SURFACE APPLIED 3" X 48" ADVANCED WARNING STRIP SECTION 09614

DETECTABLE/TACTILE WARNING SURFACES

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SECTION 09614
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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 Advanced Warning Strip where indicated. The Surface Applied Advanced Warning Strip is designed to provide distinct color contrast between the Surface Applied Detectable/Tactile Warning Surface and the adjacent walking surface. 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 3" x 6", of Surface Applied Advanced Warning Strips of the kind proposed for use.
C. Shop drawings are required for products specified showing fabrication details, composite structural system, tile surface profile, fastener locations, 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 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 Surface Applied Advanced Warning Strip 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 Surface Applied Advanced Warning Strips and accessories as produced by a single manufacturer. The manufacturer shall have a minimum of two (2) years experience in the manufacture of Advanced Warning Strips.
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.
C. Vitrified Polymer Composite (VPC) Surface Applied Advanced Warning Strips shall be an epoxy polymer composition employing aluminum oxide particles in the raised surface.
    1. Tile Dimensions: Nominal 3" by 48" by 0.1875 inches thick. Tiles shall be formed with holes for anchors.
    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 surface of tile.
    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 and Adhesive System when tested to ASTM B 117-03 not to show any deterioration or other defects after 200 hours of exposure.

1.05 DELIVERY, STORAGE AND HANDLING

A. Surface Applied Advanced Warning Strips 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. Surface Applied Advanced Warning Strips 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 Advanced Warning Strips 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 Advanced Warning Strips 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 Vitrified Polymer Composite (VPC) Surface Applied Advanced Warning Strip 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).

2.02 MATERIALS

A. Fasteners: Color matched, corrosion resistant, flat head drive anchor: ¼" diameter x 1 ½" long as supplied by Engineered Plastics Inc.

B. Adhesive: Armor-Bond as supplied by Engineered Plastics Inc.
C. Sealant: Armor-Seal as supplied by Engineered Plastics Inc.

PART 3 EXECUTION

3.01 INSTALLATION

A. During all surface preparation and Surface Applied Advanced Warning Strip 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 tile, adhesives, mechanical fasteners, and caulking shall be in strict accordance with the guidelines set by their respective manufacturers. Not recommended for asphalt applications.
C. Work 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 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. The surface to receive the Surface Applied Advanced Warning Strip is to be mechanically cleaned with a diamond cup grinder or shot blaster to remove any dirt or foreign material and should then be cleaned with a rag soaked in Acetone.
F. Immediately prior to installing the Surface Applied Advanced Warning Strip the concrete surfaces must be inspected to ensure that they are clean, dry, free of voids, curing compounds, projections, loose material, dust, oil, grease, sealers and determined to be structurally sound with a minimum 30 day concrete cure period.
G. Using Acetone, wipe the backside of the tile to remove any dirt or dust particles from the area to receive the adhesive.
H. Apply Armor-Bond adhesive to the backside of the tile. Sufficient adhesive must be placed on the prescribed areas to have full coverage.
I. Set the tile true and square to the curb ramp area as detailed in the design drawings.
J. Working from the center of the tile outwards, proceed to drill and install all fasteners in the tile's molded recesses.
K. 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" 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.
L. 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 hole. Drive the pin of the fastener with the mallet, taking care to avoid any inadvertent blows to the tile surface.
M. 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.
N. 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.
O. 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.
P. 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 Armor-Tile can be removed with Acetone.
Q. 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 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