



OptiShield Range:

EMI Seals Shielded Optical Windows Range

EMI Seals and Gaskets Ltd OptiShield Range offers a wide range of custom made shielded optical windows for displays requiring EMI or RFI shielding to meet commercial or military requirements. Our Shielding Windows have been designed to provide highly effective electromagnetic shielding whilst still providing exceptional optical clarity at very competitive costs.

Windows can be produced in glass, plastic or a combination of both and can also be manufactured with scratch resistant and anti-glare coatings or one or more layers of substrate depending on the required specifications. As optical windows vary in shielding effectiveness depending on their size, substrate, laminate and gasketing EMI Seals and Gaskets has developed a range of windows that can vary these aspects easily to take account of the specific requirements of each application.

Typical Applications we supply windows for include: Military Equipment, Electronic Enclosures, Commercial electronic devices, Medical Electronic Devices, Transportation Equipment, Light Emitting Diodes (LEDs), Liquid Crystal Displays (LCDs).

Main Optical Substrate Materials

Glass has a very durable surface and can withstand high temperatures making it a very suitable substrate for applications of coatings such as ITO (indium tin oxide) for EMI shielding and/or anti reflection coatings that will reduce first surface reflections to less than 0.5%.

Acrylic is the most versatile substrate, available in a range of colours to match display outputs to improve contrast enhancement including clear, which exhibits 92% light transmission, through to infra-red transmitting opaque materials. Acrylic can be easily machined and formed making it suitable for front panels needing cut outs, holes and steps etc. Multiple layers can be fully laminated with fine wire meshes together with different colour combinations. Acrylic has a UL94HB flammability rating and hard anti scratch, chemical resistant coatings can be applied to the surface as an optical flat or as anti-glare.

Polycarbonate has very high impact resistance, more than 16 times that of Acrylic and 200 times more than glass making it the most suitable for rugged applications. Whilst its light transmission is not as good as other substrates at 85%, it has the advantage of having UL94VO flammability rating over 2.4mm thickness. Hard anti scratch, chemical resistant coatings can be applied to the surface as an optical flat or as anti-glare. Fine wire meshes can be fully laminated between two layers.

Main Shielding Materials

Shielding is achieved using various types of metal wire mesh, typically using wire diameters ranging from .025mm to 0.5mm and with weave densities varying from 50 OPI (Opening per inch) to 200 OPI. The wire is usually made from Stainless Steel or Copper which can be treated to produce a matt black non-reflective finish. Alternatively, a standard metallic finish can be incorporated in band pass filters where the colour reduces the need for blackened mesh. The mesh can be set at any angle up to 45° in more demanding applications to restrict the possibility of moiré fringes where this is important.

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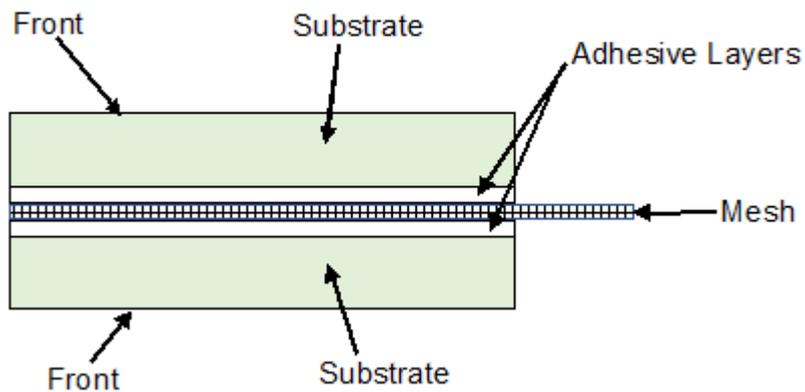
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The Basic design of the window still relies on maintaining a Faraday cage so irrespective of whether you are using a conductive coating, or a metal mesh layer incorporated into the window, both options must be grounded to the frame of the device to give an effective shield.

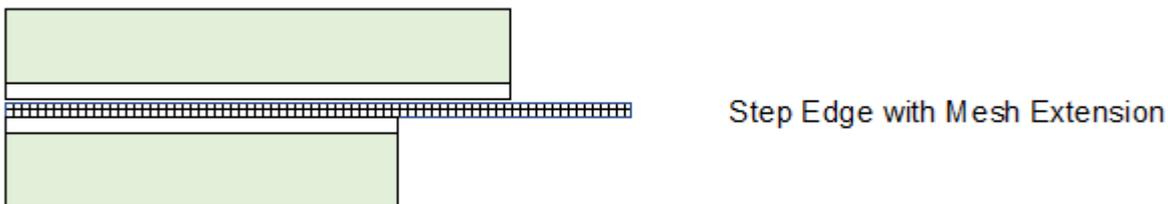
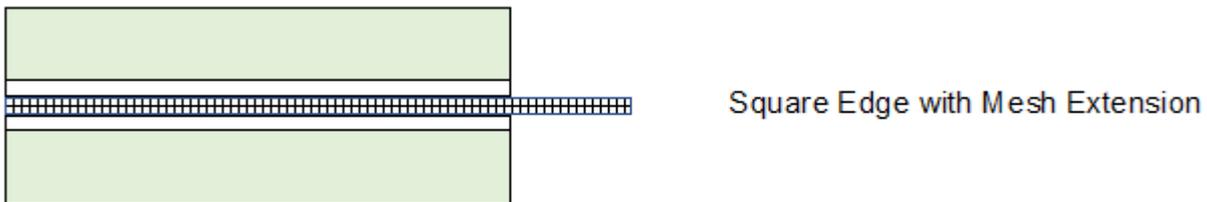
Typical Shielded Window Construction

Basic Shielded Window Construction Design



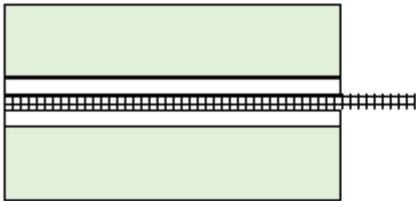
Typical Shielded Window Terminations

There are several forms of termination used for grounding the shielded windows. The following some of the methods that are cost effective and have proven to provide an efficient termination.

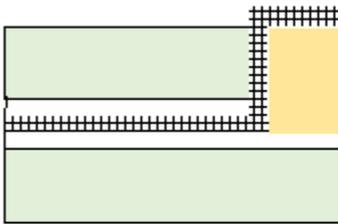


Mesh extensions can be specified for glass and plastic EMI Shielding windows. If properly installed into the aperture they yield a higher rf attenuation than a busbar / gasket combination. This edge form is also recommended for large format windows and low frequency applications.

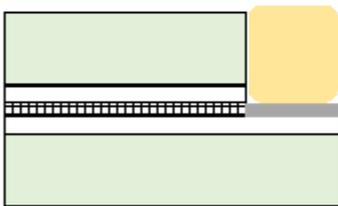
Termination options for Mesh Extension Windows



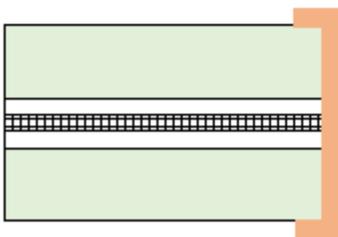
The most effective termination is to clamp the mesh extension to the enclosure. This can be done for windows with either a step or a square edge. This termination is not possible with the new generation of ultra-fine meshes.



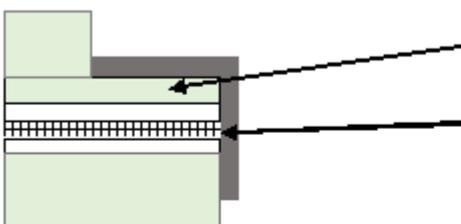
An effective compression gasket can be formed by taking the mesh over a compression gasket material such as neoprene.



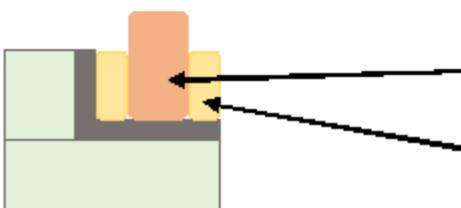
A mesh extension can be combined with a silver busbar and a conductive compression gasket. Unless there is a special gasket requirement, this termination is not recommended on the basis of cost. It is effective if a combination gasket is required to give both an environmental and RFI/EMI seal.



For large windows such as rack enclosure doors, a cost-effective option is to cut the mesh extension close to the edge of the window and finish it with a conductive tape carried over to both faces of the window. This is preferable to a simple mesh extension, which from our experience, is often torn when handling large windows.



The laminate build and the step profile must be co-ordinated to ensure that the step finishes in a substrate. The busbar must include the face that sections the mesh. Depending on the termination required it could be extended over one or both surfaces of the window.



If a gasket is used, the step depth should be designed to allow for the correct compression of the gasket on compression and the conductive surface of the gasket should maximize contact area with the busbar.

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