

# **SPECIFICATION FOR FRP HANDRAIL**

## **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
  - Pultex ® Structural Profiles (Creative Pultrusions)
  - Pultex ® SUPERSTRUCTURAL Profiles (Creative Pultrusions)

### **1.03 Scope of Work**

- A. Furnish all labor, material and equipment to fabricate FRP Handrail 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 Handrail 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 the Engineer.
- C. Qualifications are limited to experienced manufacturers and fabricators producing FRP Handrail 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 Handrail, including connections, will be in accordance with the governing building codes and standards, as applicable.

### **1.06 Submittals**

- A. Drawings of all FRP Handrail 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. *FRP Handrail shall be fabricated using Creative Pultrusions Pultex ® fiberglass reinforced polymer plastic pultruded profiles. 2" x 2" x*

*1/8" square tube safety yellow will be used to manufacture the top and mid rails. Square tube, safety yellow 1 3/4" x 1/4" will be used to manufacture the FRP Handrail Posts. The mechanical connections will be made with (4) 3/16" diameter 316 stainless steel rivets at each connection.*

2. *Design tables, with span length and deflection limits, under various Uniform and concentrated loads.*
3. *Construction materials.*

C. Detail drawings displaying

1. Dimensions of Handrail.
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 assembled to the best practical sizes for transportation.
- B. All material and equipment necessary for the fabrication and installation of the FRP Handrail 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 Manufacturer will receive no compensation for the damaged material or its removal.
- C. Identify all materials, items, and fabrications for installation and field assembly.

## PART 1 – PRODUCT

### 2.01 General

- A. Material used in the manufacturing of FRP Handrail shall be of the best quality and free from any defects and imperfections that may affect the performance of the finished product.
- B. 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.
- C. All standard FRP Handrail 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 ( $\leq 25$ ) per ASTM E84 TEST method. (Thermoset polyester resin and vinyl ester resins are available without flame retardant and UV inhibitor additives.)
- D. 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.
- E. FRP Handrail, exposed to weather, will contain an ultraviolet inhibitor.

- F. All exposed surfaces will be smooth and true to form
- G. Manufacturer's
  - 1. ULTRA, INC. Milwaukee, WI. (414)461-5051 or Fax (414)461-5015
  - 2. Or approved equal

## **2.02 Pultex ® 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. All labor, power, materials, equipment and appurtenances required for the contractor at no cost to owner would furnish testing.