

## **REPLACEABLE CAST IN PLACE DETECTABLE/TACTILE WARNING TILE**

### **Section 32 17 26**

#### **DETECTABLE/TACTILE WARNING SURFACES**

##### **PART 1 GENERAL**

###### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Special Conditions and Division 1 Specifications Section, apply to this Section.

###### **1.02 DESCRIPTION**

- A. This Section specifies furnishing and installing Replaceable Cast in Place Detectable/Tactile Warning Tiles where indicated. Not recommended for asphalt applications.

###### **1.03 SUBMITTALS**

- A. Product Data: Submit manufacturer's literature describing products, installation procedures and routine maintenance.
- B. Samples for Verification Purposes: Submit two (2) tile samples minimum 12"x12" of the kind proposed for use.
- C. Shop drawings are required for products specified showing fabrication details, composite structural system, tile surface profile, fastener and anchor locations, plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.
- D. Material Test Reports: Submit complete test reports from qualified accredited independent testing laboratories to qualify that materials proposed for use are in compliance with requirements and meet or exceed the properties indicated on the specifications. All tests shall be conducted on a Replaceable Cast In Place Detectable Tactile Warning Tile system as certified by a qualified independent testing laboratory.
- E. Maintenance Instructions: Submit copies of manufacturer's specified installation and maintenance practices for each type of Detectable Warning Tile and accessories as required.

###### **1.04 QUALITY ASSURANCE**

- A. Provide Replaceable Cast in Place Detectable/Tactile Warning Tiles and accessories as produced by a single manufacturer with a minimum of three (3) years' experience in the manufacturing of Replaceable Cast In Place Detectable/Tactile Warning Tiles.
- B. Installer's Qualifications: Engage an experienced installer certified in writing by Replaceable Cast in Place Detectable/Tactile Warning Tile manufacturer as qualified for installation, who has successfully completed installations similar in material, design, and extent to that indicated for Project.

# **Armor-Tile**

## **Tactile Systems**

- C. Americans with Disabilities Act (ADA): Provide Replaceable Detectable/Tactile Warning Tiles which comply with the detectable warnings on walking surfaces section of the Americans with Disabilities Act (Title III Regulations, 28 CFR Part 36 ADA STANDARDS FOR ACCESSIBLE DESIGN, Appendix A, Section 4.29.2 DETECTABLE WARNINGS ON WALKING SURFACES.
- D. California Code of Regulations (CCR): Provide only approved DSAAC detectable warning products as provided in the California Code of Regulations (CCR) Title 24, Section 1112A.9 and 1127B.5 for "Curb Ramps" and Section 1133B.8.5 for "Detectable Warnings at Hazardous Vehicular Areas".
- E. Herculite Polymer Composite (HLT) Replaceable Cast in Place Detectable/Tactile Warning Tiles shall be manufactured from a proprietary polymer sheet molded composition (industry term SMC) with fiberglass reinforcement, the tile shall incorporate an in-line pattern of truncated domes measuring nominal 0.2" height, 0.9" base diameter, and 0.45" top diameter, spaced center-to-center 2.40" nominal (+/- 0.05) as measured side by side. For wheelchair safety the field area shall consist of a non-slip surface with a minimum of 30 - 90° raised points 0.045" high, per square inch; Armor-Tile "Herculite Series" as manufactured by Engineered Plastics Inc., Tel: 800-682-2525, or approved equal.
  - 1. Dimensions: Replaceable Cast in Place Detectable/Tactile Warning Tiles shall be held within the following dimensions and tolerances:
    - Length and Width: [24x24], [24x36], [24x48], [24x60] nominal
    - Minimum number of Anchors: [24x24] = 9, [24x36] = 12, [24x48] = 13, [24x60] = 18
  - 2. Water Absorption of Tile when tested by ASTM D 570 not to exceed 0.05%.
  - 3. Slip Resistance of Tile when tested by ASTM C 1028 the combined Wet and Dry Static Coefficient of Friction not to be less than 0.80 on top of domes and field area.
  - 4. Compressive Strength of Tile when tested by ASTM D 695 not to be less than 25,000 psi.
  - 5. Tensile Strength of Tile when tested by ASTM D 638 not to be less than 12,500 psi.
  - 6. Flexural Strength of Tile when tested by ASTM D 790 not to be less than 30,000 psi.
  - 7. Chemical Stain Resistance of Tile when tested by ASTM 1308 no effect.
  - 8. Resistance to Wear of Unglazed Ceramic Tile by Taber Abrasion per ASTM C501 shall not be less than 500.
  - 9. Fire Resistance of Tile when tested to ASTM E 84 flame spread shall be less than 25.
  - 10. Accelerated Aging and Freeze Thaw Test of Tile and Adhesive System when tested to ASTM C 1026 and ASTM D1037 shall show no evidence of cracking, delaminating, warpage, chalking, blistering, color change, loosening of tiles or other detrimental defects.
  - 11. Salt and Spray Performance of Tile when tested to ASTM B 117 not to show any deterioration or other defects after 200 hours of exposure.
  - 12. AASHTO HB-17 single wheel HS20-44 loading "Standard Specifications for Highways and Bridges". The Replaceable Cast in Place Tile shall be mounted on a concrete platform with 1/32" airspace at the underside of the tile top plate then subjected to the specified maximum load of 10,400 lbs., corresponding to an 8000lb individual wheel load and a 30% impact factor. The tile shall exhibit no visible damage at the maximum load of 10,400 lbs.

# **Armor-Tile**

## Tactile Systems

13. Linear Thermal Expansion tested to ASTM D696-03 shall not exceed  $9.45 \times 10^{-7}$  per degree Fahrenheit.

### **1.05 DELIVERY, STORAGE AND HANDLING**

- A. Replaceable Cast in Place Detectable/Tactile Warning Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy plastic wrappings to protect tile from concrete residue during installation and tile type shall be identified by part number.
- B. Replaceable Cast In Place Detectable/Tactile Warning Tiles shall be delivered to location at building site for storage prior to installation.

### **1.06 SITE CONDITIONS**

- A. Environmental Conditions and Protection: Maintain minimum temperature of 40°F in spaces to receive Replaceable Cast In Place Detectable/Tactile Warning Tiles for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.
- B. The use of water for work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the general public. Provide barricades or screens to protect the general public.

### **1.07 GUARANTEE**

- A. Replaceable Cast in Place Detectable/Tactile Warning Tiles shall be guaranteed in writing for a period of five (5) years from date of final completion. The guarantee includes defective work, breakage, deformation, fading and loosening of tiles.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. The Herculite Polymer Composite (HLT) Replaceable Cast In Place Detectable/Tactile Warning Tile specified is based on Armor-Tile HLT Part Number ATR-2424, manufactured by Engineered Plastics Inc. (800-682-2525) existing engineered and field tested products, which have been in successful service for a period of three (3) years are subject to compliance with requirements, may be incorporated in the work and shall meet or exceed the specified test criteria and characteristics.
- B. Color: Yellow conforming to Federal Color No. 33538. Color shall be homogeneous throughout the tile. Note: slight variation in material composition may occur occasionally due to raw material supplier variations. Tiles are also available in Dark Grey (Federal Color No. 36118), Onyx Black (Federal Color No. 17038), Brick Red (Federal Color No. 22144), and Colonial Red (Federal Color No. 20109).



# **Armor-Tile**

## Tactile Systems

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. During Replaceable Cast in Place Detectable/Tactile Warning Tile installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.
- B. Prior to placement of the Replaceable Cast in Place Detectable/Tactile Warning Tile system, review manufacturer's instructions and contract drawings with the Contractor prior to the construction and refer any and all discrepancies to Project Engineer.
- C. The specifications and related materials shall be in strict accordance with the contract documents and the guidelines set by their respective manufacturers. Not recommended for asphalt applications.
- D. The physical characteristics of the concrete shall be consistent with the contract specifications while maintaining a slump range of 4 - 7 to permit solid placement of the Replaceable Cast in Place Detectable/Tactile Warning Tile system. An overly wet mix will cause the tile to float. Under these conditions, suitable weights such as sandbags shall be placed on tile.
- E. The concrete pouring and finishing operations require typical mason's tools, however, a 4' long level with electronic slope readout, and 10 lb. sandbags are specific to the installation of the Replaceable Cast In Place Detectable/Tactile Warning Tile system.
- F. The factory-installed plastic sheeting must remain in place during the entire installation process to prevent the splashing of concrete onto the finished surface of the tile.
- G. When preparing to set the tile, it is important that no concrete be removed in the area to accept the tile. It is imperative that the installation technique eliminates any air voids under the tile. Gaps in the tile perimeter allow air to escape during the installation process.
- H. The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the tile placement. Immediately after finishing concrete, the electronic level should be used to check that the required slope is achieved. The tile shall be placed true and square to the curb edge in accordance with the contract drawings. The Replaceable Cast In Place Detectable/Tactile Warning Tiles shall be tamped (or vibrated) into the fresh concrete to ensure that the field level of the tile is flush to the adjacent concrete surface. The embedment process should not be accomplished by stepping on the tile as this may cause uneven setting which can result in air voids under the tile surface. The contract drawings indicate that the tile field level (base of truncated dome) is flush to adjacent surfaces to permit proper water drainage and eliminate tripping hazards between adjacent finishes.
- I. In cold weather climates it is recommended that the Replaceable Cast In Place Detectable/Tactile Warning Tiles be set deeper such that the top of domes are level to the adjacent concrete on the top and sides of ramp. This installation will reduce the possibility of damage due to snow clearing operations. Care should be taken to finish the concrete on the side of the tile with the lower elevation, adding channels to allow water to drain from the field surface of the tile.
- J. Immediately after placement, the tile elevation is to be checked to adjacent concrete. The elevation and slope should be set consistent with contract drawings to permit water drainage to curb as the

# **Armor-Tile**

## Tactile Systems

design dictates. Ensure that the field surface of the tile is flush with the surrounding concrete and back of curb so that water ponding is not possible on the tile at the back side of curb.

- K. While concrete is workable, a 1/8" radius edging tool shall be used to create a finished edge of concrete, then a steel trowel shall be used to finish the concrete around the tile's perimeter, flush to the field level of the tile.
- L. During and after the tile installation and the concrete curing stage, it is imperative that there is no walking, leaning or external force placed on the tile that may rock the tile causing a void between the underside of tile and concrete.
- M. Following tile placement, review installation tolerances to contract drawings and adjust tile before the concrete sets. Suitable weights of 10 to 25 lb. each may be required to be placed on each tile as necessary to ensure solid contact of the underside of tile to concrete.
- N. Following the concrete curing stage, protective plastic wrap is to be removed from the tile surface by cutting the plastic with a sharp knife, tight to the concrete/tile interface. If concrete bled under the plastic, a soft brass wire brush will clean the residue without damage to the tile surface.
- O. Tiles can be cut to custom sizes, or to make a radius, using a continuous rim diamond blade in a circular saw or mini-grinder. Use of a straightedge to guide the cut is advisable where appropriate.

### **3.02 REPLACING TILES, PROTECTING AND MAINTENANCE**

- A. Protect tiles against damage during construction period to comply with Tactile Tile manufacturers' specification.
- B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.
- C. Replace tiles by method specified by tactile manufacturer.
- D. Comply with manufacturer's maintenance manual for cleaning and maintaining tile surface. It is recommended to perform annual inspections for safety and tile integrity.

**END OF SECTION**

