

## **SECTION 9 - FINISHES**

### **Composite RTF Tactile Warning Tile Specifications**

#### **PART 1 – GENERAL**

##### **1.0 DESCRIPTION**

This product shall be an exterior grade high performance Composite RTF Detectable Warning Surface (Tactile Tiles) that are homogeneous, have a uniform color throughout the matrix of the product, and include long term UV stability.

##### **PRODUCTS**

- A. Tactile Tiles and all related items such as adhesive, fasteners, hardware and caulking shall be as supplied by:  
  
Transit-Tile™, Division of PEC  
1790 30<sup>th</sup> Street Boulder, Colorado  
80301-1022 USA.  
(888) 279-7964 TEL  
(303) 444-5093 FAX
  
- B. The use of epoxy based composite materials, LPMC (Low Pressure Molding Compounds), carbon reinforced copolymer (“CRC”) materials, and/or coated or painted including but not limited gel-coated composites materials, are expressly prohibited under this specification Section.
  
- C. The Composite RTF Detectable Warning Tactile Tiles shall be comprised of a colorfast molecular crosslinked (“MCL”) reinforced copolymer composite, which is a proprietary process. This process creates a very high crosslink density in the tactile tile resulting in superior UV stability, weatherability, durability and overall performance. Materials, which do not feature “MCL” bulk molding compounding, will not be considered equal.

##### **1.1 RELATED DOCUMENTS:**

- A. Drawings and General Provisions of the Contract, including General and Special Conditions, apply to this Section.

##### **1.2 DESCRIPTION OF WORK:**

- A. Furnish and install composite tactile warning tiles and accessories in compliance with manufacturer’s recommendations as shown on the Contract Plans and as specified herein including any and all required surface preparation operations.

##### **1.3 REFERENCES AND CITED STANDARDS:**

- A. American Society for Testing & Materials (ASTM)
  
- B. Americans with Disabilities Act (ADA)
  - 1. Accessibility Guidelines for Buildings and Facilities  
Federal Register Volume 56 No. 173, Section 4.29 dated September 1994 (ADDAG).

#### **1.4 QUALITY ASSURANCE:**

##### **A. Manufacturer Qualifications:**

1. Provide RTF Tactile Warning Tiles and accessories from a single source. Manufacturer's organization and/or subcontractors shall have a minimum of four years of experience in the manufacture of RTF Tactile Warning Tiles complying with ADAAG Guidelines or molding products of similar type and design utilizing the same technology for no less than 15 years.
2. The manufacturer shall certify that the RTF Tactile Warning Tiles are compliant with the "Buy America Requirements".
3. RTF Tactile Tiles are to be fully covered by a written Warranty of the completed installation and/or a separate Warranty on the tiles themselves. The Warranty shall cover the Owner for defective work, breakage, deformation, fading, or chalking of the Composite RTF Tactile Warning Surface, as well as, delamination of the Composite RTF Tactile Warning Surface from the underlying substrate when applied by a manufacturer's authorized installation contractor.

##### **B. Installer Qualifications:**

1. Only fully and duly authorized, certified and thoroughly trained and experienced contractors throughout all phases of the installation of RTF Tactile Warning Tiles, or tiles of similar material, or designs shall be used. Contractor must be certified in writing by Transit-tile™, Division of PEC for the installation of the RTF Tactile Warning Tiles.

#### **1.5 SUBMITTALS:**

- A. Product Data: Submit standard literature describing products, installation procedures, adhesive and sealant materials, fastener type and routine maintenance. Provide any and all applicable MSDS sheets for all products used.
- B. Samples: Submit minimum of one sample of the tactile warning tile, a minimum of one foot square for approval.
- C. Shop Drawings: Submit manufacturer's standard shop drawing which show the technical details, including tile dimensions, pattern, and fastener locations.
- D. Material Test Reports: Submit written test data reports verifiable by an independent testing laboratory demonstrating that the material proposed for use are in compliance with the requirements of Section 2.1.

#### **1.6 TRANSPORTATION AND HANDLING:**

- A. Tactile tile materials shall be suitably packaged and separated so as to prevent any damage during the shipping process and subsequent storage.

- B. Owner may request that the RTF Tactile Warning Tiles and accessories be delivered to a specified location for the storage prior to installation. Proper and safe storage of all materials shall be the sole responsibility of the installation contractor or the Owner.
- C. Promptly inspect shipment(s) to assure that products comply with the requirements, quantities are correct, and that the products are undamaged. Report any damage immediately to the freight company and to the manufacturer.

#### **1.7 STORAGE AND PROTECTION**

- A. Where and when material storage is required, all materials shall be stored in accordance with manufacturer recommendations. Interior storage is preferred.
- B. Where exterior storage is warranted, materials shall be covered to prevent deterioration to the packaging due to moisture.
- C. All sealants and adhesives shall be protected from freezing conditions.
- D. Periodically inspect materials in storage to assure that products are undamaged and are maintained under specified conditions.

#### **1.8 PROJECT/SITE CONDITIONS**

- A. Field operations may only be conducted when environmental conditions fall within those recommended by the manufacturer.
- B. Air and Surface temperature shall be a minimum of 40 degrees Fahrenheit during installation and cure of the adhesive.
- C. Conditions required of new concrete over which the RTF Tactile Warning Tiles is to be applied: concrete must have been cured for a minimum of 28 days, and if any curing compound was used the surface must be power washed or shot blasted to fully remove all curing compound.
- D. Conditions required of existing concrete over which the RTF Tactile Warning Tile is to be applied: Concrete surface must be prepared as specified and within the tolerances by the manufacturer. Any areas requiring patching to achieve a uniform surface, shall be patched using an approved patching compound. All patching compound shall cure for a minimum of three days prior to installation of the RTF Tactile Warning Tiles.
- E. Concrete: Flatless / Level to within 1/8" in 10' Off Track distance shall be within 1/4" in 10' Finish to be smooth trowled not broomed finished in areas where tile to be installed. If acceptable, a tooled impression is an option to create recess in fresh concrete to accept tile profile

## 2.1 TACTILE WARNING TILES

### A. Tactile Warning Material

1. The RTF Tactile Warning Tiles shall consist of a colorfast fiberglass reinforced cross-linked ("MCL") copolymer composite. Epoxy polymer based materials are unacceptable.
2. RTF Tactile Warning tiles as supplied by **Process Equipment Company (PEC) of Boulder, Colorado**. No substitutions.

Transit-Tile™  
Division of Process Equipment Company (PEC)  
1790 30<sup>th</sup>. Street, Suite 440  
Boulder, CO. 80301-1022  
Office: 303-449-5702  
Fax: 303-444-5093  
E-mail: info@pecboulder.com.

3. Tactile warning tile color: Unless otherwise specified, the RTF Tactile Warning Tile shall be safety yellow complying with the current version of the Standard Color Tolerance Charts issued by the Federal Highway Administration. The color shall be homogenous throughout the tile. Tiles utilizing painted, or gel-coated surfaces are unacceptable. Other colors are available but minimum quantities are required for colors other than standard safety yellow.
4. Tactile Tiles shall be available in the following thickness: 1/8" , 1/4" or 3/8". Depending on which tile thickness is chosen, the concrete substrate preparation will be altered such that the final elevation of tile truncated cones shall be in complete compliance with all ADA requirements.

### B. RTF Tactile Warning Tile Geometry

1. The RTF Tactile Warning Tile shall have a truncated dome pattern complying with the Americans with Disabilities Act Regulations as noted in Federal Register Volume 56 No. 173, Section 4.29 dated September 1994 and subsequent revisions. Equivalent facilitation findings or alternate patterns shall not be acceptable.
2. The truncated dome pattern of the RTF Tactile Warning Tiles shall align properly from tile to tile.
4. The RTF Tactile Warning Tiles shall have factory molded chamfers on all four sides of the tile to assure safe, smooth transitions in all directions between the tile and adjacent surfaces and to facilitate water drainage. Squared, butt, or radial edges are not acceptable.

C. Tactile Warning Tile Dimensions

1. The RTF Tactile Warning Tile shall measure 2' x 4' x 0.125" thick  $\pm 0.0625"$ . RTF Tactile Warning Tiles shall have 0.50" flanges along both 4' sides. The bottom of the RTF Tactile Warning Tile shall be completely flat. Any undercuts, "waffle patterns" or "bosses" on the bottom of the tile are unacceptable for this project. (When applicable, the RTF Tactile Tiles may be supplied with only one (1) or no flange running along the 4' direction, which is determined by the installation requirements).
2. Each RTF Tactile Warning Tile shall feature a minimum of 10 integrally molded fastener recesses. Except for cases where fitting of the RTF Tactile Warning Tiles to meet unusual field conditions is required, all fastener recesses shall be formed in the factory. Recesses for the fasteners, whether formed in the factory or fabricated in the field, shall be located at the centers of the truncated domes. Cover plugs for the fasteners are available if specified, but is not a requirement.
3. Composite RTF Tactile Warning Tiles that feature a "Ship-Lap" detail are unacceptable for this project.

D. Tactile Tile Performance

1. The Tactile Warning Tiles shall meet or exceed the following criteria:

Property	ASTM	Value	Min	Max	Notes
Water Absorption	D570	0.09		X	
Slip Resistance	C1028	0.80	X		Wet or dry, neolite
Tensile Strength	D638	7,000 psi	X		
Flexural Strength	C293	18,000 psi	X		
Compressive Strength	D695	18,000 psi	X		
Impact Resistance	D3029	No Cracks			-30°F, 75°F, 120°F
Chemical Resistance	D543	No Reaction			
Accelerated Weathering	G26	No Deterioration			2000 Hrs.
Accelerated Aging	D 1037	No Deterioration			6 Cycles
Freeze/Thaw/Heat	C1026	No Disintegration			5 Cycles
Salt Spray	B 117	No Deterioration			100 Hours
Steiner Tunnel-Flame Spread		0-Flame Spread		X	
Steiner Tunnel-Smoke Developed		9-Smoke Developed		X	
Critical Radiant Flux	E648	>1.10			

Certified test reports shall be available for submittal and approval upon request.

## 2.2 ADHESIVE

- A. Polyurethane single or two-part elastomeric adhesive as manufactured by Mapei, International Coatings (ICO-GEL™), Elastiment™ as manufactured by Boardi Products, or other adhesive as recommended by the RTF Tactile Warning Tile supplier. The supplier reserves the right to substitute adhesive materials providing that it does NOT effect the overall warranty of the installation.
- B. Performance criteria: RTF Tactile Warning Tiles adhered to concrete shall meet or exceed the following tests:
  - 1. Accelerated aging and freeze thaw test of RTF tactile warning tile and adhesive: per ASTM-1037 requirements, shall show no evidence of cracking, delamination, checking, blistering, loosening of the tile, or other defects.
  - 2. Salt and Spray performance of the RTF tactile warning tile adhesive system: per ASTM-B117 requirements, shall show any deterioration or other defects after 100 hours of exposure.

## 2.3 FASTENERS

- A. Fasteners in concrete shall consist of 0.25" x 1.5" white nylon expansion sleeves with stainless drive pins. The RTF Tactile Warning Tile supplier may recommend alternative fasteners to suit particular job conditions.

## 2.4 SEALANT

- A. SL-1 self-leveling premium grade, single component urethane sealant as manufactured by Sonneborn, SIKA Polyurethane 2-part "2-C" or equal, as approved by the manufacturer provided any substitution does NOT effect the overall installation warranty.
- B. Backer rod shall be used in conjunction with sealant as needed but is not required.

## PART 3 – EXECUTION

### 3.1 Surface Preparation

- A. The substrate shall be poured or ground to a uniform grade so that the RTF Tactile Warning Tile sits flush on the substrate. The variation in grade shall not exceed 1/8" per 10'. When poured, if the concrete has the equivalent of a light broom or smooth finish, grinding may be required to provide the correct surface preparation for proper bonding of the tile to the substrate. When ground, the concrete shall have a light ribbed finish. There must be a maximum of 1/4" difference between the substrate and the finished installed RTF Tactile Tile in compliance with ADDAG.
- B. Saw cuts must be made to accept either the single or double flange as provided on the RTF Tactile Tiles. The saw cuts shall measure 3/8" wide by 11/16" deep and shall at all times remain parallel to the platform edge. The centerline of the saw cut shall be placed 24" back from the front edge of the platform (track side) ***The saw cut must be straight and true within 1/8" per 10'- this is a strict***

**tolerance.** A 10' long saw cut shall be made to confirm proper fit of the RTF Tactile Warning Tile prior to continuation of the saw cutting operation.

### 3.2 Installation of Composite Tactile Tiles

- A. The concrete substrate shall be clean, dry, and free of contaminants. The concrete shall have been allowed to cure for at least 28 days unless otherwise directed. Acceptable moisture tests may be conducted and submitted for approval to the manufacturer in order to prove complete concrete curing and for installation to proceed in less than 28 days. Tests shall include calcium chloride and polyethylene sheeting tests as a minimum certification that the concrete is adequately cured.
- B. Apply adhesive in accordance with the RTF Tactile Warning Tile manufacturer's instructions. Adhesive shall be applied in an "H" pattern using a minimum 6" pattern (see drawing). The entire tile bottom does not have to be completely covered with adhesive.
- C. Set RTF Tactile Warning Tiles and install fasteners in accordance with the RTF Tactile Warning Tile supplier's instruction and as further noted below:
  - 1. As much as possible, whole uncut RTF Tactile Warning Tiles shall be used. Under any circumstances do not use pieces less than 1' long where special conditions prevail.
  - 2. Leave a gap of 3/32" between successive RTF Tactile Warning Tiles to allow for expansion and contraction. Caulking of the joint between tiles shall be optional.
- D. At platform expansion joints, RTF Tactile Warning Tiles shall be cut on their short sides, the cut edges finished smoothly, and the RTF Tactile Warning Tiles laid with the cut edges aligned with the edges of the concrete substrate along the joints. Where there is platform curvature, RTF Tactile Warning Tiles shall be treated in a similar fashion so that the joints remain reasonably uniform across the width of the RTF Tactile Warning Tile.
- E. Cutting through the RTF Tactile Warning Tiles domes shall be kept to a minimum. Where less than half of the truncated dome remains, the balance shall be ground off. Where over half of the truncated dome remains, it shall be feathered so as not to present a tripping hazard.
- F. Backer rod shall be placed in the sawcuts and the sawcuts shall be filled flush to the surface with sealant following the setting of the panels.
- G. Scratch or sand the back of the tile to rough up the surface prior to applying adhesive.
- H. Apply adhesive at a rate of 6' sq. ft. per tile at 1/16" thickness with a notched trowel in each corner strips – following an "H" pattern.

### 3.3 Inspection and Acceptance

- A. Inspection shall be conducted after installation is completed and all adhesive and caulking is fully cured. It is normal to have some minor movement of the tiles as by their composite nature, the tiles take some time to “settle-in”. It is likewise normal to hear minor “pings and popping sounds” as micro-cracking occurs with the composite laminate. These sounds and movement will lessen as the installation ages.

**\*\*\* END OF SPECIFICATION \*\*\***