

DIVISION 9**CONCRETE CURB AND GUTTER**9.01 Description:

The work shall consist of constructing curb, gutter and combination curb and gutter, of six-sack or nine-sack concrete, with or without steel reinforcement, as provided, on the prepared subgrade.

The construction of concrete curb, gutter, or combination curb and gutter, shall precede the construction of non-rigid types of pavement or base course, but may either follow or precede, whichever is the more feasible, the construction of concrete pavement or concrete base course.

9.02 Materials:

9.02.01 Portland Cement shall conform to the requirements of the current A.S.T.M. Specifications for Air-Entraining Portland Cement.

9.02.02 Fine Aggregate shall conform to the requirements for “Natural Sand, 2NS” of the current Standard Specifications of the Michigan Department of Transportation.

9.02.03 Coarse Aggregate shall be 100% limestone and conform to requirements for “Coarse Aggregate, 6AA” of the current Standard Specification of the Michigan Department of Transportation.

9.02.04 Reinforcing Steel, when shown on the plans, shall conform to the requirements. A.S.T.M. A-617, Grade 60 Epoxy Coated.

9.02.05 Expansion Joint Material shall be a non-extruding and resilient type. This material shall be pre-molded and composed of fiber of cellular nature and asphalt, ground cork or other approved materials. The expansion joint material shall conform to the requirements of A.S.T.M. D-1751.

9.02.06 Concrete curb, gutter, and combined curb and gutter shall be constructed of five and one half sack (5-1/2) or nine (9) sack concrete as specified by the Engineer.

9.03 Construction Methods:

9.03.01 General – Unless otherwise specified, the Contractor may construct curbing by the use of forms, or by the use of a mechanical curb and gutter paver, providing that the required

cross-section and finish is obtained. Use of the mechanical curb and gutter paver shall have prior approval of the Engineer.

- 9.03.02 The Mixing shall be performed as specified for “Concrete” in Section 7.03.02.
- 9.03.03 The Consistency of the concrete shall be as specified for “Concrete” in Section 7.03.03. The slump shall not be more than four (4) inches unless otherwise specified by the Engineer.
- 9.03.04 The Forms shall be metal, straight and free from distortion, and of sufficient strength to resist springing during the process of depositing and finishing the concrete. Wood forms or flexible steel forms shall be used on circular curb and on special sections and shall be subject to the approval of the Engineer. Circular curb shall be defined as any curved section of curb or curb and gutter constructed on a radius of one hundred fifty (150) feet or less. They shall be of an approved section with a flat surface on top. The forms shall be of the full depth of the structure and shall be well built, substantial and unyielding. They shall be securely staked, braced, and tied to the required line and grade and sufficiently tight to prevent leakage of mortar. The inside surface of the forms shall be oiled with a light, clear paraffin-base oil which will not discolor or otherwise injuriously affect the concrete.
- 9.03.05 Placing Concrete – No concrete shall be placed until the subgrade and forms have been approved by the Engineer. No concrete shall be placed on a frozen subgrade. The subgrade shall be wetted and the concrete deposited to the proper depth. The subgrade shall be the same as that for the adjacent pavement. In fill areas, a berm of not less than two (2) feet beyond the edge of the curb and gutter shall be constructed and compacted prior to placement of the curb and gutter. The concrete shall be spaded sufficiently to eliminate all voids and tamped to bring the mortar to the surface, after which it shall be floated smooth and even by means of a wooden float or magnesium bull float.
- 9.03.06 Steel Reinforcement – When steel reinforcement or tie bars are called for on the plans, the bars shall be properly spaced and held in the correct position during the placing of concrete by the use of bar chairs or other approved devices.
- 9.03.07 Joints shall be constructed as follows:
- (a) General – Joints shall be constructed perpendicular to the lines, with their faces perpendicular to the surface, and shall not vary more than one-quarter (1/4”) inch from this position. The concrete at the faces of all joints shall be thoroughly spaded and compacted to fill all voids and the surface of the concrete at the joints shall be finished smooth and true to grade.
 - (b) Expansion Joints – Expansion joints one (1”) inch thick shall be placed at the beginning and end of all curb radii or curves and generally every one hundred (100’) feet. Expansion joint filler shall extend to the full depth of the joint and

shall be flush with the finished surface of the structure. Expansion joints shall be placed ten (10') feet each side of a catch basin.

- (c) Construction Joints – Unless otherwise shown on the plans, construction joints shall be placed in the curb and gutter at intervals of approximately ten (10') feet and at the outside edges of all drive approach flares (top of the drive approach dubdown). They shall be formed by steel templates one-quarter (1/4") inch in thickness shaped to conform to the cross-section of the structure to a depth of not more than one-half the thickness of the gutter for conventional curb and gutter. For curb and gutter formed by mechanical pavers, the joints shall be not less than one-quarter (1/4) of the thickness of the gutter. The templates shall be left in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place, and before the concrete has developed its final set.

Joint Spacing shall in no case be less than four (4') feet between joints. When curb and gutter is damaged and warrants replacement, the minimum spacing between the next adjacent joint shall be four feet.

- 9.03.08 Finishing – In finishing, the edge of the gutter and the back top edge of the curb shall be rounded with an approved finishing tool having a radius of one-quarter (1/4") inch. All transverse joints shall be finished with a double edging tool having a one-quarter (1/4") inch radius on each side. The face of the curb, at the top and bottom, shall be rounded with approved finishing tools having the radii shown on the plans.

The exposed surfaces of the curb, gutter, and combination curb and gutter shall be finished smooth and even by means of a moistened steel trowel and shall not vary more than one-eighth (1/8") inch in ten (10') feet from the established grade. After smoothing the surfaces with a steel trowel, and after the surface water has dissipated, the surfaces shall be brushed lightly with a fine brush to remove tool marks. Neat cement shall not be used as a drier to facilitate the finishing of surfaces. No additional water shall be added to the surface during finishing operations.

After the forms are removed, honeycomb and minor defects shall be filled with mortar composed of one part Portland Cement, and two parts of fine aggregate, applied with a wooden float or magnesium bull float, and all joints shall be cut open.

- 9.03.09 Curing – Curing concrete in curb, gutters, and combination curb and gutters, shall be done in accordance with Section 7.03.06 of these Specifications on all exposed surfaces.

- 9.03.10 Protection of Newly Placed Concrete – The Contractor shall be responsible for protection of the concrete from damage caused by construction operations, rain, or by any other means.

The Contractor shall be responsible for the concrete placed during cold weather, and any concrete injured by frost action shall be removed and replaced at his expense.

No concrete shall be poured between November 1st and May 1st, unless approved by the Engineer. No concrete shall be poured between November 1 and May 1, unless approved by the Engineer.

The following protection shall be used for cold weather protection of concrete:

<u>Forecast low Temperature for upcoming three (3) day period</u>	<u>Protection Requirement</u>
40 Degrees	No Restrictions
39 to 35	Cover with plastic
35 to 32	Winter Protection(Blankets or Straw)
31 and Below	Pour will not be allowed

9.03.11 Backfilling shall be done after the concrete has set a minimum of 48 hours. The spaces on both sides of the curb, gutter, and combination curb and gutter, shall be backfilled to the required elevation with suitable material, which shall be properly compacted to a minimum density of 95% maximum unit weight, and left in a neat and workmanlike condition. That portion of backfill placed within two (2') feet of the back of the curb and extending from the bottom of the curb structure to approximately four (4") inches of the top of the curb shall be considered as curb backfill.

9.03.12 Cleaning Up must be done before final acceptance of the work. The Contractor shall clean the street surface, walks, gutters, fences, lawns, private property, right-of-way, and structures, leaving them in as good condition as originally found, and shall remove all machinery, tools, surplus materials, temporary buildings and other temporary structures from the site.

9.04 Method of Measurement:

Concrete curb, gutter, or combination curb and gutter will be measured in place by length in linear feet, along the base of the curb face, or along the flow line of the gutter, with no deductions in length for catch basin or inlet castings. Circular curb will not be measured separately.

9.05 Basis of Payment:

“Concrete Curb,” “Concrete Gutter,” and “Concrete Curb and Gutter,” will be paid for at the contract price per linear foot, which price shall be payment in full for furnishing all labor, equipment and materials, including steel reinforcement when required, curing, and backfilling and performing the work complete.