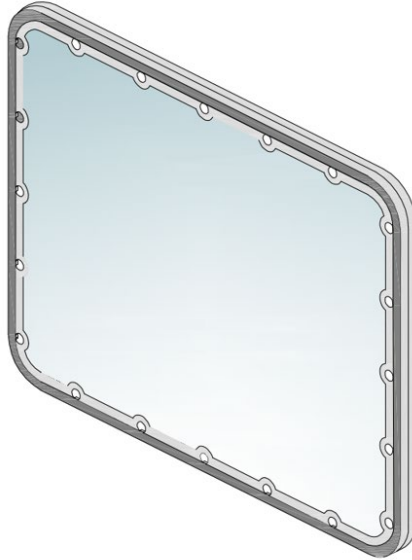


TECHNICAL SPECIFICATION Shielding Windows



Glassed areas make up a serious negative point for the guarantee of a shielding value of a room or of any electrical apparatus. So as to be able to close and define the concept of the Faraday Cage with a good compromise between visibility and the shielding value required, shielding windows, which may be of different thicknesses, are made, with standard, tempered glass, in transparent or coloured thermo-plastic material. Enclosed inside of this material there is, a mesh with an opening grade desired from 80 to 130 mesh, which may be In metallic wire, polyester or polyamide treated with copper or nickel, so as to obtain shielding efficiency.

Applications

from small screens for electronic apparatus and large windows in buildings, mobile vehicles with plane or curved geometries.

Provision

Shielded glass is provided in the dimensions requested by the Client.

Accessories on request

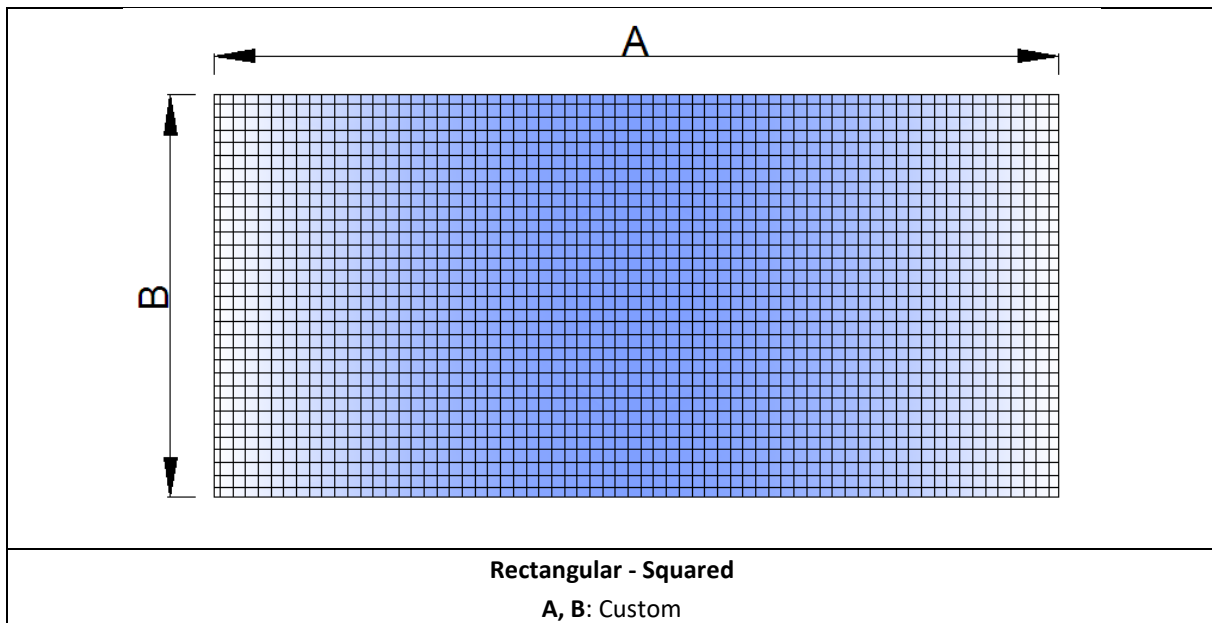
- Conductive gasket (recommended)
- Metal frame on customer drawing
- Non glare hard/scratch resistant coating
- Serigraphy
- Holes and special shapes
- Shatterproof
- Insulating
- Bulletproof

1. Material

Shielding windows can be realized in different material on request.

- Polycarbonate: **Lexan** or equivalent (optional non-glare, hard/scratch resistant coating on front surface)
- Plexiglass: **Plexiglass XT** or equivalent
- Glass.

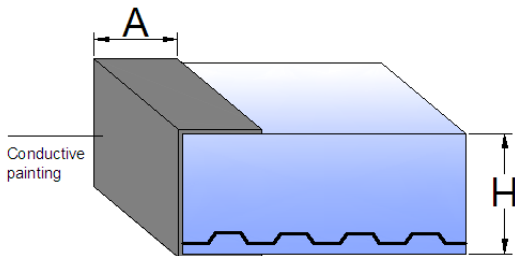
2. Shape



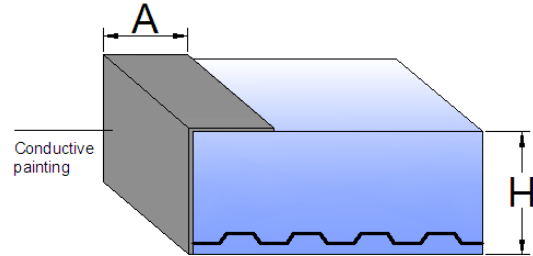
Tolerances of the product are defined according to "IO_PRD1_02 Parameters and Tolerances" Ed. 3 del 05-04-12.

3. Configuration for polycarbonate/plexiglass - Conductive busbar

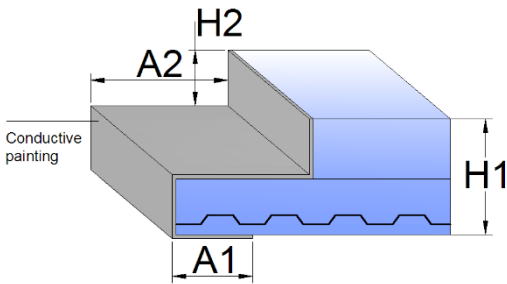
Shielding window will be treated with electrically conductive coating (mandatory for contacting).



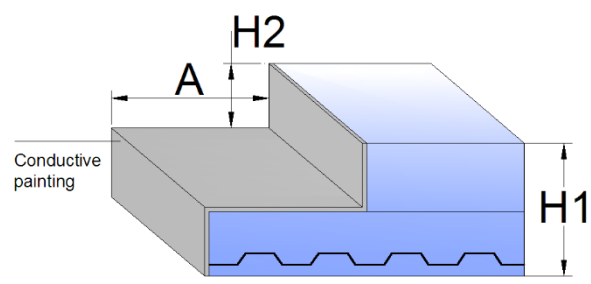
A, H: Custom



A, H: Custom



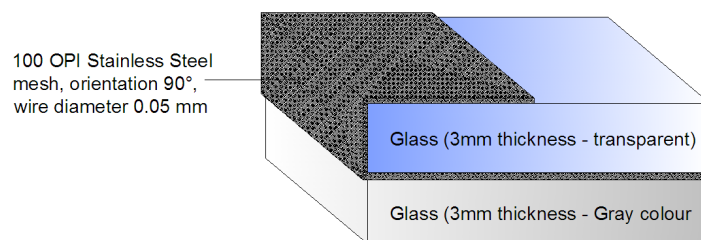
A1,A2,H1,H2: Custom



A,H1,H2: Custom

4. Configuration for EMI shielding glass windows

- EMI shielding - Safety glass
- thickness: minimum 6.5 mm
- Wire mesh : Stainless Steel wire 100 OPI, natural colour
- One glass in gray colour to eliminate light reflections of SS mesh.



For higher EMI shielding effectiveness double layer of SS mesh 100 OPI is recommended, thickness of window will be 10 mm (see EMI shielding effectiveness at Par. 5).

5. Mesh Type

The mesh type affect the shielding performance of the window.

For each type of mesh the orientation can be 90°, 45°, 30° or Custom. This parameter must be defined by the costumer, compliant with the device, to optimize visibility.

Mesh	130-138 OPI	130-138 OPI double layer	100 OPI	100 OPI double layer	80 OPI
Notes	Recommended for Polycarbonate and Plexiglass laminates	Recommended for Polycarbonate and Plexiglass laminates	Recommended for glass laminates	Recommended for glass laminates	Recommended for Polycarbonate and Plexiglass laminates
Material	POLYESTER – Cu Ni	POLYESTER – Cu Ni	Stainless Steel	Stainless Steel	POLYESTER - Cu Ni
FREQUENCY (MHz)	SHIELDING EFFECTIVENESS (dB) -MAGNETIC FIELD				
0.1	0		0	10	
1.0	18		18	30	
10	46		38	60	
30	40		45		
FREQUENCY (MHz)	SHIELDING EFFECTIVENESS (dB) - ELECTRIC FIELD				
0.1	65		65	100	70
1.0	52	70	52	100	68
10	47	70	45	90	65
100	46	73	50	70	58
200	45	70			56
300	47	72			55
400	47	61		80	53
500	47	62	38		52
1000	52	61	32		53
FREQUENCY (GHz)	SHIELDING EFFECTIVENESS (dB) -ELECTRIC FIELD AND PLANE WAVE				
1	48			75	
2	52				
3	36				
4	57				
5	35				
6	40			70	
7	42				
8	37				
9	34				
10	39			50	
13	40				
15	32				
17	39				
18	31			50	

6-. EXAMINATION METHOD

The window must be examined from the inside out, in transparency and not in reflection, illuminated by diffused light. The examination can be carried out before or after installation, but the inspection applies only to the visible part after assembly by observing the background and not the surface.

The examination of the windows should be carried out after thorough cleaning with water and neutral non-abrasive products and should not bear marks or highlights on the surface of the glass.

SHIELDING WINDOWS: CLASS B

Windows should be seen from no less than 1 m from the inside out and with a viewing angle as perpendicular as possible.

Windows should be examined no more than 1 minute per m² of surface;

Windows should be examined with diffused daylight (overcast sky) and not with direct or artificial light.

SHIELDING DISPLAY: CLASS A

Windows should be seen from no less than 0.5 m from the inside out and with a viewing angle as perpendicular as possible.

Windows should be examined no more than 1 minute for dimensions up to 1000 cm² of surface; and 2 minutes for dimensions in addition to 1000 cm² of surface;

Windows should be examined with diffused daylight (overcast sky) and not with direct or artificial light.

Quality standards

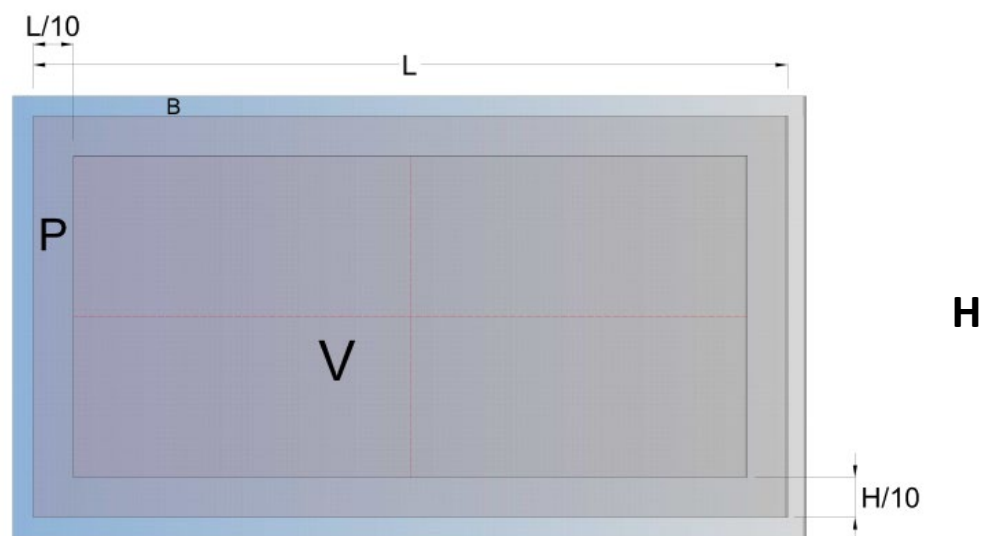
B: Conductive Busbar

P: Perimeter edge (L / 10) e (H / 10)

V: Main zone of vision

L: Glass net width

H: Glass net height



ALLOWED DEFECTS – SHIELDING WINDOWS: B CLASS

ZONE	Surface	Bubbles	Punctual residuals	White / gray Spots	Superficial Scratches
B	All	No limits	No limits	No limits	No limits
P	<= 1 mq	Max 4 units < 2 mm per side	Max 4 units < 2 mm per side	Max 1 units <= 3 mmq	Sum of the lengths of the individual scratches: max 60 mm Maximum scratch length: 30 mm
	>1 e <=2,5 mq	Max 5 units < 2 mm	Max 5 units < 2 mm	Max 2 units <= 3 mmq	Sum of the lengths of the individual scratches: max 90 mm Maximum scratch length: 30 mm
	>2,5 e <=4 mq	Max 6 units < 3 mm	Max 6 units < 3 mm	Max 3 units <= 3 mmq	Sum of the lengths of the individual scratches max 120 mm Maximum scratch length: 30 mm
	>4 mq	Max 1 unit per linear meter of perimeter	Max 1 unit per linear meter of perimeter	Max 4 units <= 3 mmq	Sum of the lengths of the individual scratches: max 160 mm Maximum scratch length: 30 mm
V	<= 1 mq	Max 2 units < 2 mm per side	Max 2 units < 2 mm per side	Max 2 units <= 2 mmq	Sum of the lengths of the individual scratches: max 30 mm Maximum scratch length: 15 mm
	>1 e >=2,5 mq	Max 3 units < 2 mm	Max 3 units < 2 mm	Max 3 units <= 2 mmq	Sum of the lengths of the individual scratches max 45 mm Maximum scratch length: 15 mm
	>2,5 e >=4 mq	Max 4 units < 2 mm	Max 4 units < 2 mm	Max 4 units <= 2 mmq	Sum of the lengths of the individual scratches max 60 mm Maximum scratch length: 15 mm
	>4 mq	As before plus 1 unit more per each additional square meter	As before plus 1 unit more per each additional square meter	Max 5 units <= 2 mmq	Sum of the lengths of the individual scratches max 20 mm Maximum scratch length: 15 mm

ALLOWED DEFECTS – SHIELDING DISPLAYS: A CLASS

ZONA	ZONE	Surface	Bubbles	Punctual residuals	White / gray Spots
B	All	No limits	No limits	No limits	No limits
P	<= 9 cmq	Max 1 unit < 2 mm per side	Max 1 unit < 2 mm per side	Max 1 unit <= 1 mmq	Sum of the lengths of the individual scratches: max 5 mm Maximum scratch length: 1 mm
	>9 e <=200 cmq	Max 3 units < 2 mm	Max 3 units < 2 mm	Max 2 units <= 2 mmq	Sum of the lengths of the individual scratches: max 10 mm Maximum scratch length 5 mm
	>200 e <=1000 cmq	Max 4 unit < 2 mm	Max 4 unit < 2 mm	Max 4 units <= 2 mmq	Sum of the lengths of the individual scratches: max 20 mm Maximum scratch length 5 mm
	>1000 cmq	Max 1 unit per each 40 cm of perimeter	Max 1 unit per each 40 cm of perimeter	Max 4 units <= 2 mmq	Sum of the lengths of the individual scratches: max 30 mm Maximum scratch length: 15 mm
V	<= 9 cmq	None	None	None	None
	>9 e <=200 cmq	Max 1 unit < 0.5 mm	Max 1 unit < 0.5 mm	Max 1 unit <= 1 mmq	None
	>200 e <=1000 cmq	Max 1 unit < 1 mm	Max 3 units < 1 mm	Max 2 units <= 2 mmq	Sum of the lengths of the individual scratches: max 10 mm Maximum scratch length: 5 mm
	>1000 cmq	Max 1 unit per each 50 cm of perimeter	Max 1 unit per each 50 cm of perimeter	Max 4 units <= 2 mmq	Sum of the lengths of the individual scratches: max 10 mm Maximum scratch length 5 mm