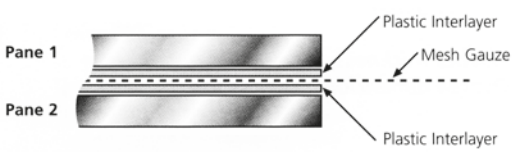
WINSHIELD | Shielded Windows
W Shielding

Fully laminated (WF Shielding) screened windows combine the physical strength and optical clarity of laminated glass or plastic with the shielding effectiveness of fine wire mesh. They complement the more cost-effective edge-laminated type (WG Shielding), which are designed primarily for racks and large enclosures. Cast plastic style (WC Shielding), featuring mesh moulded into clear plastic, complete the W Range.

Copper wire meshes, which form a highly conductive shielding medium, are available with a conductive anti-reflective 'blackened' finish which is non-oxidising and which protects the mesh, particularly where copper is used for its high degree of shielding effectiveness. In some instances we can supply the mesh material in its unlaminated form so customers can fabricate their own bespoke windows (WM Shieldng). However, we do not recommend this to customers inexperienced in handling the fine mesh, which is easily contaminated or damaged.

Windows with mesh typically have in excess of a 60% open area so provide good light transmission. Attenuation is a function of conductivity, aperture sizes and permeability in relation to field strength and frequency. Conventional mesh materials or surface coatings in windows do not generally provide high attenuation at low frequency in the magnetic field and additional measures should be taken to supplement the screened window performance in such applications. Electric field and plane wave attenuation is, however, normally excellent and this is the area of activity for most non-military window applications. Please contact us for technical advice.



BASIC CONSTRUCTION: FULL LAMINATION - With Plastic Interlayers

Applications:

Our EMI screened windows use glass and polycarbonate as their base substrate, and can be treated to improve both anti-reflective and scratch-resistant properties. Glass panels can be etched to provide an anti-reflective surface. Tinted 'interlayers' can be built into fully laminated windows to improve their anti-reflective properties particularly where, for example, non-treated stainless steel mesh is used.

When specifying the design for a particular application, temperature cycling, contamination and possible accidental damage should be taken into account. Glass windows are the most abrasion resistant but not the best for impact resistance. They are also better for anti-contamination than plastic. Fully laminated windows have good properties but are less cost effective than edge-laminated types, which provide an excellent solution for most applications.

Screened windows are generally mounted within a frame or clamp system or are bonded onto a fascia or door panel using conductive adhesive or caulking. Stepped windows (fully laminated only) may have a front pane protruding through a fascia, with the rear pane bonded inside the enclosure. The way in which the screen material inside the window is terminated depends on the type of window – see the individual series sections for further details. Gaskets are another important feature that is taken into consideration as shielded windows are often used where environmental protection is essential.

Bezel mounts can be made to suit most windows. The mounts are fabricated from aluminium, steel or other suitable metals and can be hinged or fitted with quick-action fasteners if required.

Fully Laminated Windows | WF Shielding:

Fully laminated windows in glass or plastic can be produced either as individual windows or, for smaller size, in sheet form and machined into segments. All fully laminated windows are available with or without a step and with or without a silver painted busbar. Surface treatments for scratch resistance or anti-reflectance are available and tinted inter-layers for anti-reflectance or contrast enhancement can be supplied on request.

Standard terminations for individually produced windows are flying mesh, foil or silver painted busbar or conductive gasket. Sheet-cut windows, including stepped types, are only available with silver busbar and optional gaskets. Care should be taken with stepped windows, particularly glass ones, as the pressure exerted by the gasket under compression can easily overstress even a fully laminated window. We suggested that stepped windows should be plastic or a composite where the glass pane is not under pressure when mounted.

Most gaskets in our range can be used with shielded windows and the actual type selected will depend on the degree of shielding and environmental protection required. Please contact us for technical advice.

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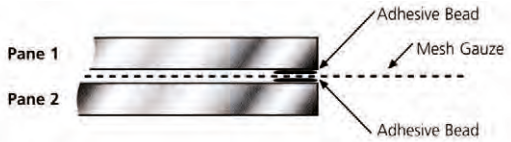
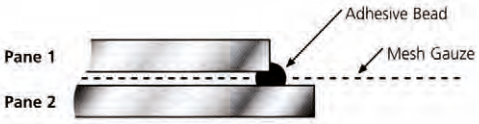
Edge Bonded Windows | WG Shielding:

Edge bonded windows use the same substrates and mesh as the fully laminated windows but are laminated around their edges, outside the 'viewing area', only and are lower cost. They are not as suitable for stepped construction but if the windows are relatively small or when the viewing area remains smaller than the smallest of the two pieces (i.e. bezel mounted where the edge remains covered albeit stepped) it is not a major problem. Standard edge bonded windows are a cost-effective solution for most commercial applications.



BASIC CONSTRUCTION: EDGE BONDED - Square Edge



BASIC CONSTRUCTION: EDGE BONDED - Stepped Edge

BASIC CONSTRUCTION: CAST WINDOWS - Integral Mesh

Cast Plastic Windows | WC Shielding:

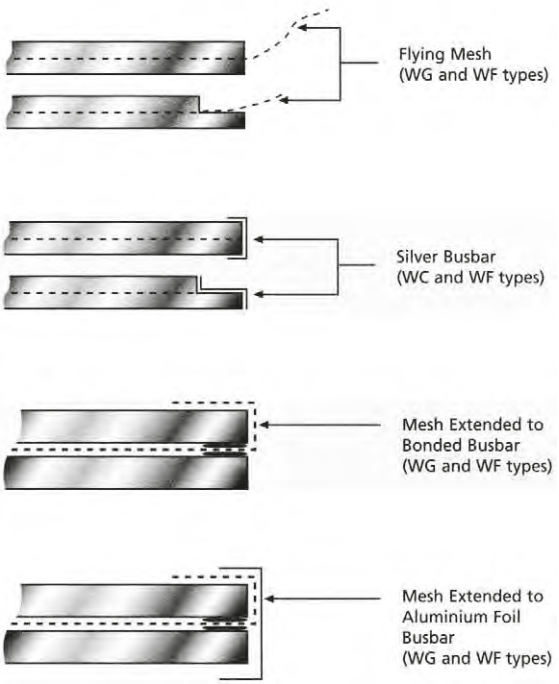
Cast windows are formed by encapsulating the mesh within a thermosetting plastic or resin substrate. The process has advantages inherent to the manufacturing technique, such as surface finishes, tints, minimum thickness and physical strength. The process necessitates a silver busbar termination although a stepped construction is possible during the machining of the cast blank. Cast windows cost more than edge laminated ones but are more robust for specialist applications.

Gasket Options:

1. Flying mesh windows generally bond both the window and the flying mesh to a convenient point on the equipment. However, the window and/or the mesh can be fitted with most gasket types. The mesh can be wrapped around a sponge material and clipped into position.
2. Silver busbar windows can be supplied with gaskets made from oriented wires in silicone, knitted mesh or conductively loaded silicone.
3. Extended mesh options (with or without foil busbar) are readily fitted with various forms of gaskets such as knitted mesh, conductive fabric or oriented wires in silicone.

   Please contact us to discuss your gasket or frame requirements.

TERMINATION METHODS



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WINSHIELD | Shielded Windows
W Shielding

Specifications and material types available

Glazing media:

Glass, including clear, diffused and toughened.

Polycarbonate, including clear, hard-faced, anti-reflective, tinted, polarised and filtered.

Polycarbonate can also be conductively coated with ITO (Indium Tin Oxide) but this is a restricted option as a minor scratch on ITO can dramatically reduce its shielding effectiveness.

Mesh Media:

Woven copper (which can be anti-reflective treated) or stainless steel mesh. Typically 100 OPI.

Other wire types including knitted meshes, finishes and OPI configurations are available to order - minimum quantities apply, please contact us for more information.

Tolerances:

Glass thickness	± 0.5 mm
Overall dimensions	± 1.0 mm to 300mm, ± 1.5 mm to 600 mm
Plastics thickness	± 0.5 mm per piece
Overall dimensions	± 0.5 mm to 300 mm, ± 1.0 mm to 600 mm

Performance:

Shielding effectiveness in dB, typical values tested in accordance with MIL-STD-285 with test samples of woven copper mesh 300 x 300 mm

It is important to note that a smaller test sample would return a far higher attenuation and all manufacturers data should be compared on this basis to avoid misinterpretation.

FREQUENCY	FIELD	100 OPI	50 OPI
10 KHz	H	20	15
100 KHz	H	40	35
1 MHz	H	50	45
1 MHz	E	>100	>100
10 MHz	E	>100	>100
100 MHz	E	80	75
1 GHz	P	60	55
10 GHz	P	30	20

How to order:

Generally by description and customers drawings indicating dimensions, finishes, fixings, gasket type and method plus the generic window group e.g. WC Shielding.
Please contact us to discuss your individual requirements.

Window Meshes | WM Shielding:

We also supply Woven Copper and Stainless Steel meshes for customers to make their own screens. Untreated (non-blackened) mesh material is available pre-cut although it is advisable to order this by the linear metre to avoid handling and fraying problems. Blackened copper mesh can be pre-cut and packed in bulk or single sheets for ease of handling.

Material types available:

Copper and Stainless Steel.

Material width:

Normally 1200 mm which we will confirm at time of order.

Openings per inch (OPI):

Standard = 100
Special = 50, 70 and 145 (minimum quantities apply)

Wire diameters:

.002" and .001" (.051 and .025 mm)

How to order:

Generally by description, stating wire type, finish, size and tolerances if cut pieces.

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