



SURFACE APPLIED DETECTABLE/TACTILE WARNING SURFACES

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 Surface Applied Detectable/Tactile Warning Surface 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 6"x6" of the kind proposed for use.
- C. Shop drawings are required for products specified showing fabrication details, composite structural system, tile surface profile, sound on cane contact amplification feature, 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 Surface Applied Detectable/Tactile Warning Surface 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 installation and maintenance practices for each type of Detectable Warning Surface Tile and accessory as required.

1.04 QUALITY ASSURANCE

- A. Provide Surface Applied Detectable/Tactile Warning Surface Tiles and accessories as produced by a single manufacturer with a minimum of three (3) years experience in the manufacturing of Surface Applied Detectable/Tactile Warning Surface Tiles.
- B. Installer's Qualifications: Engage an experienced Installer certified in writing by Surface Applied Detectable/Tactile Warning Surface Tile manufacturer as qualified for installation, who has successfully completed installations similar in material, design, and extent to that indicated for Project.
- C. Americans with Disabilities Act (ADA): Provide Surface Applied Detectable/Tactile Warning Surface 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, Part 2, Section 205 definition of "Detectable Warning". Section 1117A.4 and 1127B.5 for "Curb Ramps" and Section 1133B.8.5 for "Detectable Warnings at Hazardous Vehicular Areas".

The **Ultimate Solution**™ in Detectable Warning Systems



E. Stainless Steel Surface Applied Detectable/Tactile Warning Surface Tiles shall have an integral non-slip surface stamped into the stainless steel plate on the top of the domes and in the field surface between the domes. It shall have an ultra violet stabilized coating. 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 2.4" as measured on a diagonal and 1.7" as measured side by side. For wheelchair and high heel shoe safety the field area shall consist of an integral non-slip surface (within the stainless steel plate) that measure 0.03 above the adjacent surface; "Advantage Tactile Systems" as manufactured by Advantage Tactile Systems Inc., Tel: 800-679-4022, or approved equal.

1. Dimensions: Surface Applied Detectable/Tactile Warning Surface Tiles shall be held within the following dimensions and tolerances:

Specifiers Note: Edit section below by selecting desired length and width. Delete non-relevant dimensions.
Length and Width: [12x12] [24x24] [24x36] [24x48] [24x60] [36x48] [36x60] nominal

1. 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.
2. Chemical Stain Resistance of Tile when tested by ASTM D 543-95 (re approved 2001) to withstand without discoloration or staining - saturated calcium chloride, red enamel spray paint, red lipstick, red wax crayon, black liquid ink, chewing gum, mustard, ketchup, urine, coffee, diesel fuel, asphalt, tobacco juice, hydraulic oil and motor oil.
3. Abrasive Wear of Tile when tested by BYK – Gardener 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 sled, weight and wood block is to be 3.2 lb. Average wear depth shall not exceed 0.010 after 1,000 abrasion cycles when measured on the top surface of the dome representing the average of three measurement locations per sample.
4. Abrasive Wear of Tile when tested by Taber Tester ASTM C 501-84 and US Specifications SS-T-308b with H22 coarse Calibrade Wheels with each testing coupon weighed to the nearest 0.01 gram. Average wear index shall be a minimum of 480 after 1,000 abrasion cycles with ASTM C 501-84 parameters and 210 with SS-T-308b parameters when measured on the top surface of the dome representing the average of four sample measurements.
5. 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 in coating or a 3mm depression on domes for coated tile.
6. Accelerated Weathering of Tile when tested by ASTM G 155-05a for 3,000 hours shall exhibit the following result – $\Delta E < 2.6$, as well as no deterioration, fading or chalking of surface of federal yellow color tile (federal No. 33538).
7. 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.
8. Salt and Spray Performance of Tile when tested to ASTM B 117-03 not to show any deterioration or other defects after 1,000 hours of exposure.
9. Tensile Strength of Concrete Repair and Overlay Materials by Direct Pull-off Method ASTM C 153-04 tensile bond strength shall not be less than 160 psi
10. Determining the Adhesion of Lamination Films to Prints Utilizing Mechanical Stress by Four (4) Different Test Methods -Score/Tape, Cross Hatch, X-Cut, and Crease Folding by ASTM F 2296-04 not to show any



failure of coating delaminating from metal panel.

11. Cracking resistance by thermal shock with breaches in coating by ASTM C 554-93 no failure up to 450 degrees Fahrenheit

1.05 DELIVERY, STORAGE AND HANDLING

- A. Surface Applied Detectable/Tactile Warning Surface 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. Surface Applied Detectable/Tactile Warning Surface 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 Surface Applied Detectable/Tactile Warning Surface 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. Surface Applied Detectable/Tactile Warning Surface Tiles shall be guaranteed in writing for a period of five (5) years (minimum) 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 Stainless Steel Surface Applied Detectable/Tactile Warning Surface Tile specified is based on Advantage Tactile Systems manufactured by Advantage Tactile Systems Inc. (800-679-4022). 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. 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 all surface preparation and Surface Applied Detectable/Tactile Warning Surface 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 application of all tiles, adhesives, mechanical fasteners, and caulking shall be in strict accordance with the guidelines set by their respective manufacturers. Not recommended for asphalt applications.
- C. Coordinate with the Contractor or Engineer to ensure that the surfaces being prepared and fabricated to receive the tiles are constructed correctly and adequately for tile installation. Review manufacturer and contract drawings with the Contractor prior to the construction and refer any and all discrepancies to the Engineer.



- D. Set the tile true and square to the curb ramp area as detailed in the design drawings, so that its location can be marked / traced on the concrete surface. A thin permanent marker works well. Remove tile when done marking its location.
- E. Using a continuous rim diamond blade [for concrete] mounted on a grinder carefully cut vertically into the concrete following the outline of the tile to a depth of approximately 1/8" to 3/16" depth around the perimeter. This process is to reduce the risk of broken edges along the exposed finished concrete surface. **DO NOT OVERCUT THE CORNERS.**
- F. Using a continuous rim diamond blade in a circular saw or hand grinder cut vertically into the concrete to create a groove inside 1/4" wide and 3/4" deep inside of the tile perimeter tracing to accept the return flanges at the perimeter of the tile.
- G. Dry fit the tile to ensure the tile sits properly in the grooved area. If necessary using the procedure in "F" ensure the edges of the tile fit flush with the adjacent concrete surfaces.
- H. The concrete surface to receive the Surface Applied Detectable/Tactile Warning Surface Tile is to be mechanically cleaned with a diamond cup grinder or shot blaster to remove any dirt or foreign material. This cleaning and roughening of the concrete surface should include the entire area to receive the tile. The concrete and tile should then be cleaned with a clean rag soaked in Acetone.
- I. Use Armor-Bond adhesive on the backside of the tile. Place a bead of Armor-Bond on the underside around the perimeter of the tile and between domes along the longest dimension of the domes. The contents of 2 tubes minimum should be used for every 2x4 or larger tile. Place tile on prepared surface.
- J. With the tile in place, stand on the tile, and using a 1/4" drill bit drill through tile into the substraight to a depth of 3". Remove the tile and vacuum or blow the dust from the holes. Install the anchors and place the tile. While standing on tile install the stainless fasteners carefully, **DO NOT OVERTIGHTEN THE FASTENERS.**
- K. Following the installation of the fasteners, the concrete dust should be vacuumed, brushed or blown away from the tile's surface and adjacent concrete. Using Acetone on a rag, wipe the concrete around the tile's perimeter to ensure a clean, dry surface to receive perimeter sealant.
- L. Armor-Seal perimeter caulking sealant should be applied following the sealant manufacturer's recommendations. Tape all perimeter edges of the tile back 1/16" from the tile's perimeter edge and tape the adjacent concrete back 1/2" from the tile's perimeter edge to maintain a straight and even caulking line. Apply sealant around tile perimeter using care to work sealant into any void between the tile and concrete interface. Tool the perimeter caulking with a rounded plastic applicator or spatula to create a cove profile between the tile and adjacent concrete. Remove tape immediately after tooling perimeter caulking sealant.
- M. Do not allow foot traffic on installed tiles until the perimeter caulking sealant has cured sufficiently to avoid tracking. Curing time is weather dependant (average cure time at 75° F is 30 minutes). Adhesive or caulking on the surface of the Advantage Tile can be removed with Acetone.

END OF SECTION