



SUMIP COMPOSITES PVT. LTD.(UNIT- III)



ISO 9001



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SPECIFICATION FOR FRP CABLE TRAYS

1.0 SCOPE

This specification provides the minimum requirements for design, fabrication, testing and supply of Fiber Glass Reinforced Plastic (FRP) cable trays, necessary hardware, accessories and fittings etc. required for Power and control cable laying for Indoor and Outdoor installation.

2.0 CODES AND STANDARDS

2.1 All equipment supplied shall comply with the requirements of latest relevant standards of:

ASTM-D149 Standard test method for dielectric breakdown voltage and dielectric strength of solid electrical insulating materials at commercial power frequencies

ASTM-D256 Standard test methods for determining the Izod pendulum impact resistance of plastics

ASTM-D635 Standard test method for rate of burning and/or extent and time of burning of plastics in a horizontal position

ASTM-D638 Standard test method for tensile properties of plastics

ASTM-D790 Standard test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials

ASTM-D2863 Standard test method for measuring the minimum oxygen concentration to support candle-like combustion of plastics (oxygen index)

ASTM-E84 Standard test method for surface burning characteristics of building materials

IS 6746 Unsaturated polyester resin system for low pressure fiber glass reinforced plastic

NEMA FGI National Electrical Manufacture's Association - Fiber glass cable tray system

UL 94 Standard for safety of flammability of plastic materials for parts in devices and appliance testing

2.2 Any other International Standard or Code may be used in lieu of above, subject to the approval of the Company.

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3.0 SCOPE OF SUPPLY

The scope of supply through this specification shall include but not limited to the following:

- 3.1 Fiber glass reinforced plastic Ladder type, Perforated Type,
- 3.2 Accessories such as bends, tees, crosses, reducers, splicers, clamps and necessary hardware etc.

4.0 TECHNICAL REQUIREMENTS

4.1 FRP CABLE TRAYS

- 4.1.1 The FRP cable tray shall be ultra violet resistant. FRP cable trays shall be manufactured in accordance with NEMA FG-1-1984-1993(Current Issue) and Standards IS-6746 and ASTM E 84. Manufacturing process shall be pultrusion using automated pultrusion machines. Resin to be used shall be ultraviolet resistant polyester resin.
- 4.1.2 All cable trays and accessories shall be corrosion / chemical resistant, weather resistant, easy to drill and cut, Lightweight, high strength and flame retardant v0 in accordance with ASTM E – 84 - Class 1 Rating and as per IS -6746 – Very Low Flammability. An additive material shall be mixed with the FRP to make them resistant to ultraviolet light. The oxygen index shall be minimum 30 as per ASTM-D-2863.
- 4.1.3 The minimum glass content in the FR material shall be 55%.
- 4.1.4 The Ladder type trays shall have side rails and horizontal rungs. Both of these shall be of same material i.e. the FRP with additive material. The rungs shall be placed 300mm apart from each other. The side runner Height and the thickness of FRP channel can be decided based on the support span and loading. The rungs to side member are connected to the Larger portion of the side rail by using pin made of fiberglass reinforced thermoplastic, and should have both mechanical & structural adhesive Lock.

There should be no negative tolerance in Thickness.

The Perforated type trays shall have “C” Channel type with Perforation holes. Size of Perforated Trays

- a) 150mm(w) x 50mm(h).

- 4.1.5 The cable trays shall be supplied in standard length of 3000 mm. The tolerance on width and length shall be ± 4 mm.
- 4.1.6 The tray construction shall be such as to facilitate easy handling and to ensure easy

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laying of cables without causing damage to cables. The inside surface shall be free from sharp edges, burrs or projections.

4.1.7 Each section of tray shall be complete with necessary connector plate and hardware. All hardware (Nuts, bolts, washers etc.) shall be of Stainless Steel Material Grade: 304 for FRP trays joining plates. The bends, tees, reducers, crosses and droppers shall have required bending radius but not less than 300mm.

4.1.8 For tray system design in addition to self-load following guideline for design shall be considered:

PERFORATED TYPE:

- a) Support Span : 1500 mm
Cable load for:
 - iii) 150 mm width : 30 kg/Linear Meter

LADDER TYPE:

- a) Support Span : 2000 mm
Cable load for:
 - ii) 300 mm width : 60 kg/Linear Meter
 - iii) 450 mm width : 75 kg/Linear Meter
 - iv) 600 mm width : 90 kg/Linear Meter

In addition to this, the Ladder type Trays cable trays shall be suitable for ‘70kG concentrated load at the centre span and deflection should be measure as $\leq L/200$ mm (**Where L stand for Support Span**)

4.1.9 The side rails and all accessories shall have the holes on each end for fixing connector plates. The connectors between two sections of cable trays or a Section of cable tray with associated accessories shall be done by bolting only. For strength in Cable Trays Outside Connector Plates should be Provided with 8 sets of hardware for trays with width 600mm / 450mm and 4 sets of hardware for trays with width 300mm / 150mm.



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5.0 TESTING AND INSPECTION

Testing and inspection of cables trays shall include but not necessarily be limited to the following:

Characteristics	Type of Check	Standard	Required Value	To be witness / review at manufacturing works
Chemical Composition	Glass Content	ASTM D5630	≥55%	W
FRP Property Indicators	Flammability Test	IS 6746 / UL 94	Very Low Flammability / v0	W
	Rate of Burning	ASTM D 635	≤25mm	W
	Flame Spread Index & Smoke developed Index	ASTM E 84	Class 1	Type Test
	Water Absorption	ASTM D 570	≤0.25%	R as this is a 24 hour test
	Izod Impact Strength	ASTM D 256	>130Kg-Cm/Cm	W
	Tensile Strength	ASTM D 638	2000-6000Kg/Cm ²	W
	Flexural Strength	ASTM D 790	2500-10000Kg/Cm ²	W
	Compressive Strength	ASTM D 695	1500-5000Kg/Cm ²	W
	Oxygen Index	ASTM D 2863	Minimum 30%	W

- 5.1 A quantitative check shall be made to assure whether all items with accessories are present according to order and the packing list.
- 5.2 A visual inspection shall be made to ensure that good workmanship and practice were maintained throughout the fabrication.
- 5.3 FRP trays shall be tested as per NEMA-FG1-1984-1993(Current Issue). Following tests shall also be carried out on each type of cable tray system.
 - a) Deflection Test: L/200mm (L = Support Span) for Ladder Type & Perforated Type Trays.
 - b) Destruction Load Test for Ladder Tray.**

6 Packing of Cable Trays: All Cable Trays shall be fully packed with tight Plastic Stretch Film to avoid dirt accumulation during transit, storage & for aesthetics.