

**Item No. 431S**

**Machine Laid Portland Cement Concrete Curb and Gutter**

**431S.1 Description**

This item shall govern Portland cement (p.c.) concrete curb and gutter and reinforcing steel dowels, constructed in accordance with this specification on an approved base in conformity with the lines, grades, sections and Standard Detail Series 430S and indicated on the Drawings or as established by the Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

**431S.2 Submittals**

The submittal requirements of this specification item include:

- A. Class I p.c. concrete mix design,
- B. Type of Installation (i.e. P.C. Concrete Curb and Gutter or P.C. Concrete Curb) and construction details (i.e. base, reinforcing steel, joints, curing membrane),
- C. Identification of the type, source, mixture, Pure Live Seed (PLS) and rate of application of the seeding.

**431S.3 Materials**

- A. Portland Cement Concrete (PCC)

The Portland Cement Concrete shall conform to Class I Concrete, Section 403S.7 (Table 4) of Standard Specification Item No. 403S, "Concrete for Structures".

- B. Reinforcing Steel

Reinforcing steel shall conform to Standard Specification Item No. 406S, "Reinforcing Steel".

- C. Expansion Joint Materials

Preformed expansion joint materials shall conform to Standard Specification Item No. 408S, "Expansion Joint Materials".

- D. Membrane Curing Compound

Membrane curing compound shall conform to Standard Specification Item No. 409S, "Membrane Curing".

- E. Flexible Base

Flexible base material shall conform to Standard Specification Item No. 210S, "Flexible Base".

- F. Stabilized Base

A stabilized base identified as a Type A or B shall conform to the requirements of Standard Specification Item 340S, "Hot Mix Asphaltic Concrete Pavement".

#### 431S.4 Construction Methods

##### A. Subgrade and Base Preparation

Subgrade for curb and gutter shall be excavated and prepared to depth and width requirements indicated on the Drawings, including a minimum of 12 inches (300 mm) behind the curb, unless a greater width is indicated on the Drawings. The subgrade shall be shaped to the line, grade, cross section and dimensions indicated on Standard Detail 430S-1 or the Drawings. A minimum thickness of 4 inches (100 mm) of flexible base (Standard Specification Item No. 210S) or stabilized base shall be placed, spread, wetted (flexible base only) and thoroughly compacted. If dry, the flexible base shall be sprinkled lightly with water before p.c. concrete is deposited thereon.

##### B. Portland Cement Concrete (P.C.C.) Curb and Gutter Extrusion

The pcc curb shall be laid by a curb extrusion machine approved by the Engineer or designated representative. The line for top of curb shall be maintained from a guideline or guide rails, set by the Contractor. Curb outline shall strictly conform to the details indicated on the Drawings. The forming tube of the extrusion machine shall be readily adjustable vertically during the forward motion of the machine, to provide required variable height of curb necessary to conform to the established grade line. If a guideline is used, a pointer or gage shall be attached to the machine in such a manner that a comparison can be made between the curb and the guideline in order to provide a continual check on the curb grade. Other methods may be used if approved in writing by the Engineer or designated representative.

##### C. Portland Cement (P.C.) Concrete Placement and Finish

The p.c. concrete shall be fed into the machine in such a manner and at such consistency that the finished curb will present a well-compacted mass with a surface free from voids and honeycomb and true to established shape, line and grade.

Any additional surface finishing indicated on the Drawings and/or required by the Engineer or designated representative shall be performed immediately after placement. Weakened plane joints shall be cut to a depth of 3/4 inch (19 mm) at 10-foot (3 meters) intervals or as directed by the Engineer or designated representative.

Whenever the curb end abuts a p.c. concrete structure a 3/4-inch (19-mm) pre-molded expansion joint conforming to the curb section shall be placed between the 2 concrete surfaces.

Whenever extrusion is suspended long enough to produce a cold joint, 1/2-inch (12.5 mm) smooth dowel bars, 24 inches (600 mm) long, shall be embedded 12 inches (300 mm) into the completed curb, 1/4 curb height from top and bottom. The end of the curb at the point of suspension of extrusion shall be cut back until all remaining p.c. concrete is of a dense, well-compacted nature.

Any addition of concrete to the extruded curb is to be applied and finished before the extruded curb has achieved its initial set. The final finish shall have a gritty surface approved by the Engineer or designated representative.

##### D. Reinforcing Steel

The reinforcing steel, if required by standard 430S-1 or shown on approved plans, shall be placed as shown on the typical section of the Drawings. Care shall be exercised to keep all steel in its proper location during p.c. concrete placement.

#### E. Joints

Joints shall be of the type and spacing shown on the Drawings. Expansion joint material, 3/4 inch (19 mm) in thickness, shall be provided at intervals not to exceed 40 feet (12 meters) and shall extend the full width and depth of the p.c. concrete. Weakened plane joints shall be made 3/4 inch (19 mm) deep at 10-foot (3 meters) intervals. All joint headers shall be braced perpendicular and at right angles to the curb.

Two round smooth dowel bars, 1/2 inch (12.5 mm) in diameter and 24 inches (600 mm) in length, shall be installed at each expansion joint. Sixteen inches (400 mm) of one end of each dowel shall be thoroughly coated with hot oil, asphalt or red lead, so that it will not bond to the concrete. The dowels shall be installed with a dowel sleeve on the coated end as indicated on the Drawings or equivalent method as directed by the Engineer or designated representative.

#### F. Curing

When finishing operations are completed the curb shall be cured conforming to Standard Specification Item No. 409S, "Membrane Curing".

When the curb has cured a minimum of 3 days and prior to placement of the final lift of base course, it shall be backfilled to the full height of the p.c. concrete, tamped and sloped to drain as directed by the Engineer or designated representative.

In turf areas, the upper 4 inches (100-mm) of backfill shall be of clean topsoil, that conforms to Standard Specification Item No. 130S, "Borrow" and shall be free of stones and debris.

#### G. Seeding in Turf Areas

When turf is to be established, the preparation of the seedbed shall conform to Standard Specification Item No. 604S, "Seeding for Erosion Control".

### **431S.5 Measurement**

Machine Laid PCC Curbs will be measured by the lineal foot (lineal meter: 1 lineal meter equals 3.281 lineal feet) of completed and accepted curb, complete in place.

### **431S.6 Payment**

The work performed as prescribed by this item will be paid for at the unit bid price per lineal foot for "Machine Laid PCC Curb and Gutter". The unit bid price shall include full compensation for all work as set forth and described under payment Method A, B or C below.

#### A. Method A: With Excavation (Pay Item No. 431S-A)

This payment method includes all the work performed for "Machine Laid PCC Curb and Gutter", complete, at the unit bid price. The unit bid price shall include full compensation for excavation, preparation of the subgrade, furnishing and placing all base material, reinforcing steel, dowels, expansion joint materials, curing material, backfill and all other materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

**B. Method B: With Fine Grading (Pay Item No. 431S-B)**

This payment method includes all the work performed for "Machine Laid PCC Curb and Gutter", complete, at the unit bid price. The unit bid price shall include full compensation for fine grading, furnishing and placing reinforcing steel, dowels, expansion joint material, curing material, backfill and for all other materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

**C. Method C: included in the unit price bid for this specification item**

**Incidental Work (Pay Item No. 431S-C)**

This method includes all the work performed as incidental work relating to "Machine Laid PCC Curb and Gutter" as may be detailed and noted on the Drawings or included and described in the "Special Provisions" of the Standard Contract Documents.

Payment will be made under one of the following:

- Pay Item No. 431S-A:** Machine Laid Curb and Gutter (Excavation) Per Lineal Foot.
- Pay Item No. 431S-B:** Machine Laid Curb and Gutter (Fine Grading) Per Lineal Foot.
- Pay Item No. 431S-C:** Machine Laid Curb and Gutter (Incidental Work) Per Lineal Foot.

**End**

<b><i>SPECIFIC</i> CROSS REFERENCE MATERIALS</b>
Specification Item No. 431S, "Machine Laid PCC Curb and Gutter"

City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 130S	Borrow
Item No. 210S	Flexible Base
Item No. 206S	Asphalt Stabilized Base (Plant Mix)
Item No. 340S	Hot Mix Asphaltic Concrete Pavement
Item No. 403S	Concrete for Structures
Section 403S.7: Item No. 403S	Table 4: Classes of Concrete
Item No. 406S	Reinforcing Steel
Item No. 408S	Expansion Joint Materials
Item No. 409S	Membrane Curing
Item No. 604S	Seeding for Erosion Control

City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
No. 430S-1	Curb and Gutter Section
No. 430S-3	Curb Expansion Joint Dowel Detail
No. 430S-4	Concrete Backfill Under Curb & Gutter

No. 430S-5

Reinforcing Bar Detail at Existing Curb and Gutter

<b><i>RELATED</i> CROSS REFERENCE MATERIALS</b>
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City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 302S	Aggregates for Surface Treatments
Item No. 360	Concrete Pavement
Item No. 430S	P.C. Concrete Curb and Gutter
Item No. 433S	P.C. Concrete Driveways
Item No. 434S	P.C. Concrete Medians and Islands
Item No. 436S	P.C. Concrete Valley Gutters
Item No. 606S	Fertilizer