

SURFACE APPLIED DETECTABLE DIRECTIONAL BAR TILE

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 Directional Bar Tiles where indicated.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's literature describing products, installation procedures and routine maintenance.
- B. Samples for Verification Purposes: Submit one (1) 6" x 6" full size tile sample.
- C. Shop drawings are required for products specified showing fabrication details, composite structural system, tile surface profile, fastener 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 Surface Applied Detectable Directional Bar tile (or approved equal) 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 Surface Applied Detectable Directional Bar tile and accessory as required.

1.04 QUALITY ASSURANCE

- A. Provide Surface Applied Detectable Directional Bar tiles and accessories as produced by a single manufacturer with a minimum of three (3) years' experience in the manufacturing of Surface Applied Detectable Directional Bar tiles.
- B. Installer's Qualifications: Engage an experienced installer certified in writing by Surface Applied Detectable Directional Bar tile manufacturer as qualified for installation, who has successfully completed installations similar in material, design, and extent to that indicated for the project.
- C. Provide Surface Applied Detectable Directional Bar tiles which are in compliance with the following standards (or most recent):
 - a. 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).

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- b. 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".
- D. Vitrified Polymer Composite (VPC) Surface Applied Detectable Directional Bar tiles shall be a fiberglass reinforced polymer composition; "Armor Tile" as distributed under license by Engineered Plastics (1-800-682-2525), or approved equal.
- E. Dimensions: The tile shall incorporate an in-line pattern of guidance bars measuring nominal 0.2" height, 1.33" base width, 0.87" top width spaced center-to-center 2.94" as measured side by side. For wheelchair safety the field area shall consist of a non-slip surface with a minimum of 40 - 90° raised points 0.05" high, per square inch. Surface Applied Detectable Directional Bar tiles shall be held within the following dimensions and tolerances:

Part No.	Size [in x in]
ADD-501	36 x 48 (2 tiles; 36 x 30, 36 x 18)
ADD-502	36 x 60 (2 tiles; 36 x 30, 36 x 30)
ADD-504	6 x 48
ADD-505	12 x 48
<i>Note: Dimensional tolerances ± 5%</i>	

- F. Product Data: Vitrified Polymer Composite (VPC) Surface Applied Detectable Directional Bar tiles shall meet or exceed the following test criteria:

Test Reference	Test Description	Value
AASHTO-HS 20	Wheel Load Tests	No Failure
ASTM D 695	Compressive Strength	≥ 25,000 psi
ASTM D 790	Flexural Strength	≥ 30,000 psi
ASTM D 638	Tensile Strength	≥ 12,500 psi
ASTM D 696	Coefficient of Thermal Expansion	1.29 x 10 ⁻⁵ /°F
ASTM C 1028	Static Coefficient of Friction	≥ 0.80
ASTM E 84	Flame Spread Index	≤ 25
ASTM D 570	Water Absorption	≤ 0.05%

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ASTM C 501	Abrasive Wear Index Iw	≥ 500
ASTM B 117	Salt Spray (300 hrs)	No Failure
ASTM D 1037	Accelerated Aging Cycle Testing	No Failure
ASTM D 543	Chemical Resistance	No Failure
ASTM G 155	Accelerated Weathering	$\Delta E \leq 4.5$

1.05 DELIVERY, STORAGE AND HANDLING

- A. Surface Applied Detectable Directional Bar tiles shall be suitably packaged or crated to prevent damage in shipment and 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 Directional Bar 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 Directional Bar 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 MANUFACTURER'S WARRANTY

- A. Surface Applied Detectable Directional Bar tiles shall be warranted in writing for a period of five (5) years from date of substantial completion. The guarantee includes factory defects, breakage, and deformation.

1.08 INSTALLATION WARRANTY

- A. Surface Applied Detectable Directional Bar tile installation shall be warranted in writing for a period of two (2) years. Alternate products approved during the tendering process must be guaranteed for an additional three (3) years. Product must be guaranteed from defective work.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The Vitrified Polymer Composite (VPC) Surface Applied Detectable Directional Bar Tile specified is based on Armor Tile as distributed under license by Engineered Plastics (1-800-682-2525). 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: Color shall be homogeneous throughout the tile.

Color	Federal Color No.
Federal Yellow	33538
Light Gray	26280
Dark Gray	36118
Onyx Black	17038
Pearl White	37835
Brick Red	22144
Ocean Blue	15817
Ochre Yellow	23594
Colonial Red (Brown)	20109

2.02 MATERIALS

- A. Fasteners: Color matched sleeve (where appropriate), corrosion resistant, flat head drive anchor: 1/4" diameter x 2" long Stainless Steel Fastener as supplied by Engineered Plastics.
- B. Adhesive: Tactile Bond and Seal (TBS) as supplied by Engineered Plastics.
- C. Sealant: Tactile Bond and Seal (TBS) as supplied by Engineered Plastics.

PART 3 EXECUTION

3.01 INSTALLATION

- A. During all surface preparation and Surface Applied Detectable Directional Bar Tiles 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 adhesives, sealants and mechanical fasteners shall be in strict accordance with the guidelines set by their respective manufacturers. Not recommended for asphalt applications.

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- C. Throughout the installation phases of surface preparation and tile setting, ensure that care is taken to prevent damage to any work.
- D. Set the tile true and square as detailed in the design drawings, so that its location can be marked on the concrete surface. A thin permanent marker works well. Remove tile when done marking its location.
- E. Make saw cut for perimeter flange of tile in existing substrate straight and true. Ensure all dimensions and tolerances are as shown on the contract drawing. The saw cut at the leading edge of the installed tile is to be approximately ¼" wide x ¾" deep and along perimeter edge of tile.
- F. Set the diamond-head groover/planer to the appropriate depth of 3/16" with the grooving blades set to a ¾" depth to achieve the necessary recess in the area to receive the Surface Applied Detectable Directional Bar Tile.
- G. After grooving/planing has been completed, the surface is to be vacuumed and power washed with clean clear water, free from all dirt and debris. Visually inspect all surfaces for obtrusions or foreign matter. If obtrusions are present, promptly grind away.
- H. Immediately prior to installing the Surface Applied Detectable Directional Bar Tiles, all surfaces must be inspected to ensure that they are clean, dry, free of voids, curing compounds, projections, loose material, dust, oils, grease, sealers and determined to be structurally sound before the application of the setting adhesive. The setting adhesive requires that the substrate and the ambient temperature are 40°F minimum.
- I. Using Acetone, wipe the backside of the tile to remove any dirt or dust particles from the area to receive the adhesive.
- J. Apply Tactile Bond and Seal adhesive to the backside of the tile. Sufficient adhesive must be used to have full coverage across bottom surface of the tile.
- K. Set the tile true and square as detailed in the design drawings.
- L. Working from the center of the tile outwards, proceed to drill and install all fasteners in the tile's molded recesses.
- M. Standing with both feet applying pressure around the molded recess provided in the tile, drill a hole true and straight to a depth of 3½" using a 1/4" masonry drill bit. Drill through the tile without hammer option (on the drill) until the tile has been successfully penetrated, then with hammer option (on the drill) to drill into the concrete. Maintaining foot pressure on both sides of the hole while drilling prevents concrete dust from accumulating between the tile and concrete which can affect the tile being installed flush and may compromise installation integrity.
- N. Immediately after drilling each hole, before moving on to the next, and while still applying foot pressure, mechanically fasten tiles to the concrete substrate using a leather bound or hard plastic mallet to set the fasteners. Ensure the fastener has been placed to full depth in the molded recess, straight, and flush to the top of the hold. Drive the pin of the fastener with the mallet, taking care to avoid any inadvertent blows to the tile surface.
- O. All subsequent tiles are set following the same procedures as outlined in H, I, J, K and L. The gap of 1/8" allowed between tiles for expansion and contraction is mandatory.

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- P. 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.
- Q. Following the installation of the tiles, Tactile Bond and Seal should be applied to the joint between abutting tiles and between tiles and adjacent surface. Follow the perimeter caulking sealant manufacturer's recommendations when applying and ensure that the joint is clean and free of debris and any excess adhesive is cut away to provide sufficient depth for the sealant in the saw cut in accordance with the contract drawings.
- R. Do not allow foot traffic on installed tiles until the perimeter caulking sealant has cured sufficiently to avoid tracking. Curing time is weather dependent (average cure time at 75° F is 30 minutes). Adhesive or caulking on the surface of the Armor-Tile can be removed with Acetone.
- S. After the area has been fully tiled and sealant system applied, the tile surface shall be cleaned, following the recommended maintenance and cleaning procedures.

3.02 CLEANING, PROTECTING AND MAINTENANCE

- A. Protect tiles against damage during construction period to comply with Surface Applied Detectable Directional Bar tile manufacturer's specification.
- B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.
- C. Clean 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 tile by method specified by tile manufacturer.
- D. Comply with manufacturer's maintenance manual for cleaning and maintaining tile surface and it is recommended to perform annual inspections for safety and integrity.

END OF SECTION