

SECTION 62

DROP INLETS

62.1 DESCRIPTION

A. General: This work consists of furnishing materials and the construction of drop inlets.

B. Related Work:

Section 50	Precast Concrete
Section 54	Drainage Pipe Installation
Section 55	Cast in Place Concrete Structures
Section 56	Class M6 Concrete for Curb & Gutter and Flatwork
Section 57	Reinforcing Steel
Section 63	Storm Sewer Junction Boxes and Manholes
Section 100	Portland Cement
Section 101	Air-Entraining Admixtures
Section 102	Chemical Admixtures for Concrete
Section 104	Water for Use in Portland Cement Concrete
Section 105	Fine Aggregate for Use in Portland Cement Concrete
Section 106	Masonry Mortar Sand
Section 107	Coarse Aggregate for Use in Portland Cement Concrete
Section 108	Concrete Curing Materials
Section 113	Preformed Expansion Joint Filler for Concrete
Section 114	Concrete Joint Sealer
Section 120	Drainage Pipe Materials
Section 123	Concrete Reinforcement
Section 203	Submittals

62.2 MATERIALS

A. Concrete: Class M6, Section 55. For precast drop inlets cast at a facility regularly producing other precast concrete items under Section 50, the concrete shall conform to Section 50.

B. Castings: Unless otherwise specified, frames and grates shall consist of approved gray iron castings meeting the requirements of AASHTO M 105-06/ASTM A48, Class 35B. Grates shall fit the frames with which they are to be used. Inaccuracies of bearing shall be corrected by machining before use or replaced with new assemblies. Grates or covers to be placed in the roadway surface shall also meet AASHTO M306.

C. Steel Reinforcement: Section 123. Reinforcement is not required to be epoxy coated.

D. Mortar: Mortar shall consist of one (1) part portland cement and two (2) parts mortar sand conforming to Sections 100 and 106 respectively. Alternate commercially

available grout may be used if approved by the Engineer.

E. Curing Compound: Section 108.

62.3 CONSTRUCTION REQUIREMENTS

- A. General Requirements:** Concrete for cast-in-place drop inlets shall be proportioned, mixed, hauled, and placed in accordance with Section 55. For precast drop inlets cast at a facility regularly producing other precast items under Section 50, the concrete proportions, slump, and air content shall conform to Section 50.

When the foundation for a drop inlet is in new embankment, the embankment shall be constructed to an elevation at least 1 foot above the footing before the foundation for the drop inlet is prepared. The foundation shall be compacted as specified for the adjacent embankment.

Castings shall be set in full mortar beds or secured as specified. Castings shall be set accurately to the correct elevation so subsequent adjustment will not be necessary.

Pipe sections shall be flush on the inside of the structure wall and project outside sufficiently for proper connection with the next pipe section. Masonry shall fit neatly and tightly around the pipe. Grouting of the pipe connection may be required as directed by the Engineer if voids exist after form removal.

Drop inlets shall be either cast in place or precast. Precast drop inlets shall be defined as those drop inlets cast outside of the project limits. Drop inlets cast within the project limits will be considered cast in place.

- B. Cast In Place Drop Inlets:** The foundation excavated for drop inlets shall be thoroughly moistened immediately prior to placing concrete. Moisture shall be applied without forming pools of water.

Steel reinforcement shall be placed in accordance with Section 57.

Concrete shall be protected and cured in accordance with Section 55. The minimum curing time shall be 72 hours. The finished surface of the concrete shall present a neat and smooth appearance.

Upon completion and curing of the unit, the sheeting, bracing, forms, and falsework shall be removed and the excavation backfilled. The unit shall not be backfilled until the completion of the 72 hour curing period, or until the concrete reaches a minimum compressive strength of 3,000 psi. Backfill shall be placed in loose layers not exceeding 6 inches thick and compacted to the same degree as specified for the adjacent embankment. Installations shall be completed and left in a neat appearing condition.

- C. Precast Drop Inlets:** Shall conform to the following requirements:

Notification: Inlets shall be manufactured at a precast facility that is certified by the American Concrete Pipe Association, is approved for supplying inlets to the South Dakota Department of Transportation, or has been approved by the Engineer. Upon request from the Engineer, the Contractor and/or supplier shall supply a test report from an independent testing laboratory showing compliance with this Specification.

1. **Design:** Precast drop inlets shall conform to the configurations of the standard detail. Alternate designs may be submitted to the Engineer for approval, and shall comply with AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications. Precast drop inlets shall be designed to HL-93 load conditions. The design shall be reviewed and stamped by Professional Engineer registered in the State of South Dakota. The design submittal shall include structural design calculations, and documentation that the alternate design has been accepted by the SDDOT. The Engineer reserves the right to reject alternate designs, including alternate designs that were previously approved.
2. **Shop Drawings:** If using a design that varies from the standard detail, prior to fabrication, the Contractor shall submit shop drawings in accordance with Section 203 Submittals. The shop drawings shall consist of fabrication details including reinforcing steel and spacer placement and configurations, total quantities for the complete item, structural design calculations, and all information necessary for fabrication and erection.
3. **Forms:** Shall be designed to withstand the fluid pressure of the concrete and the added forces due to vibration and impact without distortion. The forms shall be mortar tight and free from warp.

The form surface area in contact with the concrete shall be treated with an approved form oil or wax before the form is set in position. The forms shall be thoroughly cleaned of all other substances.

4. **Fabrication:** Welding of mild reinforcing steel will not be permitted.

Steel wire bar supports will be used to maintain proper reinforcement location and concrete cover. Cutting of reinforcement and bending to the form surface, for support, will not be permitted. Steel wire bar supports, in contact with the casting forms, will be stainless steel, hot dipped galvanized, or plastic tipped extending at least 1/2 inch from the form surface.

The surface temperature of the forms and reinforcing steel, which come into contact with the concrete being placed, will be raised to a temperature above freezing prior to concrete placement. All deleterious material will be removed from the forms prior to concrete placement. For cold weather placements, concrete surfaces will be protected from freezing throughout the pour and until covered for the waiting period before application of live steam or radiant heat.

The precast units will have sufficient strength to prevent damage to the units during removal of the forms and yarding. Precast units will have a minimum concrete

compressive strength of 800 psi prior to form removal. Precast units will have a minimum concrete compressive strength of 3000 psi prior to yarding. The Engineer may approve a different minimum concrete strength for form removal and yarding, based upon fabricator demonstrated results or as shown on design details submitted and approved with the shop plans.

- 5. Concrete Cure:** The concrete shall be cured by low pressure steam, radiant heat, or as specified in Section 55.

Low pressure steam or radiant heat curing shall be done under an enclosure to contain the live steam or the heat and prevent heat and moisture loss. The concrete shall be allowed to attain initial set before application of the steam or heat. The initial application of the steam or heat shall be three hours after the final placement of concrete to allow the initial set to occur. When retarders are used, the waiting period before application of the steam or radiant heat shall be five hours. When the time of initial set is determined by ASTM C 403, the time limits described above may be waived.

During the waiting period, the minimum temperature within the curing chamber shall not be less than 50°F and live steam or radiant heat may be used to maintain the curing chamber between 50°F and 80°F. During the waiting period the concrete shall be kept moist.

Application of live steam shall not be directed on the concrete forms causing localized high temperatures. Radiant heat may be applied by pipes circulating steam, hot oil, hot water, or by electric heating elements. Moisture loss shall be minimized by covering exposed concrete surfaces with plastic sheeting or by applying an approved liquid membrane curing compound to exposed concrete surfaces. The top surface of concrete members for use in composite construction shall be free of membrane curing compound residue unless suitable mechanical means for full bond development are provided.

During the initial application of live steam or radiant heat, the concrete temperature shall increase at an average rate not exceeding 40°F per hour until the curing temperature is reached. The maximum concrete temperature shall not exceed 160°F. The maximum temperature shall be held until the concrete has reached the desired strength. After discontinuing the steam or radiant heat application, the temperature of the concrete shall decrease at a rate not to exceed 40°F per hour until the concrete temperature is within 20°F of the ambient air temperature.

The test cylinders shall be cured with the inlet, or in a similar manner as the inlet, until minimum compressive strength has been obtained.

- 6. Surface Finish and Patching:** If a precast or prestressed item shows stone pockets, honeycomb, delamination, or other defects which may be detrimental to the structural capacity of the item, it will be subject to rejection at the discretion of the Engineer. Minor surface irregularities or cavities, which do not impair the service of the item, and which are satisfactorily repaired will not constitute cause

for rejection. Repairs shall not be made until the Engineer has inspected the extent of the irregularities and has determined whether the item can be satisfactorily repaired. If the item is deemed to be repairable, the repair method and procedures shall be agreed upon by the City and fabricator prior to the work commencing.

Depressions resulting from the removal of metal ties or other causes shall be carefully pointed with a mortar of sand and cement in the proportions, similar to the specific class of concrete in the unit.

7. **Fresh Concrete Testing:** The Contractor shall be responsible for ensuring the fabricator performs all fresh concrete testing. Testing shall be performed by an American Concrete Institute (ACI) certified individual.
8. **Concrete Compressive Strength:** The Contractor shall ensure that the fabricator makes a minimum of one group of test cylinders for each class of concrete for each day's production, not to exceed 150 cubic yards per group of cylinders.

At a minimum, a group of test cylinders shall consist of the following:

- a) Two test cylinders are required for the 28 day compression test.
- b) Optionally, additional cylinders will be required for determining early concrete strength, when the Contractor desires to make delivery and obtain acceptance by the City prior to the 28 day compression test.

Acceptance of the precast units shall be in accordance with Section 55 except that the Contractor shall be responsible for ensuring the fabricator has done the sampling, preparing, and properly curing of all concrete cylinders for concrete compressive strength. The precast units will be accepted when the minimum design concrete compressive strength requirements have been met. Accepted precast units represented by that test group of cylinders may be delivered to the project and will not require the 28 day cylinder test.

Breaking of all concrete cylinders for concrete compressive strength shall be done by a certified testing laboratory.

9. **Pipe Connection and Field Collar:** An M-6 concrete collar a minimum 2 foot wide by 6 inch thick shall be placed around the outside of the pipe connection. The collar shall be reinforced with 6 inch by 6 inch W2.9 by W2.9 wire mesh. All costs for the collar shall be incidental to the unit price for the corresponding bid item.

62.4 METHOD OF MEASUREMENT

- A. **Drop Inlets:** Will be measured per each type.
- B. **Cast Iron Frames with Grates:** Will not be measured.
- C. **Concrete:** Will not be measured.

D. Reinforcing Steel: Will not be measured.

62.5 BASIS OF PAYMENT

A. Drop Inlets: Shall be made per each type, payment will be full compensation for furnishing and installing cast iron frames and grates, concrete, reinforcing steel, mortar bed, and for labor, equipment, and incidentals necessary. Precast drop inlet unit price shall include the concrete collar at the pipe connection.

B. Cast Iron Frames with Grates: Shall be incidental to the inlet.

C. Concrete: Shall be incidental to the inlet.

D. Reinforcing Steel: Steel shall be incidental to the inlet.

END OF SECTION