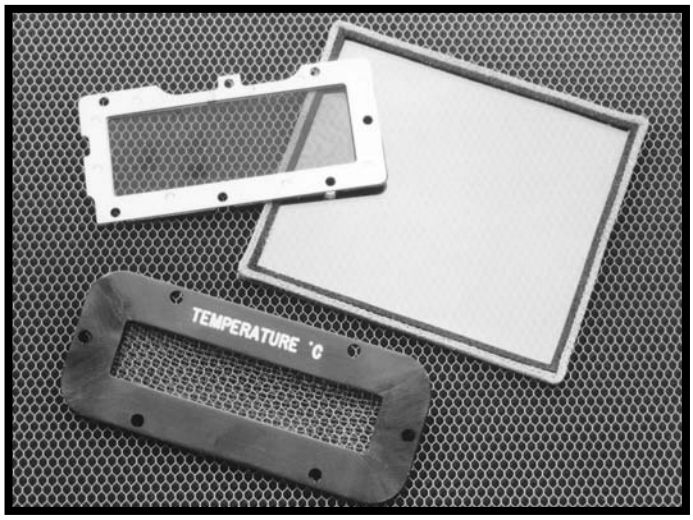
EMI/RFI Shielded Windows (3500 Series)

Product Summary

MAJR Products provides a range of defined polycarbonate laminates that can be machined, busbarred and gasketed to your requirements within a short lead-time without compromise of quality or performance.

Product Application



In addition to the rapid service polycarbonate range, shielded windows can be custom designed in glass, polycarbonate or acrylic with a variety of display enhancement features. Examples of this are:

EMI Shielded windows for rooms & chambers

Offered in large glass lamination, these windows are supplied with a mesh extension over a neoprene gasket. This allows the window to form a compression contact to the metal window frame or to be bonded directly to the shielding of the wall. A single window provides shielding of 80dB at 32.5 MHz, and a double-glazed arrangement with two windows provides in excess of 100dB.

Thermal Windows

Using a proven design for laminated transparent heated windows based on a high transmission, low reflectance ITO coating on a glass substrate, these laminates can also include other features such as EMI shielding, AR coatings and privacy filters.The recommended power supply is 24vdc and 1- 2 amps. The windows are usually laminated with the ITO heater surface to the inside to protect the coating and ensure even heat distribution.

Medical Test and Measurement Instruments

A range of high definition windows for test and measurement instruments can be made in glass or plastic with a variety of surface treatments including silk-screen printing. The shielding elements are optimized for EMI attenuation and optical performance.

Windows for aircraft cockpits

Multifunctional windows that deal with sunlight readability, viewing angles, EMI, impact resistance, environmental and mechanical conditions consistent with military and commercial aircraft applications are available in a variety of substrates and even complex shapes. Windows for space qualification and advanced avionic applications are also available. Experience in night vision requirements is also a part of our capabilities.

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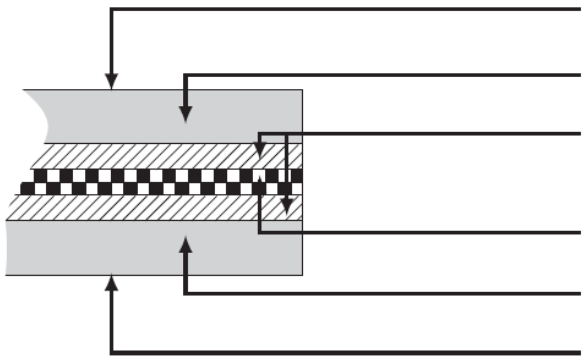
Touch screen laminates
Ruggedized touch screens with glass or polycarbonate that can incorporate circular polarizers for contrast enhancement, privacy filters for control of viewing angle, metal mesh or ITO coatings for EMI and transparent heaters for defogging and /or heating of the flat panel display. Typical design in both resistive and capacitive technology is available alongside new cutting edge breakthroughs.

Public information displays
Windows to enhance the performance of displays in the wide variety of ambient conditions encountered. Properties that can be included are impact resistance, sunlight readability and EMI shielding. Kiosks, electronic signs in a number of environmental circumstances, portable hand-held devices, cell phones and electronic gaming are all areas of growing demand for shielding windows.

Product Technical Data

Laminated Polycarbonate features



Hard coat front surface – Clear or Non Glare

Polycarbonate substrate

High temperature humidity resistant adhesive layers

High transmission, blackened copper mesh

Polycarbonate substrate

Clear hard-coated rear surface

Mesh properties.

The materials and manufacturing techniques have been optimized for optical and EMI performance and cost.

Hard coatings are applied via a gravure printing process in a class 1000 clean room environment. This process avoids coating irregularities and stressing of the polycarbonate associated with solvent-based spray coating.

laminates. Typical thermal range is -40 to +71 deg. C with up to 95% humidity.

100 OPI mesh is a pure copper mesh that has exceptional stability of the mesh structure. Light transmission of 75-80% and a highly conductive, <0.01 ohms/sq., blackened state gives excellent EMI attenuation.

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Non-Glare coating is a variation of the hard coating with a gloss level of 55 units at 60°.
The coating has total uniformity and avoids the localized changes in density associated with spray coating systems.

Adhesive Layers are comprised of a variety of proprietary bonding systems used to maximize thermal and moisture resistance of glass and plastic

Quality
Laminated panels, machined parts, terminations and all value added components to the windows are manufactured and processed in a quality ISO 9001:2000 environment. All windows are inspected in accordance with internally developed standards based on window type and application to meet or exceed customer specifications.

Technical Specifications*

Dimensions				
Laminate thickness	1.5	2.0	3.0	4.0mm
Thickness tolerance(+/-)	0.2	0.2	0.3	0.4mm
Minimum parts size	6.0	6.0	6.0	6.0mm
Maximum part size	400x300	480x650	700x1100	700x1100mm
Tolerance on size (+/-)				
Parts up to 200mm	0.2	0.2	0.2	0.2mm
Parts >200 up to 400 mm	0.3	0.3	0.4	0.5mm
Parts >400mm up to 650		0.5	0.5	0.5mm
Parts >650mm			1.0	1.0mm

Edge profile				
Square	Yes	Yes	Yes	Yes
Step	No	Yes	Yes	Yes

Machining detail	
Holes – minimum diameter	2.0mm
90° Countersink	Yes
Gasket grooves	Yes
minimum - (w x d)	3.0 x 0.3mm
Radius – minimum internal or external	1mm

Busbar – all thicknesses	
On edge only	Yes
Edge and 1 surface - L shape	Yes
Edge and 2 surfaces - C shape	Yes
Minimum width	2.0mm
Busbar conductivity	<0.2 ohms/100mm

Optical Specification	
Colour	Clear
Surface finish	Clear or Non-Glare hard coat
Light transmission	75-80%
Mesh angle	30, 45, 90° Tolerance +/-5°
Cosmetics	ISO 9001:2000 Visual inspection procedure

*All technical specifications are based on industry standards and common application dimensions and finishes. If your needs fall outside these parameters, please contact our sales department. We have done many specialized designs for our customers and would welcome the opportunity to work with you on your requirements.

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Size and Shape Parameters

The choice of size in the optical shielding ground plane is almost unlimited. Shapes as well are boundless including a multi-plane construction for shielding emitter-detector pair touch panels. Sizes of optical overlays range from less than 0.250 in diameter to very large structural panels.

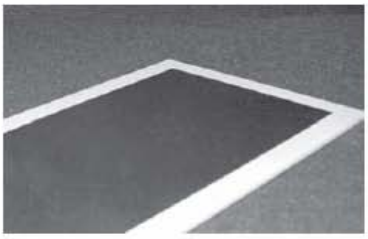
Large EMI/RFI windows of fully laminated acrylic panels with copper mesh are produced in sizes up to 5' by 12' . High performance electroplated wire mesh windows are available in standard sizes up to 3' by 8'. All panels can be sized to any shape required for the customer's application.

Machining and forming capabilities enable us to design a panel to the exact size and shape requested. CRT panels can be formed to any spherical or cylindrical radii up to a 60° diagonal. Capabilities include standard machining equipment as well as state of the art numerically controlled machining centers. This equipment enables us to offer any type of machining such as holes, slots, grooves, and notches that might be required. We also have the resources to machine all standard substrates to extremely tight tolerances, as low as +/-0.002". Standard computer numerically controlled X and Y dimensional tolerances include +/-0.005", +/-0.010" and +/-0.020" for sizes up to 5' by 12'. This can vary with substrate type and design so it is recommended that the customer contact a MAJR Sales or Engineering Representative.

Each application is considered to be unique by MAJR, so that the final product purchased is designed solely for the specific needs of our customer.

Silver Epoxy Busbar

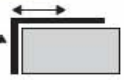
Silver epoxy busbar is applied to the perimeter of machined windows.



Typical Bus Bar Shapes

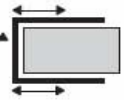
L–Shape

Outer edge and a single nominated side.



C–Shape

Outer edge and both front and rear sides.



Stepped Edge

Outer edges and step surface.

Typical Busbar Widths (mm)

- 2.0 / 3.0 / 4.0 / 5.0 / 6.4 / 10.0 / 12.7 / 15.0

Table 1 - EMI Shielding Performances

Mesh Composition Base Material/ (Plated Deposit)	Openings/ Inch	Wire Diameter (Inches)	H Field		E	Plane Wave		
			1 MHz	10 MHz	100 MHz	400 MHz	1 GHz	10 GHz
Copper	70	0.003	110	111	98	68	64	38
Copper	100	0.002	107	111	85	70	58	—
Copper (Silver)	100	0.002	107	111	84	76	66	—
Copper (Silver)	145	0.002	128	112	106	84	82	64
Stainless Steel	50	0.002	94	90	82	58	55	28
Stainless Steel	80	0.002	106	88	82	64	60	34
Stainless Steel	100	0.002	166	105	88	76	62	—
Stainless Steel (Silver)	100	0.0012	128	112	92	80	86	74
Stainless Steel (Silver)	165	0.002	137	124	106	100	81	61
Stainless Steel (Silver)	200	0.0012	128	108	98	88	86	68
Stainless Steel (Silver)	230	0.0012	140	120	95	94	80	60

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