

APPENDIX B
DIRECTIONAL TACTILE STRIP PRODUCT SPECIFICATIONS

DIRECTIONAL BAR TILE / WAY-FINDING SURFACE TILES
(Wet-Set and Surface Applied)

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section includes Specifications for furnishing and installing Directional Bar Tile / Way-Finding Tiles (DB) on all walking surfaces at the locations and to the dimensions shown on the Contract Drawings and as directed by the Engineer.

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) Directional Bar Tile (DB) samples minimum 12" x 12" 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 Directional Bar Tile (DB) 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 Directional Bar Tile (DB) delivered to the Project.
- E. Maintenance Instructions: Submit copies of manufacturer's specified maintenance practices for each type of Directional Bar Tile and accessory.

1.04 QUALITY ASSURANCE

- A. Provide composite Directional Bar Tiles (DB) as produced by a single manufacturer with a minimum of five years experience in manufacturing Directional Bar Tiles (DB).
- B. Installer's Qualifications: Engage an experienced installer certified in writing by the Directional Bar Tile manufacturer who has successfully completed Directional Bar Tile installations similar in material, design, and extent to that indicated for the Contract.
- C. Directional Bar Tiles (DB) 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).
- D. Directional Bar Tiles (DB) 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. Directional Bar Tiles (DB) 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 DB 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 DB Tiles and incidentals.

1.06 GUARANTEE

- A. DB 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: DB 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. A matte finish will be required on the Directional Bar Tile for superior slip resistance performance superior to that offered by a gloss finish. Use of Directional Bar Tile 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 DB 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. Geometry: DB Tile features 11 3/8" long (nom.) by 1 3/8" wide (nom.) "directional bars" at 3" on center.
- D. Configuration: DB 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 DB Tile shall measure 3/16" for Surface Applied and 3/8" for wet-set (nominal).
- E. Available Configurations of the DB Tiles:
Surface Applied DB - Ship Lap:
 - i. Size: 24" x 24" x 3/16" thick (nominal) with two half inch deep flanges and ship lap detail.
 - ii. The Perimeter of the Standard Panel features a chamfer (no 90 degree return).
 - iii. Tile may be field cut into alternate sizes such as 6"x24"
 - iv. The Standard Panel includes a minimum of 6 integrally molded holes for the fasteners.
- B. Wet-Set DB - Ship Lap:
 - i. Size: [6" x 24", 8" x 24", 12" x 24", 24" x 24"] x 3/8" thick (nominal) with metal inserts and stainless steel bolts.
- F. Follow Directional Bar Tile Manufacturer's installation procedures:
<http://adatile.com/wayfinding.php>
 - i. Surface Applied DB (retrofit) is installed over an existing concrete substrate using either Surface Mount or Flush Mount approach
 - Surface Mount: sawcuts as applicable, adhere, fasten and apply sealant.
 - Flush Mount Surface Applied DB: create a 1/4" nom. recess, adhere, fasten and apply sealant. Flanges may be removed as necessary.
 - ii. Wet-Set DB Tile may be set into wet concrete (new construction).

- G. Fasteners:
1. Surface Applied DB shall have minimum 6 countersunk fastening holes [6"x24" part]. Color matched, stainless steel 304, flat head drive anchor: ¼" diameter x 1 1/2" long.
 2. Wet-Set DB Tile shall have minimum 4 countersunk fastening holes [6"x24" part]. Color matched, stainless steel 304, flat head bolts: ¼" diameter x 1 1/2" long metal inserts
- 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. Wet set:
- Contractor shall provide all tools, equipment and services required for satisfactory installation per manufacturer's instruction as Incidental Work. Equipment, which may be required include typical mason's tools, a 4-foot long level with electronic slope readout, 25-pound weights, vibrator and rubber

mallet with 2" x 4" x 10" wood tamping plate, and a device for cutting the Directional Bar Tile Product.

- B. Surface Applied:
Contractor shall provide all tools, equipment and services required for satisfactory installation per the Directional Bar Tile 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 Directional Bar Tile Product manufacturer recommendations, to receive work of this Section. Prior to construction, refer any and all discrepancies to the Engineer for further action.

3.02 INSTALLATION

- A. Contractor will not be allowed to install Directional Bar Tiles until all submittals have been reviewed and approved by the Engineer.
- B. DB Tile shall be installed per manufacturer's instructions.
<http://adatile.com/wayfinding.php>
- C. Cutting of DB Tiles may be required to accommodate specific site conditions. DB Tile may be factory modified or field cut into alternate size units.
- D. 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.
- E. Immediately prior to installing the DB 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 DB 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.
- F. Apply adhesive on the backside of the DB Tiles in accordance with manufacturer's instructions.

- G. For Surface Applied DB –
 - H. 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 DB Tile by using a 5 point 1/2" (82 degree) countersink to create the necessary holes.
 - I. Mechanically fasten DB 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 DB Tile.
- J. Following the installation of the DB Tile, the sealant system should be applied to the perimeter edge. Follow the Directional Bar Tile Product manufacturer's recommendations when applying the sealant in a cove type profile to blend and seal the DB Tile edge to the adjoining surfaces.
- K. Do not allow foot traffic on installed DB Tile until the perimeter edge sealant has cured sufficiently to avoid tracking. If the DB 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
- L. Joints On Continuous Runs:
 - Surface Applied DB Tile(s): Allow 1/8" separation between successive DB Tiles for expansion/contraction.
 - Wet-Set DB Tiles(s): Allow 1/8" separation between successive DB Tiles for expansion/contraction and 1/8" minimum perimeter tooled joint

3.03 CLEANING AND PROTECTING

- A. Protect DB Tiles against damage during construction period to comply with DB Tiles manufacturer's Specifications.
- B. As necessary, while the Project remains under construction, protect DB Tiles against damage from rolling loads following installation by covering with plywood or hardwood.
- C. If requested by the Project Manager, clean DB 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 DB Tile by method specified by Directional Bar Tile Products manufacturer.

END OF SECTION
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