

## SOTR FOR WINDOW GLASS

### 1. Window Glass.

- (a) Optical Transparency. Optical Transparency of the Root Glass Window is to be greater than 75%. A type test certificate of Classification Society is to be provided for the same.
- (b) Visual inspection of the completed lamination / framed window shall be carried out in accordance with standard BN 072 Marine Glass Guide.
- (c) The Windows shall operate without damage or degradation when exposed to a mould and fungi growth environment for a period up to 28 days.
- (d) The Windows shall withstand occasional/intermittent exposure to: acids, alkalis, anti-icing fluids, cleaning fluids, insecticides, maintenance fluids, disinfectant and sea water. Additionally, they shall be able to withstand without damage or degradation exposure to ship and aircraft exhaust contaminants. These contaminants often combine with salt to produce smearing
- (e) Blast Pressure. Whilst mounted in a standard frame secured to suitable structural plating, the Root Glass Window is to withstand when subjected to Gun Blast Pressure up to and including 2.1 bar, without signs of damage or deterioration in electrical performance.
- (f) Noise Attenuation. All Root Glass Windows shall be able to attenuate external noise by 45dB at 500Hz unless otherwise specified.
- (g) Resistance to Shock and Vibration. MIL-STD-167-1A and MIL-STD-901D are to be followed for shock and vibration.
- (h) Electromagnetic Shielding. All Root Glass Windows shall provide Electromagnetic protection to the ship's compartments from communication arrays, radars, etc. The Windows shall attenuate electromagnetic radiation by 40db between 1 GHz and 40GHz in accordance with DefStan 59-41/MIL-STD 461E and MIL STD 285. The tests for the same are to be cleared by Classification Society and a Type Test certificate is to be provided.
- (j) The Electromagnetic Shielding shall not cause significant reduction in the power.
- (k) Endurance Trials (Heat Cycling for Heated Window Only). To operate satisfactorily without evidence of deterioration after a continuous heating cycle of 1000 hours being controlled between temperature range of 20° C to 40° C. The supplier should provide a Type Test certificate from Classification Society or the same.
- (l) Vibration Test (Heated Window Only). The Window and its elements should withstand satisfactorily, being subjected to a Vibration Test as per JSS 55555. The supplier should provide a Type Test Certificate from Classification Society or the same.
- (m) All necessary tests as indicated in DefStan 02-112 or equivalent standards shall be undertaken.
- (n) Glazing arrangements as indicated in DefStan 02-112 or equivalent standards will be provided for the Windows.
- (o) Thickness. Thickness & quantities of Root Glass Windows is decided based on performance requirement of Optical Transparency, Blast Pressure withstand ability and noise attenuation. The supplier will indicate in his technical offer the thickness of bridge Window Glasses and weight of each glass panel.

2. **WindowFrame.**

(a) All Root Glass Windows, unless specified otherwise, shall be supplied as complete assemblies which shall include the Frames, Glass, Heating Elements, Temperature sensing elements, Terminal Boxes and Electromagnetic Shielding.

(b) Construction.Overall dimensions, thickness and corner radii will be in accordance with the contract. Allowable variations on face dimensions of completed panels will be as follows:

+0-1.58 mm (+0-0.062 in) for panels up to 900 mm

+0-2.38 mm (+0-0.093 in) for panels over 900 mm

For thickness, a variation of +/- 0.79 mm is acceptable

(c) The Frames for all Windows shall comply with the material specification and mechanical properties given in specification for Ships' Windows and be bolted/ clamped to the ships structure.

(d) Details of certain components are presented in a tabular format below. The details are for guidance only & supplier may use equivalent or better materials.

<b><u>SNo</u></b>	<b><u>Component</u></b>	<b><u>Material</u></b>	
(i)	Window Frame & Glass retaining frame	Marine Grade SS 316 Stainless Steel	
(ii)	Glazing Screws and Hexagonal Bolts and Nuts	Stainless Steel to IS 6603/1972: Grade-07 Cr. 18 Ni 9.	
(iii)	Gasket & Channel	Rubber to spec IS 5192(Latest)Gr. B -3 IRHD 51 -60 Degree Composition of Rubber	
		Ingredients	% by weight
		Rubber (minimum)	62
		Zinc oxide (approx.)	06
		Carbon Black	As required
		Light Magnesium	Nil
		Carbonate Sulphur & organic Accelerators	As required
		Softness excluding Stearic Acid & Paraffin	01 (Rubber content))
		Wax Anti -oxide	04(Rubber content)
		Mn-Bis (Methyl-Heptyl) Factic	05 Max(Rubber content)