

SECTION 06610  
STRUCTURAL REINFORCED POLYMER COMPOSITE DECK PANELS AT GRADE

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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 deck panels (hereinafter referred as “panels”), including transportation, 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 Panel system complete with Detectable Warning Surface Tile.
  2. Verify in the field all dimensions elevations and slopes required for the top surface of the panels and report to METRA any discrepancy with contract drawings prior to fabrication.
  3. Determine quantities of standard panels, crossing panels and end panels to complete the work.
  4. 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 07900 | Joint Sealants            |

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 product data, specifications and instructions and service manual. Include laboratory test reports. Note: Samples and “As Built – drawings” are not included as part of the submittal package.
- 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. Detail field hardware, connections, and joints including accessories.
    - b. Locations and details of anchorage devices that are to be embedded/drilled in other construction.

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- c. Type of panels (i.e. Standard, Crossing, End Returns)
  - d. Material test reports from Manufacturer indicating that materials proposed for use of the Structural Reinforced Polymer Deck Panel system complete with Detectable Warning Surface Tiles system are in compliance with the requirements and meet the properties indicated.
2. Detectable Warning Surface Tile System:
- a. Manufacturer's literature describing products routine maintenance practices.
- C. GUARANTEE: Guarantee for no less than ten (10) years from the date of installation against spalling, cracking or color fading of the product. Any such panel that fails during the stipulated guarantee period shall be replaced with new panels at no additional cost to Metra.

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 system, complete with Detectable Warning Surface Tile 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 on 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 for transit applications 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 composite polymer deck panel manufacturing experience plus personnel with a minimum of five (5) years cumulative direct supervisory experience in the manufacture of structural composite polymer products.
- D. State of Illinois: "Accessibility Standards"
- E. Federal: "Americans with Disabilities Act"
- F. 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 METRA, and prevent cracking, distorting, warping, staining, or other physical damage.

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- B. Deliver anchorage items that are to be embedded in other construction before starting such work. Review connections drawings as required for installation.

PART 2 PRODUCTS

2.1 STRUCTURAL REINFORCED POLYMER COMPOSITE DECK PANEL SYSTEM

- A. Available Manufacturers for the Structural Reinforced Polymer Composite Deck Panel System, complete with Detectable Warning Surface 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. 300 International Drive, Suite 100 Williamsville, NY 14221 ATTN: Ken Lawrence or Jim Darling 1-800-682-2525.

- B. Structural Reinforced Polymer Composite Panels shall have the following dimension:

Standard Panel: Length 7'-11 3/4", Width 2'-0", Depth 6"

Standard Crossing Panel: Length 6'-0", Width 3'-0", Depth 6"

Non-Standard Crossing Panel: Length 8'-0", Width 3'-0", Depth 6"

Standard End Return Panel: Length 7'-4", Width 3'-0", Depth 6"

2.2 CONNECTION MATERIALS AND FINISHES

- A. Plates to be galvanized of a grade suitable for application.
- B. Steel angles to be galvanized of a grade suitable for application
- C. Threaded rod, nuts and washers to be zinc plated

2.3 CAULKING/EXPANSION MATERIALS

EMSEAL Expandable AST HI Acrylic Expanded Sealant

2.4 TACTILE TILE DETECTABLE WARNING SURFACE

- A. Tactile surface tiles 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.
Warping of edges	± 0.5% max.

- B. Tile Composition: Polymer composite epoxy resin
- 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:

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- a. Armor-Tile as fabricated by Engineered Plastics, Inc 300 International Drive, Suite 100 Williamsville, NY 14221 ATTN: Ken Lawrence or Jim Darling 1-800-682-2525.

2.5 FABRICATION

- A. Tooling: Accurately construct tooling of sufficient strength to withstand pressures due to molding operations, and temperature changes. Maintain tooling to provide completed panels or shapes, lines and dimensions indicated, within manufacturer's tolerances specified.
- B. Tolerances: Panel fabrication shall not exceed the following tolerances criteria.
  - a. Panel length  $\pm 1/8$  inch
  - b. Panel width  $\pm 1/8$  inch
  - c. Panel squareness 0.002 radians (2:1000)
  - d. Panel camber:  $\pm 1/8$  inch in length or width
  - e. Panel thickness:  $\pm 1/16$  inch
  - f. Draft on sides and ends of panel  $\pm 1/16$  inch
- C. Finish Structural Reinforced Polymer Composite Deck Panels as follows:
  - a. Finish along surfaces in contact with each other. Normal plant-run finish that produces an exposed surface smooth finish.
- D. Expansion Joints: Emseal expansion material to be used between structural reinforced polymer composite deck panels and adjacent surfaces.
- E. Cleaning and Protection:
  1. Protect panels against damage during construction period to comply with tactile surface tiles manufacturer's directions.
    - a. Protect detectable warning surface 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.
    - b. Cover detectable warning surface tiles with undyed, untreated building paper or plastic until inspection substantial completion.
  2. Clean detectable warning surface tiles not more than four (4) days prior to date scheduled for inspections intended to establish date or substantial completing in each area of project. Clean detectable warning surface tiles by method recommended by panel manufacturer.

2.6 PLANT QUALITY CONTROL EVALUATIONS

- A. METRA's Testing and Inspection Agency will evaluate the Structural Reinforced Polymer Composite Panel for manufacturer's quality control, testing methods and test results.
  1. Allow METRA's Testing and Inspection Agency access to material storage areas, Structural Reinforced Polymer Composite Panels production equipment, materials placement, and curing facilities.
  2. Cooperate with METRA's Testing and Inspection Agency and provide samples of materials and other items as may be requested for additional testing and evaluation.
  3. Allow METRA's Testing and Inspection Agency to be present during the testing of the Structural Reinforced Polymer Composite Panels.

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- 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 Manufacturer's Testing and Inspection Agency.
    - a. Uniform Design Load Tests based on 125 pounds per square foot (Live Load = 100 pounds per square foot plus snow load = 25 pounds per square foot).
    - b. Concentrated Design Load Tests based on snow removal equipment vehicles = 10,000 pounds, with a wheel base of 13'-0" longitudinal and 6'-6" transverse.
    - c. Uniform Ultimate Load Test to determine the margin of safety above the design load the panel can withstand, based on 650 pounds per square foot of failure, whichever comes first.
  2. When there is evidence that the strength or durability of panels may be deficient or may not meet requirements, METRA's Testing and Inspection Agency will 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.
  3. Test results will be made in writing on the same day that tests are made, with copies to METRA, 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
- D. 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 MERTA, to meet construction conditions.
- E. 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
- F. Detectable Warning Surface Tile System - material testing shall be performed by the Manufacturer's Testing and Inspection Agency and comply with specified requirements
- a. Water Absorption of Tile when tested by ASTM D 570-98 not to exceed 0.05%.
  - b. 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.

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- c. Compressive Strength of Tile when tested by ASTM D 695-02a not to be less than 28,000 psi.
- d. Tensile Strength of Tile when tested by ASTM D 638-03 not to be less than 19,000 psi.
- e. Flexural Strength of Tile when tested by ASTM D 790-03 not to be less than 25,000 psi.
- f. 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.
- g. 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.
- h. Resistance to Wear of Unglazed Ceramic Tile by Taber Abrasion per ASTM C501-84 (re approved 2002) shall not be less than 500.
- i. Fire Resistance of Tile when tested to ASTM E 84-05 flame spread shall be less than 15.
- j. 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.
- k. 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
- l. 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.
- m. 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

3.1. 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.

3.2 INSTALLATION

- A. 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.

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3.3 CLEANING

- A. Clean exposed surfaces of planks after erection to remove markings, dirt and stains.
  - 1. Wash and rinse according to precast composite fabricator'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