

MANDATORY
SUPPLEMENTAL SPECIFICATION
FOR
CURB RAMP WITH DETECTABLE WARNING
SURFACE

502.01 – Description – add the following:

Curb Ramp with Detectable Warning Surface - This work shall consist of furnishing all material, equipment, tools and labor necessary for the placement of concrete and/or brick pavers or concrete paver surfaces and curb ramp with detectable warning surface complete and ready for service at location(s) specified in the contract documents or as directed by the Owner. All work shall be in accordance with the details or standards shown in the contract documents and the Virginia Department of Transportation (VDOT), CG-12 Detectable Warning Surface (Access for Mobility Impairments), Special Design Section Drawing No. A 59 (Rev. 7/04) or as directed by the Owner.

502.02 – Materials - add the following:

(h) Detectable Warning Surface – Materials shall conform to the requirements of Section 502 of the Specifications, except as follows:

Detectable Warning Surface shall be “tiles” made of homogeneous glass and carbon, reinforced composite material or vitrified polymer composite (VPC) material with ultra-violet stabilized coating, to minimize color wear, and a “non-slip” surface, incorporating “truncated domes,” made of same material. The nominal thickness of the detectable warning tile shall be 1/8" exclusive of the height of the truncated domes. The tiles shall be in compliance with applicable Americans with Disabilities Act Accessibility Guidelines (ADAAG) and American with Disabilities Act (ADA) regulations with regard to detectable warning surfaces.

1. Types: Detectable warning surface shall be classified as follows:

- a. Cast-In-Place** tile shall be installed in the concrete in accordance with manufacturer’s specifications. The cast-in-place tile shall be used for new construction.
- b. Surface Mounted** tile shall be secured to the concrete with a structural adhesive system and fasteners that anchors into the concrete. The surface mounted tile shall be installed to existing or proposed smooth finished concrete ramps.

2. Detail Requirements: Requirements for the detectable warning surface tiles shall meet the following:

- a. Compressive Strength:** 18,000 PSI minimum when tested by ASTM D695
- b. Tensile Strength:** 10,000 PSI minimum when tested by ASTM D638-91

- c. **Flexural Strength:** 24,000 PSI minimum when tested by ASTM C293-94 or ASTM D790
 - d. **Water Absorption:** 0.35% maximum when tested by ASTM D570
 - e. **Slip Resistance:** 0.9 minimum for the combined wet/dry static co-efficient of friction when tested by ASTM C1028
 - f. **Chemical and Stain Resistance:** No deterioration, discoloration or staining when tested by ASTM D543-87 or ASTM 1308
 - g. **Fire Resistance:** 25 minimum when tested to ASTM E84
 - h. **Accelerated Weathering:** No deterioration, fading or chalking of surface after 2000 hours minimum exposure when tested by ASTM G26-95
 - i. **Salt and Spray Performance:** No deterioration or other defects after 100 hours minimum exposure when tested by ASTM B117
 - j. **Accelerated Aging and Freeze Thaw:** No disintegration, cracking, delamination, warpage, blistering, color change or other defects when tested by ASTM D037 or ASTM C1026
3. **Pattern/Dimension:** Pattern and dimensions of the detectable warning surface tile shall incorporate an “in-line” dome pattern of truncated domes 0.2” in height, 0.9” diameter at the base and 0.4” diameter at top of dome. Domes should be spaced no greater than $2\frac{3}{8}$ ” from center to center. The field area of the detectable warning surface should consist of raised points no greater than 0.045”, to create a non-slip surface for wheelchair safety. Surface mounted detectable warning surface tiles shall have countersunk fastening holes and perimeter beveled edges.

Overall dimension of the detectable warning surface tiles shall be in accordance with this specification and the contract documents.

4. **Color:** Unless otherwise called out in the contract documents, the detectable warning surface tiles shall be “Brick Red”, Federal Color No. 31136, or Federal Color No. 11302, for applications on standard concrete curb ramps and “Light Gray”, Federal Color No. 26280 for applications on red brick paver or red brick concrete paver ramps, or as approved by Owner. The color shall be integral with the detectable warning device tiles and shall not be surface applied. Paints or other surface coatings shall not be used. Product samples with proposed color shall be submitted to Owner for approval prior to installation.
5. **Manufacturer:** Detectable Warning Surface tile shall be provided by:
- a. Engineered Plastics, Inc. (Armor-Tile)
 - b. ADA Solutions, Inc.
 - c. Approved Equal
6. **Fasteners:** Fasteners shall be flat-head drive anchors made of a corrosion-resistant material $\frac{1}{4}$ ” in diameter x $1\frac{3}{4}$ ” long.

7. **Adhesives:** Adhesive shall be a urethane elastomeric adhesive material, as required by the manufacturer's specifications.
8. **Sealants:** Sealant shall be a gray epoxy, two-component sealant, as required by the manufacturer's specifications.

502.03 – Procedure – add the following:

(d) Curb Ramp with Detectable Warning Surfaces: The installation of the concrete curb ramp and transition slope ramps shall be constructed according to the contract document and Section 502 of the Specifications except for the detectable warning devices tiles that shall be installed in accordance with manufacturer's specifications and contract documents.

Curb ramp and transition slope ramp floors shall be 7" thick Class A-3 concrete or, if precast, 7" thick Class A-4. Transition slope ramps may be poured monolithically with curb ramp floor or by using permissible construction joint with required bars. The required bars shall be 8" in length No. 5 rebar and placed 12" from center to center along both of the curb ramp floors, mid-depth of the ramp floor, with 1½" minimum concrete cover. If curb ramp floor is precast, holes must be provided for dowel bars so that adjoining flared transition slope ramps can be cast in place after the placement of the precast curb ramp. The finished surface of the curb ramp and transition slope ramps shall be uniformly profiled to match the adjoining surfaces without lips or obstructions and shall drain completely. The location and orientation of the curb ramps shall be constructed as shown in the contract documents or directed by the Owner

Curb ramp running slopes at unrestrained sites shall not be steeper than 1:12 (0.0833) and the cross slope shall not be steeper than 1:48 (0.02). Transition slope ramps shall not be steeper than 1:12 (0.0833). When altering existing sidewalk, where existing site development precludes the accommodation of a ramp slope of 1:12 (0.0833), a running slope between 1:12 (0.0833) and 1:10 (0.10) is permitted for a rise of 6" maximum and a running slope of between 1:10 (0.10) and 1:8 (0.125) is permitted for a rise of 3" maximum. In historic facilities, a 1:6 (0.1667) ramp with a maximum run of 2" is permitted if a lesser slope is not feasible and if the historic significance of the facility would be treated or destroyed through the use of complying ramp. Curb ramp running slope shall not exceed 8' in length, except at sites where the contract documents specify a greater length.

Where a curb ramp is constructed within the existing curb, combination curb and gutter and/or sidewalk, the existing curb or combination curb and gutter shall be removed to the nearest joint beyond the curb transitions or to the extent that no remaining section of curb or curb and gutter is less than 5' long. The existing sidewalk shall be removed to the nearest joint beyond the transition slope ramps or walk around or to the extent that no remaining section of sidewalk is less than 5' long.

When a curb ramp and transition slope ramps are constructed with bricks or concrete pavers, the bricks and concrete pavers shall be installed in accordance with manufacturer's specifications or contract documents and Supplemental Specifications for Unit Paving.

Detectable warning surface tile shall extend the full width of the curb ramp or landing and in the direction of travel 24" from the back of curb. The detectable warning surface shall not be installed on the transition slope ramps. The detectable warning surface shall be located so that the edge nearest the curb line is between 6" and 8" from the face of curb unless noted in the contract documents.

Domes shall be aligned on a square grid, aligned in rows parallel and perpendicular to the predominant direction of travel. The domes must be not skewed diagonally to the direction of travel.

After the installation of the detectable warning surface tile, the surface of the tile shall be free of any debris, concrete and sealant and shall be cleaned according to the manufacturer recommendations.

The Contractor and manufacturer shall jointly warrant the installed detectable warning surface to last no less than two years without losing more than one percent of the truncated domes due to delaminating as a result of product failure and shall further warrant the surface for a minimum of five years against fading, chipping, peeling, cracking or loss of original shade due to sunlight, salt or exposure to weathering.

502.04 – Measurement and Payment.

Delete the eighth paragraph, **Curb-cut ramps**, from the 2002 Virginia Department of Transportation, Road and Bridge Specifications in its entirety and replace with the following:

Curb Ramp with Detectable Warning Surface, Cast-In-Place will be measured in square yards of finished surface and detectable warning surface, complete-in-place, and paid for at the contract unit price per square yard. This price shall be full compensation for furnishing and installing a curb ramp with cast-in-place detectable warning surface tile, including but not limited to, layout, excavation, bedding, concrete and/or brick pavers or concrete pavers, detectable warning surface tile, surface preparation, saw-cutting, dowels, bars, surface sealant, repairs and cleaning of the adjoining areas disturbed by the installation, and all other labor, tools, equipment, materials and incidentals necessary to complete the work. The curb ramp shall be measured and paid by the type of surface material (concrete, and/or concrete pavers or brick pavers) and the cast-in-place detectable warning surface application. Brick pavers and concrete pavers shall include the cost of the brick pavers and concrete pavers, bedding materials, handling, installation, and any other incidental work required to complete the curb ramps. The quantities of the concrete and/or concrete pavers or brick pavers, and detectable warning surface shall be computed as the actual quantity of the material installed in place.

Curb and combination curb and gutter slope transitions adjacent to the curb ramp are included in the payment for curb and combination curb and gutter in Section 502 of the Specifications and are not included in this pay item.

Removal and disposal of existing sidewalk, curb ramp, curb and combination curb and gutter will be measured for separate payment in Section 510 of the Specifications and are not included in this pay item.

Curb Ramp with Detectable Warning Surface, Surface Mounted will be measured in square yards of finished surface and detectable warning surface, complete-in-place, and paid for at the contract unit price per square yard. This price shall be full compensation for furnishing and installing a curb ramp with surface mounted detectable warning surface tile, including but not limited to, layout, excavation, bedding, concrete and/or brick pavers or concrete pavers, detectable warning surface tile, saw-cutting, dowels, bars, fasteners, adhesives, surface sealants, repairs and cleaning of adjoining areas disturbed by the installation, and all other labor, tools, equipment, materials and incidentals necessary to complete the work. The curb ramp shall be measured and paid by the type of surface material (concrete, and/or concrete pavers or brick pavers) and the surface mounted detectable warning surface application. Brick pavers and concrete pavers shall include the cost of the brick pavers and concrete pavers, bedding materials, handling, installation and any other incidental work required to complete the curb ramps. The quantities of the concrete and/or brick pavers or concrete pavers and detectable warning surface shall be computed as the actual quantity of the material installed in place.

Curb and combination curb and gutter slope transitions adjacent to the curb ramp are included in the payment for curb and combination curb and gutter in Section 502 of the Specifications and are not included in this pay item.

Removal and disposal of existing sidewalk, curb ramp, curb and combination curb and gutter will be measured for separate payment in Section 510 of the Specifications and are not included in this pay item.

Installation of Detectable Warning Surface, Surface Mounted, to an Existing Curb Ramp will be measured in square feet of detectable warning surface, complete-in-place, and paid for at the contract unit price per square feet. This price shall be full compensation for furnishing and installing the surface mounted detectable warning surface tile, including but not limited to, detectable warning surface tile, saw-cutting, fasteners, adhesive, surface sealants, repairs and cleaning of adjoining areas disturbed by the installation, and all other labor, tools, equipment, materials and incidentals necessary to complete the work. The quantities of the detectable warning surface shall be computed as the actual quantity of material installed in place.

Pay Items	Units
Curb Ramp (type of material) with Detectable Warning Surface, Cast-In-Place	Square Yard
Curb Ramp (type of material) with Detectable Warning Surface, Surface Mounted	Square Yard
Installation of Detectable Warning Surface, Surface Mounted, to an Existing Curb Ramp	Square Foot