



*Improve Your Image*

## **COTS Military Grade Ultra Rugged LCDs**



## **DiamondVue Xtreme Series**



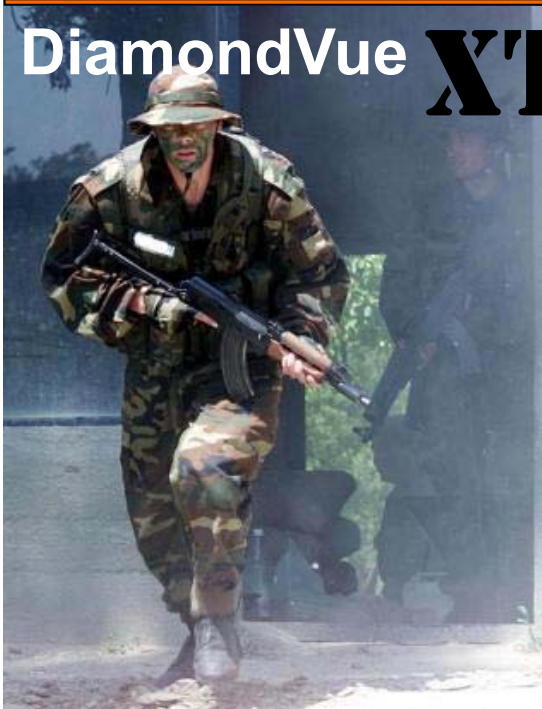
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# DiamondVue XTREME MILITARY GRADE COTS ULTRA RUGGED LCD SERIES



VarTech's COTS Military Grade DiamondVue Xtreme Series of LCD displays excels in the harshest environments and most demanding applications. These LCDs are optically bonded and have chemically strengthened front glass with optional EMI coating. Electromagnetic Environmental Interference protection, enhanced shock and vibration safeguards, extended operational temperatures, and anti-reflective protective faceplates make these LCDs ideal for rough terrain vehicles, harsh weather field operations, and any other application which requires an ultra rugged flat panel solution.

## DiamondVue Xtreme Military LCDs are compliant with these IEC Specifications and MIL-STDs:

- EN61000-4-2 - Electromagnetic Immunity
- FCC Part 15 – Class B - Electromagnetic Emissions and Evaluation
- High Temperature – Operating and Storage
- Low Temperature – Operating and Storage
- Humidity – MIL-STD-810F, Method 507.4-1
- Salt / Fog – MIL-STD-810F, Method 509.4
- Fungus – MIL-STD-810F, Method 508.4
- General Truck Vibration (Non Operating, in package)
- Tactical Transportation Vibration (Non Operation, un-damped equipment)
- Tactical Transportation Vibration (Non Operation, damped equipment)
- Transit drop – MIL-STD-810F, Method 516.5, Procedure IV
- Bench Handling – MIL-STD-810F, Method 516.5, Procedure VI
- Road Shock – Half Sine, 15Gpeak, 5 msec – MIL-STD- 810F, Method 516.5, Procedure I

### EMI

- FCC Part 15 – Class B
- Optional MIL-STD-461D/E

### Shock

- Designed to meet MIL-STD-901D

### Vibration

- Designed to meet MIL-STD-167





# COTS Military Grade Ultra Rugged LCDs



Available in 6.4" - 23.1" Sizes

## XTREME SERIES FEATURES and OPTIONS

1. Mechanically engineered for extreme harsh environmental conditions.
2. Conformal Coating of all internal circuit boards for added protection against humidity, salt, etc.
3. Conformal Coating to all exterior metalwork for added protection against humidity, salt, etc.
4. High-end power supply engineered with high-grade components which are designed and tested for lower leakage current and higher dielectric strength. This power supply provides low earth leakage and low emissions while providing stringent isolation
5. Optically bonded laminated anti-reflective front protective glass (optional bonded touch screen).
6. FCC Class A & B level EMI/RFI protection (optional ITO coating or transparent MicoMesh for EMI/RFI shielding per MIL-STD-461).
7. Integrated heaters at the rear of the LCD panel for extended CCFL operational temperature capabilities down to -20°C (optional bonded thermal ITO conductive coating thin film & bus bar for -40°C operation).
8. Full-Range Linear Dimming to black (optional automatic dimming sensor or push button digital controls)
9. Strengthened humidity resistant bonding adhesive on all connectors and screws/nuts for added shock & vibration protection.
10. Optional CCFL enhanced high brightness backlighting.
11. Optional Low Power LED enhanced high luminance 1000+ nits (cd/m<sup>2</sup>)
12. NVIS - A proprietary NIR [near infrared] rejection filter, when placed over displays, it removes the NIR component of the display emission but maintains sunlight readability.

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## MOUNTING OPTIONS

	NEMA 4 Panel	NEMA 4X Panel	VESA	RETMA Rack
6.4"	•			
8.4"	•	•	•	Dual
10.4"	•	•	•	•
12.1"	•	•	•	•
15.0"	•	•	•	•
17.0"	•	•	•	•
19.0"	•	•	•	•
20.1"	•	•	•	•
21.3"	•	•	•	•
23.1"	•		•	•

## SCREEN PERFORMANCE

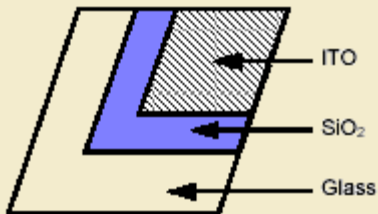
	Resolution	Brightness	Optional High Luminance
6.4"	VGA 640 x 480	400 nits	700 nits
8.4"	VGA / SVGA	400 nits	1400 nits
10.4"	VGA / SVGA / XGA	380 nits	850, 1200 nits
12.1"	XGA 1024 x 768	300 nits	1000 nits
15.0"	XGA 1024 x 768	450 nits	1500 nits
17.0"	SXGA 1280 x 1024	250 nits	1200 nits
19.0"	SXGA 1280 x 1024	250 nits	850 nits
20.1"	UXGA 1600 x 1200	250 nits	780 nits
21.3"	UXGA 1600 x 1200	250 nits	750 nits
23.1"	UXGA 1600 x 1200	250 nits	N/A

# EMI-ITO Glass Shielding with Conductive Coating

VarTech's EMI-ITO is a range of EMI shielded windows with a conductive coating for use in EMI/RFI shielding applications. The combination of high visible light transmission, near neutral color and low electrical resistance make an ideal EMI/RFI shield for electronic displays requiring moderate shielding effectiveness and high quality optical properties.

**Product Format:** EMI-ITO windows are either un-laminated or fully laminated glass filters with an ITO coating of 12 ohms/sq. Windows are available to order as finished windows. Laminated versions offer greater strength and options for front surface treatment and edge profiles.

**Coating Properties:** The soda lime float glass is coated with a primary secondary layer of Indium Tin Oxide (ITO).



Surface resistance:	12 ohms/sq
Coating thickness:	150nm
Heat Resistance:	140°C
Humidity (60°C/90%RH):	No effect
Adhesion to glass:	MIL M-13508 4.4.6
Abrasion resistance:	MIL C-675-A 4.6.11 MIL E-12397-B
Transmittance @550nm:	89%
Color:	Clear
Reflection:	<4%

**Termination Method:** Direct contact can be made to the conductive surface by a suitable conductive fabric over foam gasket, silver loaded silicone gasket, copper tape or silver epoxy painted busbar. Do not use gaskets containing metal wire which can damage the coating or place the window directly against a hard plastic or metal surface.

### Design Options:

- Contrast Enhancement & privacy filters
- Colors and Neutral density tints
- NIR blocking filters

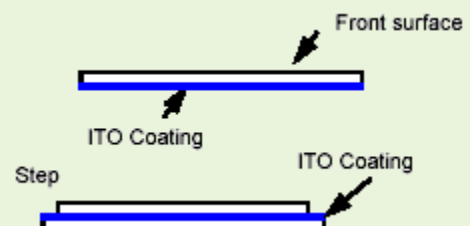
**Shielding Effectiveness:** The soda lime float glass is coated with a primary secondary layer of Indium Tin Oxide (ITO).

	Window diagonal (mm)						
(MHz)	50	100	150	200	300	400	450
30	52	48	39	36	33	32	30
75	43	37	44	31	29	26	25
100	44	37	34	31	28	26	25
150	42	35	32	29	25	24	23
200	61	54	50	48	44	43	42
300	52	43	42	40	35	34	32
500	45	39	37	22	30	29	29
700	37	33	29	25	25	25	25
1000	32	26	24	24	24	24	24

Coatings of 12 ohms/sq has been chosen to provide a good balance between shielding and optical performance. Coatings greater than 20 ohms/sq lack shielding effectiveness and lower ohm/sq coatings have reduced light transmission and increased light reflection.

### Product Range:









- Size:** parts up to 400 x 500mm
- Thickness:** 1.1mm un-laminated  
2.5 to 4.3mm laminated
- Front finish:** Plain glass  
Anti-Reflective (MLAR) coating  
Non-Glare (etch85)

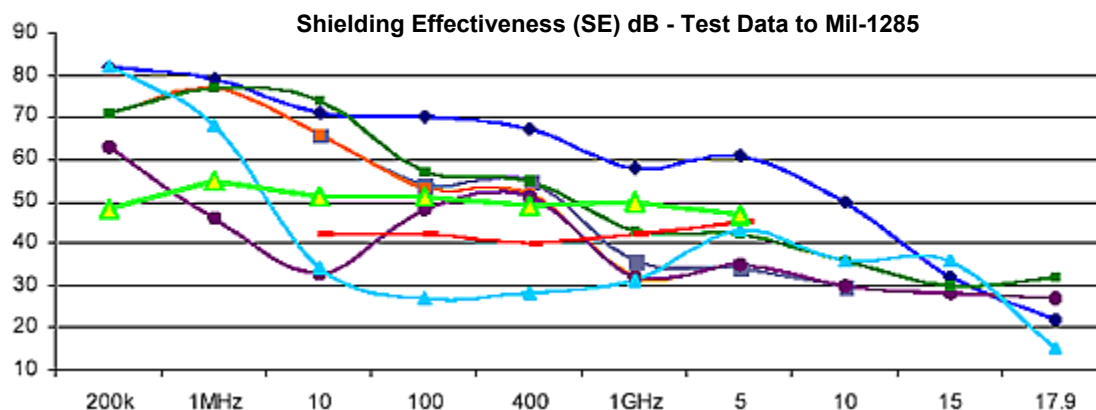


## EMI Mesh

Woven meshes for shielded windows, apertures and displays where an electronic enclosure requires shielding from electromagnetic interference (EMI) or is emitting electromagnetic energy which may cause interference with another system but requires a high level of visible light transmission or image clarity.

- Blackened 100opi copper is a rugged mesh that is recommend for standalone use.
- EmiClare is a proprietary mesh optimized for optical performance without sacrificing EMI performance. This is only supplied in finished window formats.
- MicroMesh is an etched copper grid matrix with higher light transmission and optical clarity. This is only supplied in fully laminated windows.
- Conventional stainless steel metal mesh and coated woven fabric are also available.
- Low ohms/sq EMI-ITO coated film that has no grid pattern.

Material	Light T%	Surface Resistivity Ohms/sq	Format	SE Graph Key
EmiClare	80%	0.030	Only in final window form	
MicroMesh	89%	0.050	Laminated window only	
50opi .001" Blk Cu plated S/S	75%	0.025	Sheets 450 x 600mm	n/a
80opi .001" Blk Cu plated S/S	71%	0.020	Sheets 450 x 600mm	n/a
100opi .001" Blk Cu plated S/S	65%	0.020	Sheets 450 x 600mm	
100opi .002" OFL Blk Copper	60%	0.010	Sheets upto 1200 x 2500mm	
100opi .002" conventional Blk Cu	60%	2.0 +	# Not supplied by OFL	
100opi .002" unblk copper	60%	0.010	Rolls 1200m wide	
Coated Woven Fabric	66%	0.140	Rolls 1200m wide	
EMI-ito film	82%	12-15	Rolls 1200m wide	



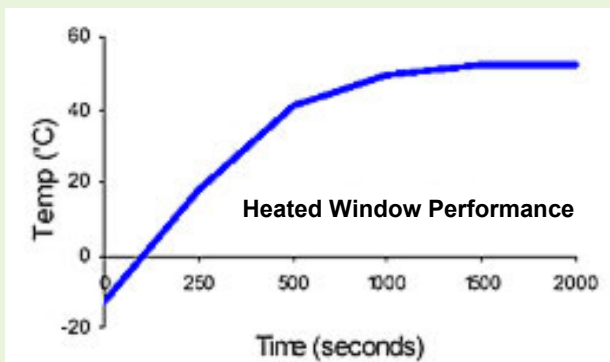
**Blackening:** To eliminate light reflections the mesh is blackened. VarTech's blackening system is highly conductive and enhances shielding effectiveness at frequencies below 10GHz. The stainless steel meshes are copper plated before blackening.



# Transparent Heaters

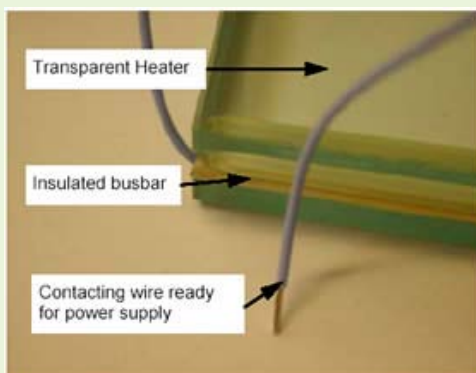
VarTech's Transparent Heaters for the defrosting and maintaining LCD displays at optimum operating temperatures for screen response or the defrosting and maintaining windows from moisture. VarTech has developed a clear transparent heater circuit with a rugged busbar termination that can be incorporated with our range of contrast enhancement and EMI shielded filters.

**Specification:** The VarTech Transparent Heaters are either un-laminated or fully laminated glass filters with an Indium Tin Oxide (ITO) coating of 12 ohms/sq. This is an optimum coating density to provide excellent heating performance with good optical clarity compared to the highly reflective thin resistive wires typically used to provide heat.



Extensive testing and military qualification has proved the VarTech transparent heater to maintain a LCD at 20°C with an outside temperature of -50°C and 3°C/minute temperature gradient.

**Termination Method:** Highly rugged proprietary insulated busbar and wire termination along two opposing edges.



## Applications:



Transparent heaters are used in a board range of applications including: public information displays, material handling equipment, military ground based vehicles, naval flight deck equipment, control panels on heavy agricultural and earth moving equipment, periscopes and off-shore oil platforms.

## Product Range:

### Un-laminated glass transparent heater:

- Transmittance @ 550nm 89%
- Thickness 1.1mm only
- Plain float finish only
- Max size 400 x 500mm

### Laminated glass transparent heater:

- The ITO surface is located within the lamination for ruggedization and additional layers incorporated for mechanical & impact resistance
- Thickness 2.5mm upwards
- Finish plain, etch non-glare and anti-reflective coating

### Additional elements for Multi-function windows with transparent heater:

- EmiClare EMI shielding
- Contrast enhancement
- Etch non-glare and anti-reflective coated front surface finish
- Silk screen printing