mesh is smoothly embedded in the sheet and will therefore only cause a minimum of optical disturbances. If the shielded window is placed in front of a data display, there might occur interference phenomena followed by varying light intensities on the screen (Moiré fringes).

A turn of the mesh by a few degrees may reduce these disturbances. Custom-made shielded windows with specific dimensions will be cut out of the sheet. Afterwards, a groove will be milled all the way around the edge of the sheet in a step construction.

This groove will be plated with silver (silver busbar) and provides the contact to the wire mesh. The window can then be mounted on the chassis by means of a conductive gasket or by using a conductive adhesive. Shielded windows used in front of a display should be mounted in a way that the mesh side of the window is placed as close to the LED/LCD as possible.

MATERIAL

Type of Plastic: Cast Acrylic.

Max. size: 1150 x 850 mm.

Thickness: 2.0 mm, 2.5 mm, 3.0 mm, 4.0 mm.

Tolerances: ± 0.2 mm.

Working Temp. Range: - 40 to 70 °C.

Mesh - stainless steel, 100 OPI Surface: bright or blackened Wire diameter: 0.025 mm.

Light transmission: 78%.

FILTER

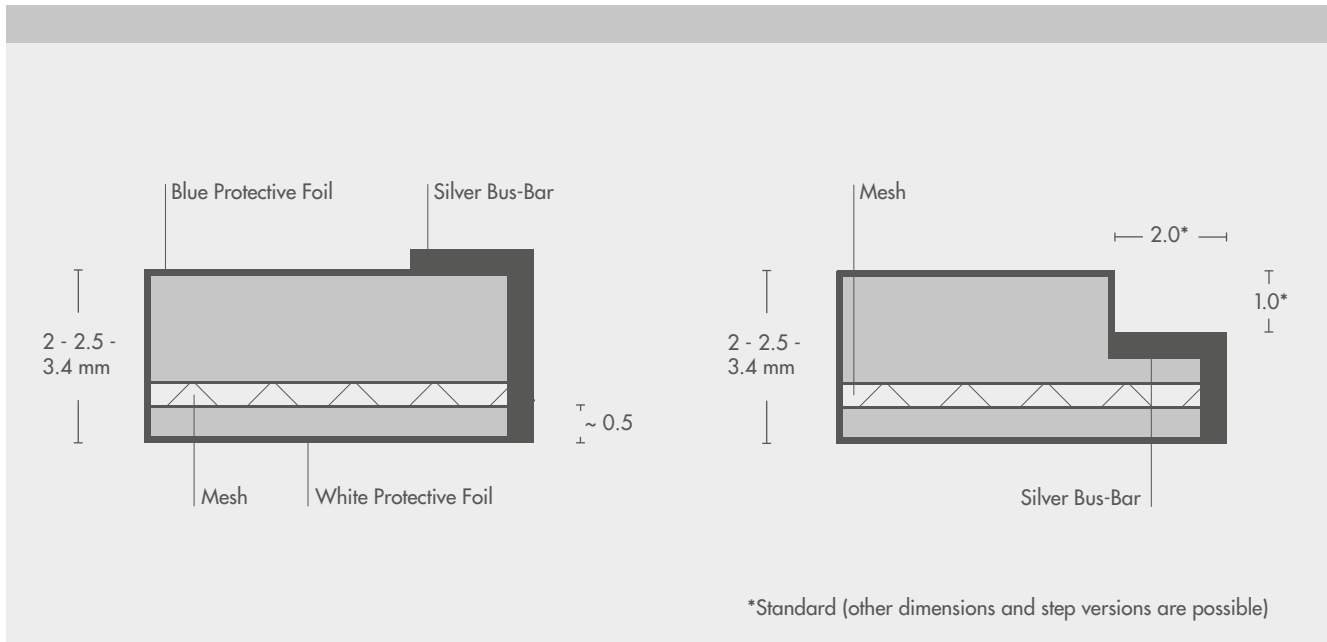
In addition to being used as an EMI shield, the shielded window can be used as a contrast filter. More than 55 different transparent colors are available, making it possible to choose a contrast filter adapted to the wave length (color) of the signal source (display).

This allows for the greatest possible light transmission while simultaneously excluding secondary light to achieve a clear and easily read signal.

COSTRUCTION

Butt edge with bus-bar

Step with bus-bar



ORDERING INFORMATION

SW **GL - 1** **45** **A - 001**

- SW** Product Family
- GL** Windows base Material: **GL** = Glass / **PC** = Polycarbonate / **AC** = Acrylic
- 1** Mesh Type: from 1 to 6
- 45** Oriented Mesh 45° or 90°
- A** Costruction Type: assigned by **Euro Technologies**
- 001** Dimension