

## **SECTION 32 17 26**

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

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## **CAST IN PLACE 4" X 24" DETECTABLE GUIDANCE 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 Cast In Place Detectable Guidance 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) samples minimum 4"x6" Cast In Place Detectable Guidance Tiles of the kind proposed for use.

C. Shop drawings are required for products specified showing fabrication details, composite structural system, reinforcement flange spacing, 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 laboratory's 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 Cast In Place Detectable Guidance Tile system as certified by a qualified independent testing laboratory and be current within a 24 month period.

E. Maintenance Instructions: Submit copies of manufacturer's specified maintenance practices for each type of tactile tile and accessory as required.

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

A. Provide Cast In Place Detectable Guidance Tiles and accessories as produced by a single manufacturer. The manufacturer shall have a minimum of two (2) years experience in the manufacture of Detectable Guidance Tiles.

B. Installer's Qualifications: Engage an experienced Installer certified in writing by tactile manufacturer as qualified for installation, who has successfully completed tile installations similar in material, design, and extent to that indicated for Project. Manufacturer's supervisor shall be present at all times during the installation of the Detectable Guidance Tiles.

C. Vitrified Polymer Composite (VPC) Cast In Place Detectable Guidance Tiles shall be an epoxy polymer composition employing aluminum oxide particles in the tile surface.

1. Tile Dimensions: Nominal 4" by 24" by 0.3125 inches thick. Tiles shall be formed with ¼" thick structural flanges which extend below the surface a minimum of 1".
2. Water Absorption of Tile when tested by ASTM D 570-98 not to exceed 0.05%.
3. 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 tile surface.
4. Compressive Strength of Tile when tested by ASTM D 695-02a not to be less than 28,000 psi.
5. Tensile Strength of Tile when tested by ASTM D 638-03 not to be less than 19,000 psi.
6. Flexural Strength of Tile when tested by ASTM D 790-03 not to be less than 25,000 psi.
7. 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.
8. Abrasive Wear of Tile when tested by BYK - Gardner Tester ASTM D 2486-00 with reciprocating linear motion of 37± 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.
9. Resistance to Wear of Unglazed Ceramic Tile by Taber Abrasion per ASTM C501-84 (re approved 2002) shall not be less than 500.
10. Fire Resistance of Tile when tested to ASTM E 84-05 flame spread shall be less than 15.
11. 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.
12. 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
13. 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.
14. Salt and Spray Performance of Tile when tested to ASTM B 117-03 not to show any deterioration or other defects after 200 hours of exposure.
15. AASHTO HB-17 single wheel HS20-44 loading "Standard Specifications for Highways and Bridges". The Cast In Place Detectable Guidance Tile shall be mounted on a concrete platform with a ½" airspace at the underside of the tile top plate then subjected to the specified maximum load of 10,400 lbs., corresponding to an 8000 lb individual wheel load and a 30% impact factor. The tile shall exhibit no visible damage at the maximum load of 10,400 lbs.

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

A. Cast In Place Detectable Guidance Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings and tile type shall be identified by part number.

B. Cast In Place Detectable Guidance 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 Cast In Place Detectable Guidance 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. Cast In Place Detectable Guidance Tiles shall be guaranteed in writing for a period of one (1) year 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 Vitrified Polymer Composite (VPC) Cast In Place Detectable Guidance Tiles specified is based on Armor-Tile 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. Tiles are also available in Light Grey (Federal Color No. 26280), Dark Grey (Federal Color No. 36118), Onyx Black (Federal Color No. 17038), Pearl White (Federal Color No. 37875), Brick Red (Federal Color No. 22144), Ocean Blue (Federal Color No. 15187), Ochre Yellow (Federal Color No. 23594), and Colonial Red (Federal Color No. 20109).

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

A. During Cast In Place Detectable Guidance Tile installation procedures ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.

B. The specifications of the structural embedment flange anchoring system 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.

C. 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 Cast In Place Detectable Guidance Tile system. An overly wet mix will cause the tile to float. Under these conditions, suitable weights shall be placed on each tile.

D. Prior to placement of the Cast In Place Tactile Tile system, the contract drawings shall be reviewed.

E. The concrete pouring and finishing operations require typical mason's tools, however a large non-marring rubber mallet are specific to the installation of the Cast In Place Detectable Guidance Tile system. A vibrating mechanism such as that manufactured by Vibco can be employed, if desired.

F. 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. Holes in the tile perimeter allow air to escape during the installation process. Concrete will flow through the large holes in each embedment flange on the underside of the tile. This will lock the tile solidly into the cured concrete.

G. 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 Cast In Place Detectable Guidance Tiles shall be tamped (or vibrated) into the fresh concrete to ensure that the bottom surface of the tile's top plate rests on the concrete, and the top surface of the tile is just less than ¼" above the level of the concrete to meet ADA requirements. 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 is just less than ¼" above the adjacent surfaces which meets ADA requirements for trip hazards

H. Immediately after placement, the tile elevation is to be checked to adjacent concrete.

I. While concrete is workable, a 3/8" 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.

J. During and after the tile installation and the concrete curing stage, it is imperative that there is no walking, leaning or external forces placed on the tile that may rock the tile causing a void between the underside of tile and concrete.

K. Following tile placement, review installation tolerances to contract drawings and adjust tile before the concrete sets.

M. Following the concrete curing stage, if concrete splashed onto the surface of the tile, a soft brass wire brush will clean the residue without damage to the tile surface.

### **3.02 CLEANING, PROTECTING AND MAINTENANCE**

A. Protect tiles against damage during construction period to comply with Tactile Tile manufacturer's specification.

B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.

C. Clean Tactile Tiles not more than four days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project. Clean Tactile Tile by method specified by Tactile Tile manufacturer.

D. Comply with manufacturers maintenance manual for cleaning and maintaining tile surface and it is recommended to perform annual inspections for safety and tile integrity.

### **END OF SECTION**