

PART 1 – GENERAL

1.1 SCOPE

A. The cable tray system shall conform to the material and fabrication requirements as per this specification.

1.2 STANDARDS

A. The cable tray system shall conform to applicable sections of:

1. National Electrical Manufacturers Association (NEMA)
FG-1 (latest edition) Fiberglass Cable Tray Systems
2. National Electric Code (NEC)
3. ASTM International
ASTM E-84 (Class 1 Rating) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM D-257 Standard Test Methods for DC Resistance or Conductance of Insulating Materials (Conductive System)
4. UL (Underwriters Laboratories, Inc.)
Standard for Non-Metallic Cable Tray Systems
5. CSA INTERNATIONAL (National Standard of Canada)
CAN/CSA-C22.2 No. 126 Cable Tray Systems (Vinyl Ester)
6. International Electrotechnical Commission (IEC)
61537 Cable management – Cable tray systems and cable ladder systems (Conductive System)
7. American Bureau of Shipping (ABS)
Rules for Building and Classing Mobile Offshore Drilling Units (MODU) (Conductive System)

1.3 GENERAL

A. Tray Requirements

1. Tray widths 6" (152mm), 9" (229mm), 12" (305mm), 18" (457mm), 24" (610mm), 30" (762mm), and 36" (914mm)
2. Lengths (as required): 10 ft, 20 ft, 3m, and 6m
3. Rung spacing (as required): 6" (152mm), 9.25" (235mm), 12" (305mm), and 18.5" (470mm)
4. Rung type (as required): Standard Rung, Marine Rung or Strut Rung
5. Radius of fittings (as required): 12" (305mm), 24" (610mm), and 36" (914mm)
6. Resin Systems (as required): Isophthalic Polyester, Vinyl Ester, Conductive, Halogen-Free Polyester, or Halogen-Free Low Smoke Plus

B. Loading Requirements

1. There shall be three NEMA working load classifications of fiberglass cable tray based on 20 Ft. (6m) support span:

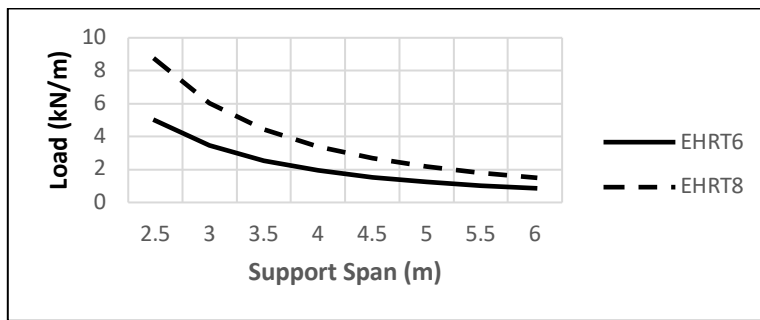
Class	Working Load	FOS
A	50 Lbs./Lineal Ft.	1.5
B	70 Lbs./Lineal Ft.	1.5
C	100 Lbs./Lineal Ft.	1.5

2. Span support criteria shall be as specified (Reference the following table):

Support Span (Ft.)	Working Load in Lbs./Lineal Ft. (NEMA)		
	Class A	Class B	Class C
30	-	-	100
20	50	75	100
18	50	75	100
16	50	75	100
14	50	75	100
12	50	75	100
10	50	75	100

3. Nominal loading depth (as required): 2" (51mm), 3" (76mm), 5" (127mm), 7" (178mm) and 9" (229mm)

4. For International Standards, the manufacturer shall declare the tray system Safe Working Load (SWL) per the International Electrotechnical Commission (IEC) 61537 and publish in the form of a table or diagram.



*Load vs. span is based on maximum deflection measured from the mid-point between supports for a single span installation. Continuous span conditions and/or deflection measurements at other points between supports may yield higher load ratings.

PART 2 – PRODUCTS

2.1 MANUFACTURER(S)

A. The fiberglass ladder-type cable tray system shall be manufactured - pultrusion, compression molded, resin transfer molded and/or fabricated by Enduro Composites, Inc., located at 16602 Central Green Blvd., Houston, TX 77032; Tel: 713-358-4000, 800-231-7271; Email: sales@endurocomposites.com; Web: www.endurocomposites.com; or approved equal conforming to these specifications.

2.2 MATERIALS

A. The glass fiber to resin content shall be maintained between 45 to 65 percent by weight in all pultruded components except flat sheet which shall be 35 to 45 percent; and 25 to 45 percent by weight in all molded components.

B. All composite material shall have an ultraviolet light inhibiting chemical additive to resist UV degradation.

C. All composite material shall be fire retardant and have a flame spread rating of 25 or less (Class 1 Rating) when tested in accordance with ASTM E-84.3. Materials shall be fire retardant with Class 1 Flame Spread Rating (25 or less per ASTM E-84).

D. All pultruded Polyester and Vinyl Ester products shall have a complete surfacing veil to provide maximum chemical and UV protection.

E. Conductive resin systems shall contain carbon additives to dissipate static electricity. Materials shall exhibit conductive properties for both surface and volume resistivity in accordance with the American Bureau of Shipping (ABS) Rules and specifications for installation on an ABS classed vessel, MODU or facility per Steel Vessel Rules 4-8-4A1/9.1.

PART 3 – EXECUTION

3.1 CONSTRUCTION

A. Straight section ladder tray shall be prefabricated structures made from fiberglass reinforced plastic, consisting of two longitudinal members (side rails) connected by transverse rungs, meeting all the requirements herein described.

1. Standard C-Channel profile side rails must turn in.

2. The upper flanges for alternative Z-Channel profile side rails (6" profile depth only) must turn out.

3. All rung to side member connections shall have both a mechanical and a chemical (adhesive) lock. The tray shall be assembled by the use of a locking pin made of fiberglass reinforced thermoplastic. The locking pin shall be inserted under pressure with a high strength, chemical resistant adhesive.

4. The tray interior shall be clear of all projections or sharp objects.

5. All straight section lengths shall be pre-drilled to accept connector plates.

6. All cut ends and drilled holes (factory and field) shall be resin coated.

B. Fittings are to be prefabricated and shall meet all the requirements herein described.

1. All fittings shall have a nominal 9.25" rung spacing.

2. All fittings shall be pre-drilled to accept connector plates.

3. All fittings shall be designed and installed so as to have the same load carrying capacity as the straight sections.

4. Rung to side member connections shall have both a mechanical and/or chemical (adhesive) lock. Fittings shall be assembled by use of a locking pin made of fiberglass reinforced thermoplastic and/or a stainless-steel rivet. The locking pin shall be inserted under pressure with a high strength chemical resistant adhesive.

- All radius 90° and 45° horizontal and vertical bends, all tees and crosses for tray types using 6" (152mm), and most 4" (101mm) and 8" (202mm), C-channel members shall be of concentric curved molded design and made by resin transfer molding.

C. Connector Plates and Fasteners:

1. Connector plates shall be fiberglass and designed with sufficient strength so they may be installed between 0.2 and 0.3 of the length of the span from the support without derating the load carrying capacity of the tray.

2. Connector plates for conductive tray shall be stainless steel.

3. Fasteners for connector plates shall be 3/8" (9.5mm) diameter Type 316 Stainless Steel, Monel, Silicon, Bronze, or FRP/GRP studs & hex nuts as required.

D. Accessories

1. The manufacturer shall be capable of providing all necessary parts (i.e. clamps, support assemblies, etc.) for the installation of a complete fiberglass tray system.