



**SECTION 06610**  
**STRUCTURAL REINFORCED POLYMER COMPOSITE ELEVATED TRANSIT BOARDING**  
**PLATFORM SYSTEM**

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**PART 1 GENERAL**

**1.1 SUMMARY**

A. This Section includes the requirements for furnishing and installing all Structural Reinforced Polymer Composite Elevated Transit Boarding Deck Panels (hereinafter referred to as “panels”), including transportation, tools, labor, material and equipment necessary to complete the work. The Contractor’s work includes but is not limited to the following:

1. Supply and install Structural Reinforced Polymer Composite Deck Panels, complete with monolithic Fusion Bonded Aggregate Deck Topping and Tactile Tile Detectable Warning Surface.
2. Verify the location of the structural steel support system in the field.
3. Locate all other items shown in the Construction Documents in order to determine the corresponding openings in the panels.
4. Provide necessary openings during fabrication in all panels requiring opening.
5. Verify in the field all dimensions, elevations and slopes required for the top surface of the panels and report to engineer any discrepancy with contract drawings prior to fabrication.
6. Determine quantities of panels and types to complete the Work.
7. Other appurtenant or related work, as specified herein, directed by the Engineer, or as shown on the drawings.

B. Related Sections:

1. Section 01400 – Site Quality Requirements.
2. Section 02110 – Site Clearing.
3. Section 02368 – Steel “H” Piling.
4. Section 05120 – Steel Pipe Handrails.
5. Section 07900 – Joint Sealants.
6. Section 09900 – Paints and Coatings.

**1.2 REFERENCES**

- A. 2001 American Railway Engineering and Maintenance-of-Way Association (A.R.E.M.A) Manual for Railway Engineering.
- B. 2002 Illinois Department of Transportation (I.D.O.T.) Standard Specifications for Road and Bridge Construction.
- C. Latest BOCA National Building Code.
- D. Latest Manual of Steel Construction of the American Institute of Steel Construction.



### 1.3 SUBMITTALS

- A. MANUFACTURER'S DATA: The Contractor shall submit copies, in accordance with SECTION 01330 – SUBMITTAL PROCEDURES, of the manufacturer's specifications, data and instructions for the manufactured materials and products. Include laboratory test reports from a qualified independent testing laboratory.
- B. SHOP DRAWINGS: The Manufacturer shall prepare shop drawings for submittal in accordance with SECTION 01330 – SUBMITTAL PROCEDURES. All shop drawings shall indicate detailing fabrication and installation including but not limited to the following:
  - 1. Structural Reinforced Polymer Composite Deck Panels:
    - a. Panel dimension and cross-sections, location, size and type of reinforced composite internal flanges, tactile surface and slope(s) for drainage of rainwater.
    - b. Detail loose, cast-in, and field hardware, inserts, connections, and joints, including accessories and construction at openings in panels.
    - c. Locations and details of anchorage devices that are to be embedded in other construction. Furnish templates, if required, for accurate placement.
    - d. Shop Drawings for products specified showing fabrication details of the Structural Reinforced Polymer Composite Deck Panel System, complete with Monolithic Fusion Bonded Aggregate Deck Topping and Detectable Warning Surface Tile System; plans of panel placement and material to be used as well as outlining installation materials and procedures.
    - e. Material test reports from the Manufacturer's Testing and Inspection Agency indicating that materials proposed for use of the Structural Reinforced Polymer Composite Deck Panel System, complete with Monolithic Fusion Bonded Aggregate Deck Topping and Tactile Tile Detectable Warning Surface System are in compliance with requirements and meet the properties indicated.
  - 2. Detectable Warning Tile Surface System:
    - a. Manufacturer's literature of product and routine maintenance practices.
    - b. Include laboratory test reports from a qualified independent testing laboratory.
  - 3. Guarantee for no less than twenty five (25) years from the date of installation against structural fatigue, corrosion, spalling, or cracking. Any such panel that fails during the stipulated guarantee period shall be repaired or replaced at no additional cost to owner.

### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: The Contractor shall engage an experienced Installer who has completed installation of Structural Reinforced Polymer Composite Deck Panel, complete



with Monolithic Fusion Bonded Aggregate Deck Topping and Detectable Warning Tile Surface Systems, similar in material, design and extent to that indicated for this Project and with a five year record of successful in-service performance.

1. Installer shall have full knowledge of railroad restrictions for work on this project, and shall be equipped to handle all panel related materials on site. All site equipment shall remain clear of overhead electrical lines and shall be installed only during those time periods allowed in the contract documents.
  2. Equipment that can be extended to within 15'-0" of any overhead electrical wire will require the wire to be de-energized and the adjacent track taken temporarily out of service.
  3. A schedule of erection equipment and erection progress shall be submitted prior to the start of Work.
- B. Manufacturer's Qualifications: Firm experienced in producing Structural Reinforced Polymer Composite Deck Panels similar to those indicated for this Project and with a record of successful in-service performance as well as sufficient production capacity to produce required units without delaying the Work.
1. The Manufacturer shall have a minimum of five (5) years of Structural Reinforced Polymer Composite Deck Panel manufacturing experience plus personnel with a minimum of five (5) years cumulative direct supervisory experience in the manufacture of structural cast composite polymer products.
- C. State of Illinois: "Accessibility Standards"
- D. Federal: "Americans with Disabilities Act"
- E. Pre-installation Conference: Conduct conference at Project site to comply with the requirements of the Conditions of the Contract and of Division 1 – General Requirements.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver panels to Project site in such quantities and at such times to ensure continuity of installation. Store panels at Project site in a location approved by engineer, and prevent cracking, distorting, warping, staining, or other physical damage.
- B. Deliver anchorage items that are to be embedded in other construction before starting such work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

## PART 2 PRODUCTS

### 2.1 STRUCTURAL REINFORCED POLYMER COMPOSITE DECK PANEL SYSTEM

- A. Available Manufacturer's for the Structural Reinforced Polymer Composite Deck Panel System, complete with Monolithic Fusion Bonded Aggregate Deck Topping Detectable



Warning Tile System: Subject to compliance with requirements, fabricators offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Armor-Deck Transit Platform System as fabricated by Engineered Plastics, Inc. 100-300 International Drive Williamsville, NY 14221 ATTN: Ken Szekely 1-800-682-2525.

- B. Tensile Modulus of Elasticity: ASTM D 638 - 570,000 psi
- C. Compressive Strength: ASTM C 109 - 5000 psi
- D. Bond Strength: ACI 503R - 100% substrate failure
- E. Freeze Thaw Resistance: ASTM C 666 - Pass (no change)
- F. Wet Skid Resistance: ASTM E 274 - Minimum 40
- G. Tensile Strength: ASTM C 307 - Minimum 1200 psi
- H. Flexural Strength: ASTM C 580 - Minimum 1000 psi
- I. Tensile Adhesion: ACI 503R - 250 psi pull off
- J. Color to be approved by owner.

## 2.2 MONOLITHIC FUSION BONDED AGGREGATE DECK TOPPING

- A. This “Diamond Hard” vitrified polymer composite, is fabricated as one component of the Structural Reinforced Polymer Composite Deck Panel System: Subject to compliance with requirements, fabricators offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Monolithic Diamond-Tek granite wearing surface as fabricated by Engineered Plastics, Inc. 100-300 International Drive, Williamsville, NY 14221 ATTN: Ken Szekely 1-800-682-2525

- B. Epoxy Resin: Use only one brand and type of epoxy resin throughout Project, unless otherwise approved by engineer.

- C. Aggregate Percentages:

Silica Sand 25-30% - 12-40 mesh  
Granite Stone 40-45% - 6-20 mesh  
Alumina Trihydrate 15% - 15 micron.

## 2.3 CONNECTION MATERIALS AND FINISHES

- A. Galvanized Steel: As provided by Structural Reinforced Polymer Composite Deck Panel manufacturers.
- B. Bolts and Studs: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); nickel-plated nuts; connecting rod; and flat, unhardened steel washers.
- C. Accessories: Provide required to install panels.



## 2.4 BEARING PADS

- A. Provide size of pads for panels as follows:
  - 1. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, Durometer 60
- B. Subject to compliance with requirements, elastomeric pads that may be incorporated to the project include but is not limited to the following:
  - 1. J.V.I. Inc., 7550 Linder Avenue, Skokie, Illinois (847) 675-1560.

## 2.5 DETECTABLE WARNING TILE SYSTEM

- A. Detectable Warning Tiles System shall consist of raised truncated domes with the following dimensions and tolerances:

Length and Width	24"x48" ± 0.6% max
Thickness	0.1875" ± 0% adhesive applied
Dome Height	0.200 ± 5% max.
Dome Diameter – Base	1.234" ± 8% max.
Dome Diameter – Top	0.851" ± 3% max.
Center-to-Center of Domes	2.63 ± 11% max.
Warpage of edges	± 0.5% max.

- B. Tile Composition: Vitrified Polymer Composite (VPC).
- C. Color: Color will be safety yellow and shall employ an in mold coating system and be integral throughout the matrix.
- D. Approved Manufacturer: Subject to compliance with requirements, fabricators offering products that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Armor-Tile as fabricated by Engineered Plastics, Inc. 100-300 International Drive, Williamsville, NY 14221 ATTN: Ken Szekely 1-800-682-2525.

## 2.6 FABRICATION

- A. Tooling: Accurately construct forms of sufficient strength to withstand pressures due to molding operations, and temperature changes. Maintain formwork to provide completed panels, lines and dimensions indicated, within fabrication tolerances specified.
- B. Built-In Anchorages: Accurately position built-in anchorage devices as per detailed fabrication drawings. Locate anchorages where they do not affect the position of the main reinforced composite internal "I" beams.



- C. Cast-in Openings: Openings larger than 5 inches in diameter of 5 inches square according to final shop drawings. Smaller holes may be field cut or drilled by trades requiring them without cutting "I" beams and if acceptable to engineer.
- D. Top Surface Finish: The Monolithic Fusion Bonded Aggregate Deck Topping surface of the panels shall be a non-skid granite wearing surface meeting ASTM C-1028 Standards for non slip finish. Samples to be submitted to owner for approval.
- E. Tolerances: Panel fabrication shall not exceed the following tolerance criteria:
  - 1. Panel length:  $\pm 1/8$  inch
  - 2. Panel width:  $\pm 1/8$  inch
  - 3. Panel squareness: 0.002 radians (2:1000)
  - 4. Panel camber:  $\pm 1/8$  inch in length or width
  - 5. Panel thickness:  $\pm 1/16$  inch
  - 6. Draft on sides and ends of panel:  $\pm 1/16$  inch
- F. Finish Structural Reinforced Polymer Composite Deck Panels as follows:
  - 1. Finish along surfaces in contact with each other. Normal plant-run finish that produces an exposed surface smooth finish.
- G. Cleaning and Protection:
  - 1. Perform the following operations prior to shipping panels:
    - a. Sweep or vacuum top surface sections thoroughly.
    - b. Clean tactile tiles, using rugged bristle broom and commercial detergent being careful to remove marks or any residue. Flush clean with water.
    - c. Remove any excess grout or other surface blemishes using appropriate cleaner recommended by tactile tiles manufacturer.
- H. Protect panels against damage during construction period to comply with detectable warning tiles manufacturer's directions.
  - 1. Protect detectable warning tiles against damage from rolling loads for initial period following installation by covering with plywood or hardboard, using dollies to move stationary equipment across planks.
  - 2. Cover detectable warning tiles with undyed, untreated building paper or plastic until inspection and substantial completion.
  - 3. Clean panel surface including detectable warning tiles not more than four (4) days prior to date scheduled for inspections intended to establish date or substantial completion in each area of project. Clean tiles by method recommended by the tile manufacturer.

## 2.7 PLANT QUALITY CONTROL EVALUATIONS



- A. Engineer's testing and Inspection Agency will evaluate Structural Reinforced Polymer Composite Panel manufacturer's quality control, testing methods and test results.
  - 1. Allow engineer's Testing and Inspection Agency access to material storage areas, Structural Reinforced Polymer Composite Panels production equipment, materials placement, and curing facilities.
  - 2. Allow engineer's Testing and Inspection Agency access to the Contractor's testing and Inspection Agency testing of the Structural Reinforced Polymer Composite Panels.
  - 3. Cooperate with engineer's Testing and Inspection Agency and provide samples of materials and other items as may be requested for additional testing and evaluation.
  
- B. Structural Reinforced Polymer Composite Panels will be considered potentially deficient if they fail to comply with specified requirements, including, but not limited to the following:
  - 1. Test results fail to meet design strengths.
  - 2. Curing and protection of panels fail to meet requirements.
  - 3. Panels are damaged during handling and erecting.
  
- C. Structural Reinforced Polymer Composite Panel Testing:
  - 1. Full scale load and material testing shall be performed by the Contractor's Testing and Inspection Agency.
  - 2. Uniform Design Load Tests based on the 125 pounds per square foot (Live Load = 100 pounds per square foot plus Snow Load = 25 pounds per square foot).
  - 3. Concentrated Design Load Tests based on snow removal equipment vehicle = 10,000 pounds, with a wheel base of 13' - 0" longitudinal and 6' - 6" transverse.
  - 4. Uniform Ultimate Load Tests to determine the margin of safety above the design load the panel can withstand, based on 650 pounds per square foot or failure, whichever comes first.
  - 5. Coefficient of Friction/Slip Resistance Test using standard test method ASTM-C 1028-89, the combined wet/dry static coefficient of friction not to be less than 0.80.
  - 6. Abrasion Resistance Test using test method ASTM C 1353 -96.
  - 7. When there is evidence that the strength or durability of panels may be deficient or may not meet requirements, the engineer shall appoint a Testing and Inspection Agency to obtain, prepare and test samples obtained from completed Structural Reinforced Polymer Composite Panels to determine design strengths and to perform structural evaluation or other necessary analysis.
  
- D. Test results will be made in writing on the same day that tests are made, with copies to engineer, contractor, and fabricator. Test reports will include the Project identification name and number, date, name and Structural Reinforced Polymer Composite Panel fabricator, name



of testing agency; identification letter, name and identification of plank or panels represented by tests; test strengths, and type of break, and direction of applied load with respect to the top surface of panel.

- E. Dimensional Tolerances: Panels having dimensions smaller or greater than tolerance limits may be rejected.
  - 1. Panels having dimensions outside the specified tolerances will be rejected if the appearance or function of the structure is adversely affected or if larger dimensions interfere with other construction.
  - 2. Repair or remove and replace rejected units, as required by engineer, to meet construction conditions.
- F. Defective Work: Panels not conforming to requirements, including strength, durability requirements, manufacturing tolerances, and finishes, are unacceptable. Remove rejected panels and replace with panels conforming to requirements.
- G. Detectable Warning Tile System - material testing shall be performed by the Manufacturer's Testing and Inspection Agency and comply with specified requirements
  - 1. Water Absorption of Tile when tested by ASTM D 570-98 not to exceed 0.05%.
  - 2. Slip Resistance of Tile when tested by ASTM C 1028-96 the combined Wet and Dry Static Co-Efficients of Friction not to be less than 0.80 on top of domes and field area.
  - 3. Compressive Strength of Tile when tested by ASTM D 695-02a not to be less than 28,000 psi.
  - 4. Tensile Strength of Tile when tested by ASTM D 638-03 not to be less than 19,000 psi.
  - 5. Flexural Strength of Tile when tested by ASTM D 790-03 not to be less than 25,000 psi.
  - 6. Chemical Stain Resistance of Tile when tested by ASTM D 543-95 (re approved 2001) to withstand without discoloration or staining - 10% hydrochloric acid, urine, saturated calcium chloride, black stamp pad ink, chewing gum, red aerosol paint, 10% ammonium hydroxide, 1% soap solution, turpentine, Urea 5%, diesel fuel and motor oil.
  - 7. Abrasive Wear of Tile when tested by BYK - Gardner Tester ASTM D 2486-00 with reciprocating linear motion of  $37 \pm$  cycles per minute over a 10" travel. The abrasive medium, a 40 grit Norton Metallite sand paper, to be fixed and leveled to a holder. The combined mass of the sled, weight and wood block is to be 3.2 lb. Average wear depth shall not exceed 0.060 after 1000 abrasion cycles when measured on the top surface of the dome representing the average of three measurement locations per sample.
  - 8. Resistance to Wear of Unglazed Ceramic Tile by Taber Abrasion per ASTM C501-84 (re approved 2002) shall not be less than 500.
  - 9. Fire Resistance of Tile when tested to ASTM E 84-05 flame spread shall be less than 15.





10. Gardner Impact to Geometry "GE" of the standard when tested by ASTM D 5420-04 to have a mean failure energy expressed as a function of specimen thickness of not less than 550 in. lbf/in. A failure is noted when a crack is visible on either surface or when any brittle splitting is observed on the bottom plaque in the specimen.
11. Accelerated Weathering of Tile when tested by ASTM G 155-05a for 3000 hours shall exhibit the following result –  $\Delta E < 4.5$ , as well as no deterioration, fading or chalking of surface of tile color No 33538
12. Accelerated Aging and Freeze Thaw Test of Tile and Adhesive System when tested to ASTM D 1037-99 shall show no evidence of cracking, delamination, warpage, checking, blistering, color change, loosening of tiles or other detrimental defects.
13. Salt and Spray Performance of Tile and Adhesive System when tested to ASTM B 117-03 not to show any deterioration or other defects after 200 hours of exposure.

## PART 3 EXECUTION

### 1.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements, including installation tolerances, true and level bearing surfaces, and other conditions affecting performance of the panels. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 1.2 INSTALLATION

- A. Bearing pads: Install bearing pads as panels are being erected. Set pads on true, level, and uniform bearing surfaces and maintain in correct position by bonding it to the top flange of the steel beams until panels are placed.
- B. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to panels, unless otherwise approved by engineer.
- C. Erection Tolerances: Install panels square and true, without exceeding the following tolerances:
  1. Variations from Level or Elevation: 1/8" in any 20' run.
  2. Variation from Position in Plan: Plus or minus 1/4" maximum at any location along the platform.
  3. Offsets in Alignment of Adjacent Panels at any Joint: 1/16" in any 10' run.



### 3.3 CLEANING

- A. Clean exposed surfaces of planks after erection to remove markings, dirt and stains.
  - 1. Wash and rinse according to Structural Reinforced Polymer Composite Deck Panel manufacturer's recommendations. Protect other work from staining or damage due to cleaning operations.
  - 2. Do not use cleaning materials or processes that could change the appearances of exposed composite finishes.

### PART 4 MEASUREMENT AND PAYMENT (NOT USED)

END OF SECTION