SURFACE APPLIED TACTILE / DETECTABLE WARNING SURFACE TILES

(For Transit Use)

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section includes Specifications for furnishing and installing Surface Applied Tactile / Detectable Warning Surface Tiles (SA) in an inline truncated dome pattern on all curb ramps, platform edges and walking surfaces at the locations and to the dimensions shown on the Contract Drawings as directed by the Engineer. (Surface Applied Tactile is also known as Retrofit Tactile Warning Tiles)

1.02 RELATED DOCUMENTS

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

B. Americans with Disabilities Act (ADA) Title 49 CFR Transportation, Part 37.9 Standards for Accessible Transportation Facilities, Appendix A, Section 4.29.2 Detectable Warnings on Walking Surfaces. FHA Memo (5-06-02) titled Truncated Domes. Federal Register Volume 71, No. 209, 49 CFR Part 37 (10-30-06), ADA Standards for Transportation Facilities (11-29-06, DOT): Sections 406, 705, and 810. ADA Standards for Accessible Design – 2010 (9/05/11, DOJ), ADAAG: Sections 705 and 810. Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Rights of Way (7/23/11, Access Board), PROWAG: Sections R208, R304, R305, R308, and R309.

C. American Society for Testing and Materials (ASTM) Test Methods B117, C501, C1028, D543, D570, D638, D695, D790, G151, G155, and E84.

D. American Association of State Highway and Transportation Officials (AASHTO): Test Method AASHTO-H20.

E. California Code of Regulations (CCR 2007) Title 24 Part 1 Articles 2, 3 and 4, and Part 2 Section 205 definition of “Detectable Warning”, Section 1127B.5 for “Curb Ramps”, and Section 1133B.8.5 for “Detectable Warnings at Hazardous Vehicle Areas”. California Department of Transportation Detectable Warning Surface Authorized Material List. Division of the State Architect IR 11B-3 (1/26/05) and IR 11B-4 (1/01/11). IR 11B-4 (1/01/11) removed the requirement for a “staggered” pattern and now calls for the “square grid” (in-line) pattern.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's literature describing products, installation procedures and maintenance instructions.

B. Samples for Verification Purposes: Submit two (2) Tactile Warning Surface samples minimum 8" x 8" of the kind proposed for use. Samples shall be properly labeled and shall contain the following information: Name of Project, Submitted by, Date of Submittal, Manufacturer's Name, and Catalog Number.

C. Shop Drawings: Submit Standard Manufacturer Shop Drawings showing all pertinent characteristics of the Surface Applied Tactile Warning Tile (SA) including profile, sound on cane contact amplification feature, fastener locations and installation methods.

D. Material Test Reports: Submit current test reports from qualified, accredited independent testing laboratory in accordance with ASTM guidelines and indicating that materials proposed for use are in compliance with specification requirements and meet the properties indicated. All test reports submitted shall be representative of the Surface Applied Tactile Warning Tile (SA) delivered to the Project.

E. Maintenance Instructions: Submit copies of manufacturer's specified maintenance practices for each type of Tactile Warning Surface Tile and accessory.

1.04 QUALITY ASSURANCE

A. Provide composite Surface Applied Tactile Warning Tiles (SA) as produced by a single manufacturer with a minimum of five years experience in manufacturing Surface Applied Tactile Warning Tiles (SA).

B. Installer's Qualifications: Engage an experienced installer certified in writing by the Tactile Warning Surface manufacturer, who has successfully completed Tactile Warning Surface installations similar in material, design, and extent to that indicated for the Contract.

C. Surface Applied Tactile Warning Tiles (SA) must be compliant with ADAAG, PROWAG, and California Title 24 requirements. Division of the State Architect IR 11B-3 (1/26/05) and IR 11B-4 (1/01/11). IR 11B-4 (1/01/11) removed the requirement for a "staggered" pattern and now calls for the "square grid" (in-line) pattern.

D. Surface Applied Tactile Warning Tiles (SA) shall meet or exceed the following test criteria using the most current test methods:
    1. Compressive Strength: 28,000 psi minimum, when tested in accordance with ASTM D695.
    2. Flexural Strength: 29,000 psi minimum, when tested in accordance with ASTM D790.

3. Water Absorption: Not to exceed 0.10%, when tested in accordance with ASTM-D570.
4. Slip Resistance: 1.00 minimum wet/dry static coefficient of friction when tested in accordance with ASTM C1028.
5. Flame Spread: 25 maximum, when tested in accordance with ASTM E84.
6. Salt and Spray Performance of Tactile Warning Surface: No deterioration or other defects after 200 hours of exposure, when tested in accordance with ASTM-B117.
7. Chemical Stain Resistance: No reaction to 1% hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, and antifreeze, when tested in accordance with ASTM D543.
8. Abrasion Resistance: 500 minimum, when tested in accordance with ASTM C501.
9. Accelerated Weathering of Tactile Warning Surface when tested by ASTM-G155 or ASTM G151 shall exhibit the following result: $\Delta E<5.0$ at 2,000 hours minimum exposure.
10. Tensile Strength: 11,000 psi minimum, when tested in accordance with ASTM D638.
11. AASHTO-H20 Load Bearing Test: No Damage at 16,000# loading.
12. Freeze/Thaw/Heat: No deterioration when tested in accordance with ASTM C 1026.

1.05 DELIVERY, STORAGE AND HANDLING

A. Surface Applied Tactile Warning Tiles (SA) shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings.

B. Storage Facility
   1. Store SA Tiles in an area that is within an acceptable temperature range (40-90 degrees). In particular, protect sealants from freezing.
   2. Maintain Storage Facility in a clean dry condition to prevent contamination or damage to SA Tiles and incidentals.

1.06 GUARANTEE

A. SA Tiles shall be guaranteed in writing for a period of five (5) years from date of Contract's final completion. The guarantee includes manufacturing defects, breakage, and deformation.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Composition: SA Tiles shall be manufactured using a matte finish exterior grade homogeneous (uniform color throughout thickness of product) glass and carbon reinforced polyester based Sheet Molding Compound (SMC) composite material.

Truncated domes must contain fiberglass reinforcement within the truncated dome for superior structural integrity and impact resistance. A matte finish will be required on the Tactile Warning Surface for superior slip resistance performance superior to that offered by a gloss finish. Use of Tactile Warning Surface Products employing coatings or featuring layers of material with differing composition, performance, or color properties is expressly prohibited under this Section.

B. Color: Color shall be homogeneous throughout SA Tile.

1. Federal Yellow (Y) per Federal Standard 595B Table IV, Color No. 33538.
2. Brick Red (R) per Federal Standard 595B Table IV, Color No. 20109.
3. Clay Red (CR) per Federal Standard 595B Table IV, Color No. 22144.
4. Safety Red (SR) per Federal Standard 595B, Table IV, Color No. 31350.
5. Black (B) per Federal Standard 595B Table IV, Color No. 37038.
6. Dark Gray (G) per Federal Standard 595B Table IV, Color No. 36118.
7. Safety Blue (B) per Federal Standard 595B Table IV, Color No. 15187.
8. White (W) per Federal Standard 595B Table IV, Color No 37925.
9. Seattle Yellow (SY) per Federal Standard 595B Table IV, Color No. 23594.
10. Houston Beige (Pantone #7529C).

C. Domes: Square grid pattern of raised truncated domes of 0.2”nominal height, base diameter of 0.9” and top diameter of 0.45”. The Federal Code of Regulations permits a truncated dome spacing range of 1.6”-2.4.” For superior wheelchair, walker and shopping cart mobility, the preferred truncated dome spacing shall have a center-to-center (horizontally and vertically) spacing of 2.35”, measured between the most adjacent domes on square grid.

D. Configuration: SA Tile sizes shall be as indicated on the Contract Drawings. The field area shall consist of a non-slip textured surface with a minimum static coefficient of friction of 0.80, wet and dry. At a minimum, the thickness of the body of SA Tile shall measure 0.1875” (nominal).

E. In compliance with the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Rights of Way (7/23/11, Access Board, “PROWAG”) Section R302.7.2 and California Code of Regulations (CCR 2007) Section 1127B.5.5 and Section 1133B.8.5, the Composite Tactile Warning Surface Tiles shall have a perimeter beveled edge with a maximum slope of 1:2 in order to minimize the potential for a pedestrian tripping.

F. <u>Available Configurations of the SA Tiles:</u>

1. SA - Butt Joint, In-Line Truncated Domes:
    i. Size: 2’ x 4’ x 3/16” thick (nominal) with a half inch deep flange along both 4 foot sides.

ii. The Perimeter of the Standard Panel features a chamfer (no 90 degree return).
iii. Dome Spacing: 2.35” on center, in-line
iv. The Standard Panel includes a minimum of 15 integrally molded holes for the fasteners.
v. Fasteners: Color matched, composite sleeve anchor with 304 stainless steel nail: ¼” diameter x 1 1/2” long.
vi. As a custom order, Tactile Warning Surface Panel may be manufactured in a ¼” and 3/8” thickness.

2. SA - Ship Lap, In-Line Truncated Domes:
   i. Size: 2’ x 4’ x 3/16” thick (nominal) with a half inch deep flange along both 4 foot sides.
   ii. The Perimeter of the Standard Panel features a chamfer (no 90 degree return).
   iii. Dome Spacing: 1.70” on center, in-line
   iv. The Standard Panel includes a minimum of 13 integrally molded holes for the fasteners.
   v. Fasteners: Color matched, composite sleeve anchor with 304 stainless steel nail: ¼” diameter x 1 1/2” long.

G. Follow Tactile Warning Surface Manufacturer’s installation procedures.
1. Transit ChemLink M1 Data Sheet found here: http://www.adatile.com/transit.php

H. Adhesive:
1. Polyether Structural Adhesive/Sealant by Chem Link (M-1)
2. Urethane Elastomeric Adhesive by Bostik (Hydroment Ultra-Set Advanced or Durabond D-818)
3. Approved equal.

I. Sealants:
1. Single Component Urethane Sealant:
   i. Sources: BASF NP1 by BASF Building Systems or Sikaflex 1A by Sika Corp.
   ii. Colors: Black, Limestone, Redwood Tan
2. Polyether Structural Adhesive/Sealant by Chem Link (M-1)
   i. Colors: Black, Gray, Limestone, White
3. Approved Equal

J. Cleaning materials used on site shall have code acceptable low VOC solvent content and low flammability.

K. The Specifications of the concrete, sealants and related materials shall be in accordance with the Contract Documents and the guidelines set by their respective manufacturers.

2.02 MANUFACTURERS

A. Available manufacturers, subject to compliance with these Specifications include, but are not limited to, the following:

1. ADA Solutions Inc. of Chelmsford, MA (Phone: 800-372-0519, Fax: 978-262-9125, Web Site: www.adatile.com , E: info@adatile.com), or approved equal.
2. Requests for Approved Equal Status must be submitted and approved by the Owner during the Bid Phase of the Project.

2.03 EQUIPMENT

A. Contractor shall provide all tools, equipment and services required for satisfactory installation per the Tactile Warning Surface Product manufacturer's instruction.

PART 3 – EXECUTION

3.01 PREPARATION

A. Transmit submittals and deliverables required by this Section.
B. Furnish products as indicated.
C. Substrate Condition: Ensure substrate is in suitable condition, and in compliance with the Tactile Warning Surface manufacturer recommendations, to receive work of this Section. Prior to construction, refer any and all discrepancies to the Engineer for further action.
D. See Transit Surface Applied Installation Guidelines to properly prepare area for installation: http://www.adatile.com/transit.php.
E.

3.02 INSTALLATION

A. Contractor will not be allowed to install Tactile Warning Surface Tiles until all submittals have been reviewed and approved by the Engineer.

B. SA Tile shall be installed per manufacturer's instructions: http://www.adatile.com/transit.php

C. When multiple SA Tiles regardless of size are used, the truncated domes shall be aligned between the tactile warning surface tiles and throughout the entire tactile warning surface installation.

D. In accordance with the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Rights of Way (7/23/11, Access Board): Sections 304 + 305), Tactile Warning

Surface Tile shall be located relative to the curb line as shown within Sections 304+305 of the Guidelines.

E. Cutting of SA Tiles may be required to accommodate specific site conditions. All possible attempts shall be made to minimize cutting of the SA Tiles. Minimum acceptable width of the cut SA Tile shall be 9".

F. Environmental Conditions: Air and substrate temperatures must exceed 40 degrees for at least 8 daytime hours for a sound and proper installation. A "weed torch" may be used to boost the substrate temperature to expedite cure of adhesives and sealants.

G. Immediately prior to installing the SA Tiles, 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 four (4) day concrete cure period (unless otherwise directed by the SA Tile manufacturer) and that the surface is flat. As necessary, substrate may be mechanically cleaned with a diamond cup grinder or shot blaster to remove any dirt or foreign material although a broom or leaf blower is usually adequate for cleaning of the substrate.

H. Apply adhesive in accordance to adhesive manufacturer instructions or as shown on the ADA Solutions Chemlink M1 Data Sheet.

I. On Continuous Runs:
Allow 1/8" separation between successive SDSA Tiles for expansion/contraction.

J. Drill holes true and straight to a depth of 2 1/2" by 1/4" using the recommended bit. As necessary, additional countersunk holes may be added to the SA Tile by using a 5 point ½" (82 degree) countersink to create the necessary holes.

K. Mechanically fasten SA Tile to the concrete substrate using a 32oz. to 48oz. hammer to set the composite sleeve anchors. Ensure that the fastener has been set to full depth, straight and true. Care should be taken when setting the fastener to avoid any advertent blows with the hammer to the SA Tile.

L. Following the installation of the SA Tile, the sealant system should be applied to the perimeter edge. Follow the Tactile Warning Surface manufacturer's recommendations when applying the sealant in a cove type profile to blend and seal the SA Tile edge to the adjoining surfaces.

M. Do not allow foot traffic on installed SA Tile until the perimeter edge sealant has cured sufficiently to avoid tracking. If the SA Tile must be placed into immediate pedestrian service, apply baby powder to the sealant to minimize the possibility of tracking while the sealant cures. Foot imprints may appear in the fully cured sealant application

3.03 CLEANING AND PROTECTING

A. Protect SA Tiles against damage during construction period to comply with SA Tiles manufacturer's Specifications.

B. As necessary, while the Project remains under construction, protect SA Tiles against damage from rolling loads following installation by covering with plywood or hardwood.

C. If requested by the Project Manager, clean SA Tiles not more than four (4) days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project. Clean SA Tile by method specified by Tactile Warning Surface Products manufacturer.

END OF SECTION
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