

**STROMBERG**  
**ARCHITECTURAL PRODUCTS**  
**Glass Fiber Reinforced Concrete**  
**Bollards**  
**Installation Specifications**  
**SECTION 02815**

**PART 1 • GENERAL**

**1.1 Description:**

This section covers all material, labor, accessories and appliances necessary for the complete installation of Glass Fiber Reinforced Concrete (GFRC) bollards as indicated on the drawings and specified herein.

**1.2 Related Sections:**

- A)** Division 04 Section "Cast Stone".
- B)** Division 05 Section "Metal Fabrications" for supplementary supports for large items.
- C)** Division 06 Section "Rough Carpentry" for supplementary supports for large items.
- D)** Division 06 Section "Glass Fiber Reinforced Plastic Fabrications".
- E)** Division 09 Section "Glass Fiber Reinforced Gypsum Fabrications".
- F)** Division 09 Section "Paints and Coatings" for field painting and sealing prior to painting.

**1.3 References:**

- A)** ASTM C 150 – Standard Specification for Portland Cement; 1999a.
- B)** ASTM C 33-99 Concrete Aggregates
- C)** ASTM C 666 – Standard test Method for Resistance of Concrete to Rapid Freezing and Thawing
- D)** ASTM C 979-82 (1993): Pigments for Integrally colored Concrete.
- E)** ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 1999.
- F)** ASTM G 23 – Standard Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials; 1996.

**1.3 Manufacturer:**

- A)** All GFRC bollards used in this work shall be manufactured by Stromberg Architectural Products, Inc.; P.O. Box 8036, I-30 West, 4400 Oneal, Greenville, TX, 75404. ASD. Tel: (903)454-0904, Fax: (903)454-3642, Email:sales@strombergarchitectural.com, www.strombergarchitectural.com.
- B)** Substitutions: Not permitted.

#### 1.4 Submittals:

- A)** Submit under provisions of Section 01300.
- B) Shop Drawings:** For custom items, provide drawings showing dimensions, layout, joints, details, and interface with adjacent work; include field measured dimensions of the spaces where items are to be installed, if critical to proper installation.
- C) Custom Work:** Furnish dimensioned camera-ready line art of proposed custom designs to manufacturer.
- D) Product Data:** Submit manufacturer's data sheets on each product to be used, including dimensions, finishes, storage and handling requirements and recommendations, and installation recommendations.
- E) Samples:** For each custom finish specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

#### PART 2 • PRODUCTS

##### 2.1 Composition:

All Glass Fiber Reinforced Concrete bollards shall be a matrix of high density concrete made of ASTM C 150 Portland cement, crushed stone, silica sand, and polymers reinforced with glass fiber and structural reinforcing as required; asbestos free.

1. Color: As selected from manufacturer's selection.
2. Color: To match Architect's sample.
3. Surface Texture: Exposed surface as selected from manufacturer's selection.
4. Overall Height: \_\_\_\_\_ ft. \_\_\_\_\_ in.
5. Bollard Plan Shape: (Select One) [square] [round] [as indicated on drawings] [as selected by architect]
6. Bollard Dimensions: (Select "a", "b", or "c" below)
  - a. [\_\_\_\_\_ ft. \_\_\_\_\_ in. Radius]
  - b. [\_\_\_\_\_ ft. \_\_\_\_\_ in. Square]
  - c. [Per Drawings]
7. Internal Light: (Select One) [N/A] [Lighted per Electrical documents]
8. Density: 140 pcf (2240 kg/cu m).
9. Shell Thickness: 3/8" to 3/4" (9.5 mm), nominal.
10. Surface Burning Characteristics: Flame spread index of 0, smoke developed index of 5; when tested in accordance with ASTM E 84. Fuel contribution of 3.
11. Weather Resistance: No significant loss of strength or change in appearance after 200 hours accelerated weathering conducted in accordance with ASTM G 23.
12. Flexural Strength: 1000 to 1800 psi (6.9 to 12.4 MPa).
13. Modulus of Elasticity:  $2 \times 10^5$  psi (1370 MPa).
14. Compressive Strength: Over 5000 psi (34 MPa).
15. Variation from Dimensions Indicated on Drawings: Plus and minus 1/8 inch (3 mm), maximum.

16. Variation from Plane Along Edge or Surface: Plus and minus 1/16 inch per linear foot (1.5 mm in 300 mm), maximum.
17. Outside Corner Radius: 1/16 inch to 1/8 inch (1.5 to 3 mm).
18. Draft Angle: 3 degrees minimum on returns, setbacks, reveals, and grooves.
19. Provide non-corrosive anchors and reinforced anchoring points as indicated on drawings.
  - a. Concealed Anchors: Hot-dipped Galvanized Steel unless otherwise indicated.

## **2.2 Quality Assurance:**

- A. Manufacturer: Obtain GFRC bollards as manufactured by a firm specializing in the manufacture of GFRC bollards, with a minimum of ten years experience.
- B. Provide a list of projects comparable in size, scope, and complexity as indicated.
- C. Provide verification that glass fiber reinforced concrete bollards meets or exceeds products specified.
- D. Installer Qualifications: Regularly engaged and experienced in the installation of GFRC products.

## **2.4 Delivery, Storage, and Handling:**

- A. All Glass Fiber Reinforced Concrete bollards shall be carefully loaded and packed for transportation avoiding excess stress, and preventing damage; use appropriate equipment. All product shall be released to freight carrier in a sound, unblemished and unbroken condition.
- B. Store products in manufacturer's unopened packaging until ready for installation, in a clean dry area protected from weather, moisture and damage; store units upright and not stacked unless permitted by manufacturer. Product shall be stored clear of the ground on non-staining pallets or other temporary planking.
- C. Protect product from staining, chipping, and other damage.

## **PART 3 • EXECUTION**

### **3.1 Inspection:**

- A) Do not begin installation until substrates have been properly constructed; verify that substrates are plumb and true.
- B) If substrate installation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
  1. Proceed with installation only after unsatisfactory conditions have been corrected.
- C) Check field dimensions before beginning installation. If dimensions vary too much from design dimensions for proper installation, notify Architect and wait for instructions before beginning installation.
- D) Verify that bearing surface is plumb and true.
- E) Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 Preparation:**

- A. Clean surfaces thoroughly prior to installation.

- B. Prepare surfaces using methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install supplementary temporary and permanent supports as required for proper installation.

**3.3 Installation:**

- A) Install Glass Fiber Reinforced Concrete bollards true to line, plumb and level in accordance with applicable code and manufacturer's recommendations. Shim when necessary.
- B) Patch exposed anchor points to match color and texture of unit.
- C) Clean GFRC Units according to manufacturer's written instructions.
  - 1. Remove dirt, stains or other residue and undesired materials.
  - 2. Protect surrounding materials and surfaces during cleaning.

**3.3 Protection:**

- A) Protect installed products until completion of project.
- B) Touch-up, repair or replace damaged products before substantial completion.

END OF SECTION