

ULTRA FIBERGLASS SPECIFICATION FOR HEAVY DUTY FRP LADDERS AND CAGES

PART 1 – GENERAL

1.01 Related Documents

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions Specifications apply to the Writing Specification Section.

1.02 Summary

- A. The following Fiber Reinforced Polymer Composites
 - Fiberglass Structural Profiles

1.03 Scope of Work

- A. Furnish all labor, material and equipment to fabricate FRP Ladders and Cages as displayed on the drawing and as specified herein.

1.04 Quality Assurance

- A. A reputable and qualified manufacturer of demonstrated ability that has routinely engaged in the manufacture FRP Ladders and Cages will furnish the material specified. (*Ultra, Inc. of Milwaukee, WI. (414)461-5051 or fax (414)461-5015*)
- B. Substitution of any components or modification of systems will be made only when approved by an architect or engineer.
- C. Qualifications are limited to experienced manufacturers and fabricators producing FRP Ladders and Cages or similar to that indicated for this project, with adequate production capacity, so as to not delay the work.
- D. In addition to requirements of the specification, comply with manufacturer's instructions and recommendations for work.

1.05 Design Criteria

- A. The design of FRP Ladders and Cages, including connections, will be in accordance with the governing building codes and standards, as applicable.

1.06 Submittals

- A. Drawings of all FRP Ladders and Cages will be submitted to the Engineer for approval in accordance with the necessary requirement of each specific project.
- B. Manufacturers catalog of data displaying:
 1. *Ladder shall be fabricated using fiberglass reinforced polymer plastic pultruded profiles. 2" x 2" x ¼" square tube safety yellow will be used to manufacture the ladder side rails. Round tube, safety yellow 1 ½" x 1/8" will be used to manufacture the ladder rungs (rungs will be coated with embedded grit), side rails will be drilled so that the rung can be press fitted into the sidewalls of the square tube. The mechanical connections will be made with (4) 3/16" diameter 316 stainless steel rivets in each rung*
 2. *Cages also shall be Fabricated using fiberglass reinforced polymer plastic pultruded profile. Cage hoops will be fabricated using 1/8" flat strip. Hoops will be spaced every 48" O/C at max. Vertical support will be fabricated using 2' x 9/16" x 1/8" channel. All mechanical connections will be made with 18-8 stainless steel bolts, Nylon insert lock nuts, and washers.*
 3. *Standard wall mounting brackets will be fabricated using 6" x ¼" channel or 6" x 3/8" channel attached to the Ladder rail every 72" max. Standard cage hoop mounting brackets will be fabricated using 8" x 3/8" channel, and 6" x 3/8" channel attached to the Ladder rail every 48" max*
 4. *Design tables, with span length and deflection limits, under various Uniform and concentrated loads.*
 5. *Construction materials.*

- C. Detail drawings displaying
 - 1. Dimensions of FRP Ladders and Cages.
 - 2. Sectional assembly
 - 3. Location and identification match marks

1.07 Shipping and Storage Instructions

- A. All systems, sub-systems, and structures will be factory fabricated and shipped fully assembled.
- B. All material and equipment necessary for the fabrication and installation of the FRP Ladders and Cages will be stored, during, and after shipment in a manner to prevent cracking, twisting, bending, breaking, chipping or damage of any kind of material, or equipment, including ultraviolet damage. Any material, which in the opinion of the engineer, becomes damaged as to be unfit for use, will be promptly removed from work site, and the Contractor will receive no compensation for the damaged material or its removal.
- C. Identify all materials, items, and fabrications for installation and field assembly.

PART 2 – PRODUCT

2.01 General

- A. Material used in the manufacturing of FRP Ladders and Cages shall be of the best quality and free from any defects and imperfections that may affect the performance of the finished product.
- B. Material used in the manufacturing of FRP Ladders and Cages to be USA manufactured with product tracking and resin samples retained for quality control.
- C. All material will be of type and quantity specified; where quality is not specified, it will be the best of the respective types and application for the intended purpose.
- D. All standard FRP Ladders and Cages in the summary section will be manufactured using the pultrusion manufacturing process, with either thermoset polyester or thermoset vinyl ester resin, including flammability and ultraviolet (UV) inhibitor additives. A synthetic surface veil will be the outermost layer of the exterior surface. The fiber reinforced polymer composites profiles will achieve a class 1 flammability rating (≤ 25) per ASTM E84 TEST method. (Thermoset polyester resin and vinyl ester resins are available without flame retardant and UV inhibitor additives.)
- E. In highly corrosive areas, all cut ends, holes and abrasions of fiber reinforced polymer composites products will be sealed with a compatible resin coating to prevent intrusion of moisture where applicable.
- F. Ladders and Cages, exposed to weather, will contain an ultraviolet inhibitor.
- G. All exposed surfaces will be smooth and true to form
- H. Manufacturer's
 - 1. ULTRA, INC. Milwaukee, WI. (414)461-5051 or Fax (414)461-5015
 - 2. Or approved equal

2.02 Structural Profiles

- A. Structural profiles will be manufactured with a premium grade polyester or vinyl ester resin with fire retardant additive to meet Class I flame rating of ASTM E84 and the self extinguishing requirement of ASTM D635. All structural profiles will contain a UV inhibitor.
- B. Manufactured by the pultrusion process.
- C. Structural fiber reinforced polymer composites member composition will consist of a glass fiber reinforced polyester or vinyl ester matrix, approximately 50% resin-to-glass ratio. A synthetic surface veil will be the outermost layer of the exterior surfaces. Continuous glass strand roving will be internally used for transverse strength.

Part 3 - Execution

2.03 Installation

- A. In an atmospheric or other non-corrosive environment sealing any drilled holes or cut edges is not necessary.
- B. In a highly corrosive environment we recommend sealing all field cut and drilled edges, holes and abrasions with a catalyzed resin compatible with the original resin as recommended by the manufacturer. The sealing of the edges will prevent premature fraying at the field cut edge.

Part 4 - Inspection and Testing

- A. The engineer will have the right to inspect all test and to-be-furnished material under these specifications prior to transportation from the point of manufacture.
- B. All labor, power, materials, equipment and appurtenances required for the contractor at no cost to owner would furnish testing.