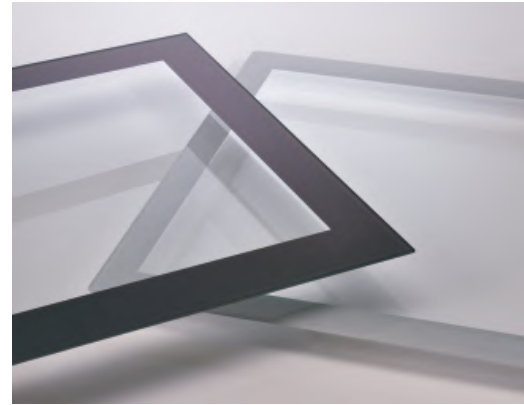


EMI Shielded Polycarbonate and Acrylic Windows WIN-SHIELD™ P Windows



Customer Value Proposition:

WIN-SHIELD P custom designed windows provide EMI shielding while maximizing your display's performance by using specially engineered optical materials enabling viewing under the most challenging conditions.

In addition to shielding, WIN-SHIELD P protects your displays from scratching, breakage, liquids and exposure to harsh environments.

Various advanced lamination processes are utilized, combining shielding materials with application driven specialty films to provide hard coated surfaces, antiglare, antireflective surfaces and other product enhancements such as light control privacy film. Our unique lamination processes support embedded screen printed graphics and protects them from scratching and wear.

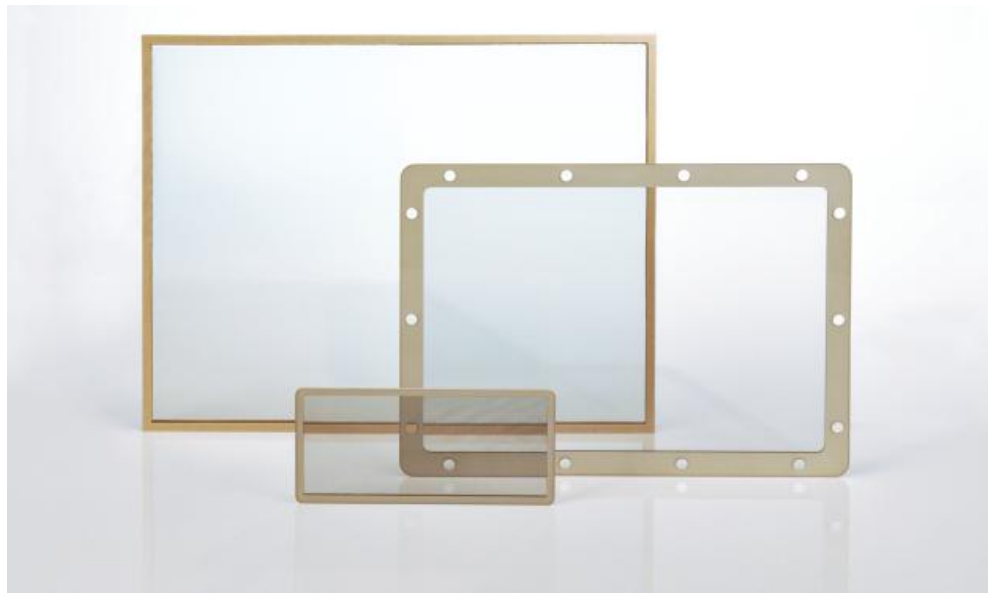
WIN-SHIELD P windows utilize various shielding materials, depending on the application. Highly transparent conductive films as well as specially designed fine wire meshes, either stainless steel or copper, are available.

Our WIN-SHIELD P products are terminated with a high performance silver buss bar. Buss bar material is our high performance CHO BOND® 577 silver epoxy. Additionally CHO-FOIL® Metal Adhesive Tapes can also be utilized for the buss bar termination.

Parker Chomerics shielded windows can be provided with a wide variety of conductive gaskets for assembly into bezels and frames. Non-conductive gaskets and sealants can also be applied to windows to provide superior environmental protection. Windows can be kitted or integrated with frames into turnkey assemblies. Parker Chomerics supply chain management services are available for these enclosures reducing customers supply chain complexity.

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Product Features:

- Custom thickness 0.007" to 0.500" (0.177mm to 12.7mm)
- Custom sizes up to 48" x 96" (121.92cm x 243.84cm)
- Window materials: Polycarbonate or Acrylic
- Embedded screen printed graphics
- Can be designed to meet various flammability requirements (UL-94-, V0, V1, V2, HB)
- EMI shielding plated stainless steel mesh
- EMI shielding conductive film
- Excellent scratch and abrasion resistance
- Sunlight readability
- Anti-glare coating
- Anti-reflective coating
- Scratch resistant hardcoating
- Light control film
- EMI shielding copper mesh

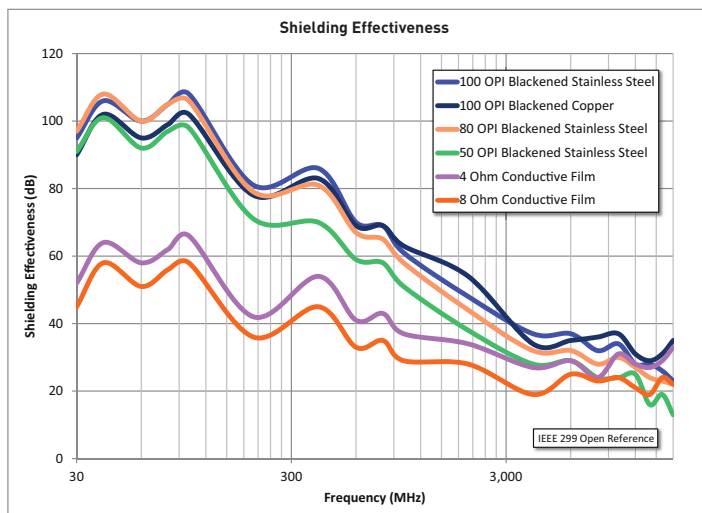
Typical Applications:

- Military electronics
- Tempest environments
- Devices used in critical patient care environments
- Hand-held mobile communications
- Shielded cabinets and racks
- Rugged LCDs
- Instrument Panels
- Digital Signage

Product Information

Material Properties:

Polycarbonate or Acrylic EMI Shielding Properties



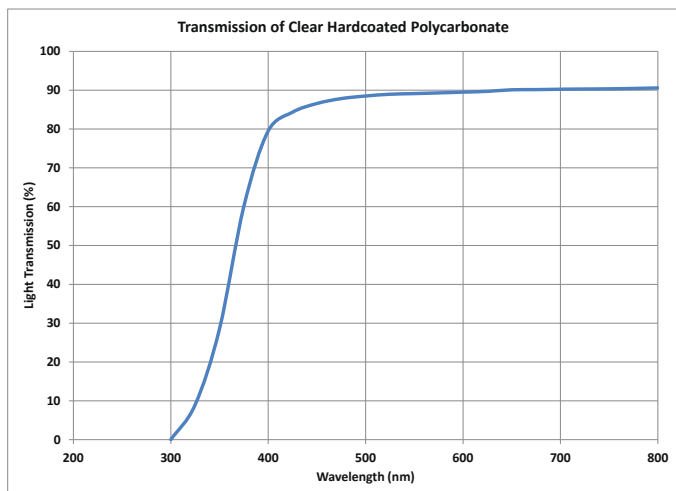
Optical Properties:

Hardcoating

Hardcoating protects polycarbonate and acrylic based materials from scratching, abrasion and solvent attack. Parker Chomerics hardcoatings are designed to increase the life and durability of the window. Taber abrasion measurements shown in Table 2 show excellent resistance to abrasion. Furthermore, the windows perform well against various solvent attacks as seen in Table 3.

Clear Hardcoating

Clear hardcoating is an ideal choice when a clear scratch resistant window is desired. It is a cost effective means of preserving the resolution of a display. Clear hardcoat is typical on the inside of a window facing the LCD. It can also be used as a front surface in low ambient light applications where reflections are not an issue.



Anti-glare Hardcoating

Anti-glare (AG) hardcoatings are utilized when reducing glare is desired. It features a textured surface that blurs hard reflections and improves viewability. AG hardcoatings improve the scratch resistance and are resistant to fingerprinting, smudges and smears. It has high solvent resistance and can be easily cleaned by isopropyl alcohol.

Table 1- Anti-glare Coating (Polycarbonate Laminate)

Surface	Gloss Reading ¹	Light Transmission ²	Haze Reading ²
Clear Hardcoat	87-93	90-93%	0.3-0.7%
Anti-glare	55-63	88-93%	9-14%

¹ Based on black background

² Testing per ASTM D1003-61

Table 2 - Taber Abrasion: ASTM D1 044-85 (% haze change) (Polycarbonate Laminate)

Cycles	Clear Hardcoat	Anti-Glare Hardcoat
25	1.60%	0.60%
50	2.50%	3.2%
100	5.80%	8.70%
200	13.00%	18.00%

Anti-reflective Coatings

Anti-reflective coatings (AR) are used in high performance applications where high light transmission and low reflection is desired. AR coatings are used to increase the contrast of a display by reducing ambient light reflections. Transmission of the overall window will increase 3-4% per surface when AR coating is used.

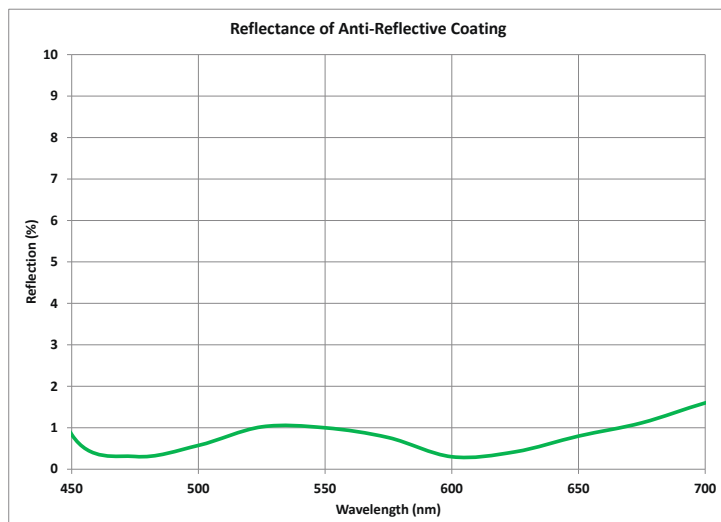
Coating Design:

Optimized for visible light (400-700 nm)

Average Reflection < 0.7%

Surface Properties:

Anti-reflective surface has a hydrophobic/oleophobic coating that reduces fingerprinting, oils marks and cleans easily.



Physical Properties:

Table 3 - Chemical Resistance: 24-Hour Watch Glass (Polycarbonate Laminate) Soak*

Chemical	Clear Hardcoated	Anti-Glare Hardcoated
Acetic Acid	Excellent	Excellent
Acetone, Acetic Acid	Excellent	Good
Dimethylformamide, Acetone	Excellent	Good
Ethyl Acetate, Dimethylformamide	Excellent	Excellent
10% Hydrochloric Acid, Ethyl Acetate	Excellent	Excellent
Isopropyl Alcohol, 10% Hydrochloric Acid	Excellent	Excellent
MEK, Isopropyl Alcohol	Excellent	Good
Pine Oil, MEK	Excellent	Excellent
Ammonia, Pine Oil	Excellent	Excellent
Toluol, Ammonia	Excellent	Excellent
Water, Toluol	Excellent	Excellent
Windex® Water	Excellent	Excellent
Unleaded Gas, Windex®	Excellent	Excellent
Oil 30w, Unleaded Gas	Excellent	Excellent
Brine 33% Salt, Oil 30w	Excellent	Excellent
THF, Brine 33% Salt	Excellent	Good
MeCl ₂ , THF	Good	Good
10% NaOH, MeCl ₂	Good	Good
10% NaOH	Good	Good

*24-Hour Watch Glass Soak Test Rating

- Excellent = 24 hour exposure OK
- Good = Minor cosmetic defects such as craze, haze, and gloss change between one and 24 hours
- Fair = Major chemical attack such as wrinkle, blister, and destroy between five minutes and one hour

24-Hour Watch Glass Soak Test is one of the industry's most stringent tests for chemical resistance.

Thermal:

Typical Operating Temperature Range: -40 to +70°C (-40 to +160°F)

Storage:

25°C (80°F), 50% relative humidity with no masking present

Product Information:

Design Guide (Please choose from the following options):

1. Front Surface Options:
 - Anti-glare
 - Anti-reflective
 - Anti-glare/Anti-reflective
 - Clear Hardcoat
2. EMI Shielding Options:
 - 100 OPI Blackened Stainless Steel
 - 100 OPI Blackened Copper
 - 80 OPI Blackened Stainless Steel
 - 50 OPI Blackened Stainless Steel
 - 4 Ohm Conductive Film
 - 8 Ohm Conductive Film
3. Embedded Options:
 - Screen Printed Graphics (Borders, Logos)
 - Privacy Filters (Directional Viewing)
 - IR Blocking (Hot Mirror)
 - Night Vision
 - Polarizers (Circular, Linear)
 - None
4. Rear Surface Options:
 - Clear Hardcoat
 - Antireflective
 - Antiglare
5. Silver Epoxy Buss Bar (CHO BOND® 577) Options:
 - U Buss
 - U Buss w/step
 - L Buss
 - Z Buss
6. Conductive Gasket Options (other types available on request):
 - SOFT-SHIELD® Fabric Over Foam (FOF)
 - CHO-SEAL® Conductive Elastomers
 - CHO-FOIL® Copper Tape

Standard Tolerance:

- ± 0.010" Machined
- ± 0.015" Die cut
- ± 10% Thickness
- ± 0.020" Bus Bars/Graphics

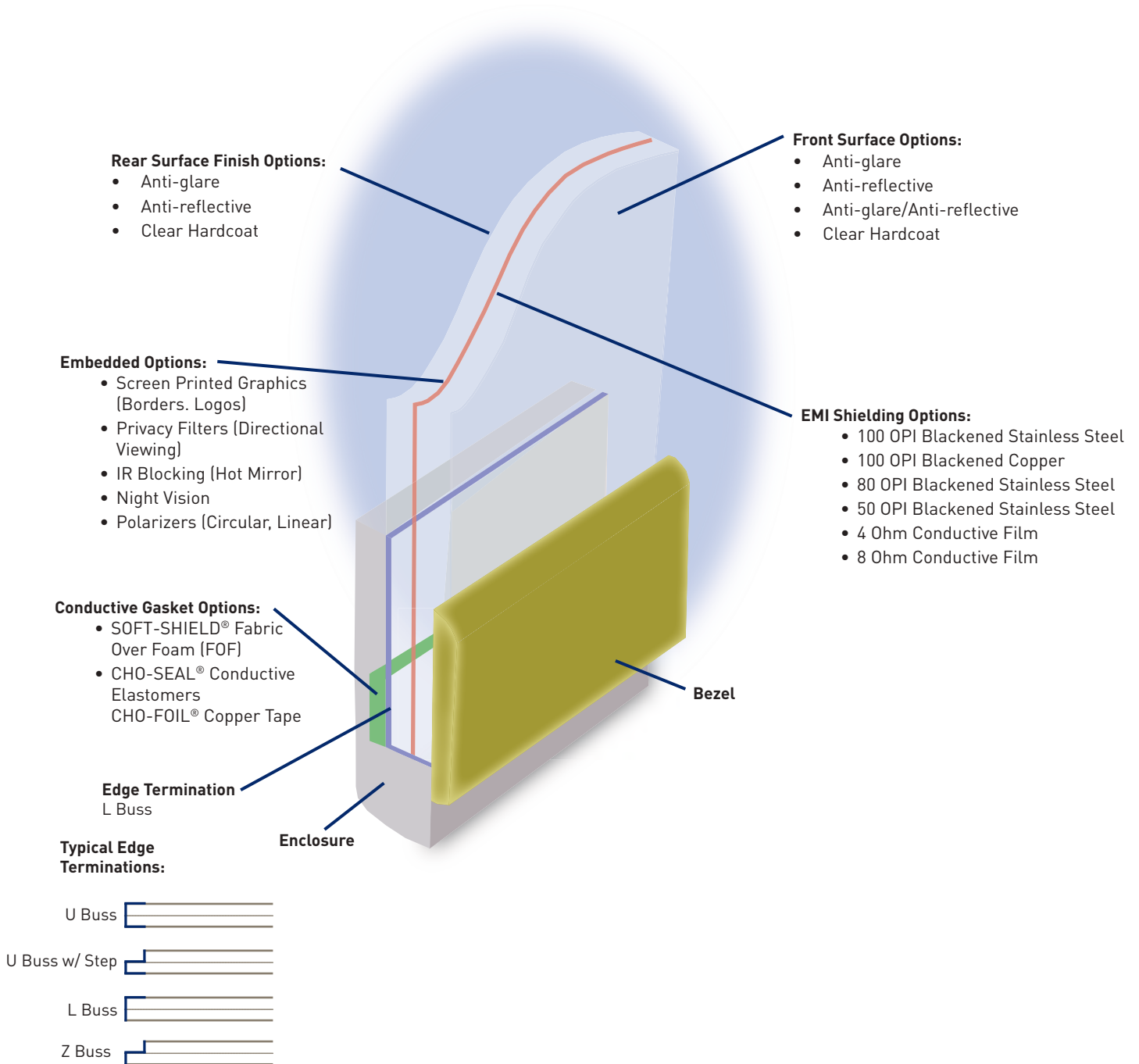
Custom tolerances available upon request

Maximum Sizes:

48" x 96" (121.92cm x 243.84 cm)

Larger sizes available upon request

Design Options:



Supplied by:
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