SECTION 32 17 34

CONCRETE DETECTABLE WARNING TILES

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section includes provisions for furnishing and installing concrete cast-in-place detectable warning tiles embedded in all curb ramps at the locations and to the dimensions shown on the Drawings, in accordance with the Project Manual and as directed by the City.

1.2 REFERENCES

A. Drawings and General Provisions of this Contract 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.

C. California Code of Regulations (CCR) 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”.

D. American Society for Testing and Materials (ASTM) Test Methods B117, C1028, D543, D570, D638, D695, D790, D1037, D2486, D2565, D5420 and E84.

E. SFPW Accessible Street Crossing Standards, latest edition.

F. SFPW Standard Specifications (SFPWSS), revised November, 2000.

1.3 SUBMITTALS

A. Product Data: The Contractor shall submit manufacturer’s literature describing products, installation procedures and maintenance instructions.

B. Samples for Verification Purposes: The Contractor shall submit two (2) tile samples minimum 6” x 8” of the kind proposed for use. Samples will be properly labeled and will contain the following information: Contract name, submitted by, date of submittal, manufacturer’s name, catalog number and date of fabrication.

C. Shop Drawings: The Contractor shall submit Shop Drawings showing plans of tile placement, including joints, all materials to be used and an outline of installation procedures.

D. Material Test Reports: The Contractor shall submit current test reports from qualified independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet the properties indicated. Tests listed in Section 1.4 will be performed by a certified and qualified independent testing laboratory on a cast-in-place tactile tile system. All test reports submitted will be certified by the testing laboratory and will be no more than six (6) months old from the time of the submittal.

1.4 QUALITY CONTROL

A. The Contractor shall provide concrete cast-in-place detectable warning tiles and accessories as produced by a single manufacturer.

B. Installer's Qualifications: The Contractor shall engage an experienced installer certified in writing by tile manufacturer, who has successfully completed tile installations similar in material, design and extent to that indicated for this Contract.

1.5 DELIVERY, STORAGE AND HANDLING

A. Tiles will be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces will be protected by sturdy wrappings.

1.6 GUARANTEE

A. Concrete cast-in-place detectable warning tiles will be guaranteed in writing for a period of five (5) years from date of the Contract's Final Completion. The guarantee includes, but is not limited to, defective work, breakage, deformation, loosening of tiles, and failure of fasteners and anchors.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Cast-in-place detectable warning tiles will be made of a polymer composite concrete and be ADA and CCR compliant.

B. Color: Yellow conforming to Federal Standard 595B Table IV, Color No. 33538. Color will be homogeneous throughout the tile.

C. Domes: Square grid pattern of raised truncated domes of 0.2 inches nominal height, base diameter of 0.9 inches and top diameter of 0.45. Domes will have a center to center spacing of 1.67 inches and a base to base spacing of 0.77 inches, measured between the most adjacent domes on square grid.

D. Tiles will meet or exceed the following test criteria using the most current test methods:
1. Polymer Composite Concrete Based Tiles

Property	Limit
Compressive Strength	11,000 psi minimum
Tensile Strength	1,700 psi minimum
Flexural Ultimate Strength	2,700 psi minimum
Slip Resistance	0.80 minimum
Water Absorption	Not to exceed 2%
Abrasion Resistance	<0.03 cm^3/cm^2

E. The field area will consist of a non slip surface with a minimum static coefficient of friction of 0.80, wet and dry.

F. Tile Size: Individual panel size will be a minimum of 2 feet wide by 3 feet long. Minimum 3 feet of detectable warning tile depth is required at each curb ramp unless noted otherwise on contract drawings.

G. Filler: Non-shrink grout per the grout manufacturer's requirements.

H. Cleaning materials used on site will have code acceptable low VOC solvent content and low flammability.

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

2.2 MANUFACTURERS

A. Available manufacturers and models subject to compliance with these Specifications include the following or approved equal:

Manufacturer	Material	Model
TekWay Dome-Tiles manufactured by StrongGo LLC	Polymer Composite Concrete	Cast-in-place

2.3 EQUIPMENT

A. The Contractor shall provide all tools, equipment and services required for the satisfactory installation per manufacturer's instruction as Incidental Work. Equipment, which may be required, include typical mason's tools, a 4 feet long level with electronic slope readout, 25 pound weights, vibrator and small sledge hammer with 2" x 6" x 20" wood tamping plate, and a device for cutting the tiles.

PART 3 – EXECUTION

3.1 PREPARATION

A. During all concrete pouring and tile installation procedures, the Contractor shall ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.

B. The physical characteristics of the concrete will be consistent with these Specifications while maintaining a slump range of 4 inches to 7 inches to permit solid placement of the cast-in-place tactile tile system.

C. The concrete will be poured and finished, true and smooth to the required dimensions and slope prior to tile placement.

3.2 INSTALLATION

A. The Contractor shall not be allowed to install curb ramps until all submittals have been reviewed and approved by the City.

B. The tiles shall be installed per manufacturer's instructions.

C. The tiles will be oriented such that the rows of detectable warning tiles are parallel with the direction of the ramp.

D. The largest size tile manufactured will be used to minimize multiple tiles on the ramp. When multiple tiles are used, the domes will be aligned between the tiles and throughout the entire detectable warning tile installation. The tiles will be placed to the back of curb in accordance with the Drawings. Cutting the tiles may be required.

E. Panel to panel joints between detectable warning panels must be laid out by adjoining factory edges. All grade break joints shall be factory edges; no cutting of tiles shall be allowed at grade breaks.

F. The tiles will be tamped or vibrated into the fresh concrete to ensure that there are no voids or air pockets, and the field level of tile is flush to the adjacent concrete surface or as the Drawings indicate to permit proper water drainage and eliminate tripping hazards between adjacent finishes.

G. While the concrete is workable, a 1/8 inch radius edging tool will be used to create a finished edge of concrete, then a steel trowel will be used to finish the concrete around the tile's perimeter, flush to the field level of the tile.

H. Concrete detectable warning tiles shall have a beveled edge sloped at 1:2 maximum to create a smooth transition between the back of curb and detectable warning tiles.

I. All visible gaps/joints shall be filled to create smooth transitions throughout. Grinding of filler material shall be performed to create smooth transitions, if necessary.

J. An overly wet mix will cause the cast-in-place detectable warning tiles to float. Under these conditions, suitable weights such as 2 concrete blocks or sandbags (25 lb) will be placed on each tile.

3.3 CLEANING AND PROTECTING

A. The Contractor shall protect detectable warning tiles against damage during construction to comply with tile manufacturer's Specifications.

B. During and after the tile installation and the concrete curing stage, it is imperative that there will be no walking, leaning or external forces placed on the tile to rock the tile, causing a void between the underside of tile and concrete.

C. The Contractor shall protect detectable warning tiles against damage from rolling loads following installation by covering with plywood or hardwood.

D. The Contractor shall clean tiles prior to the date scheduled for inspection. The tiles will be cleaned by the method specified by the tile manufacturer. Protective covering provided by manufacturer shall be removed at completion of curb ramp construction.

END OF SECTION