

Section 2417. Corrugated Culverts

2417.01 DESCRIPTION.

- A. Furnish and install corrugated culverts.
- B. Roadway and entrance culverts are defined in [Article 2416.01](#).

2417.02 MATERIALS.

- A. Use corrugated culverts that meet the requirements of [Section 4141](#), or [Section 4146](#) when polyethylene culvert pipe is designated.
- B. Use round culvert pipe, unless specified otherwise. When required, elongate round pipe. When specified, use arch type pipe.
- C. When placing under roadway, use corrugated steel culverts coated according to [Article 4141.02](#).
- D. A paved invert may be required according to the contract documents.

2417.03 CONSTRUCTION.

A. Maximum and Minimum Sizes.

- 1. Table 2417.03-1 provides minimum allowable pipe sizes.

Table 2417.03-1: Minimum Allowable Pipe Sizes

Culvert Use	Minimum Pipe Size in. (mm)
Roadway Culvert	18 (450)
Entrance Culvert	15 (375)

- 2. Table 2503.03-2 provides maximum allowable pipe sizes.

Table 2417.03-2: Maximum Allowable Pipe Sizes

Corrugation Depth in. (mm)	Maximum Pipe Size in. (mm)
1/2 (13)	84 (2100)
1 (25)	120 (3000)

- 3. When culverts of sizes outside the limitations in Tables 2417.03-1 and 2417.03-2 are specified, they will be covered by the contract documents.

B. Minimum Depth of Fill.

- 1. Place a minimum of 1 foot (0.3 m) of fill over entrance culverts.
- 2. Place a minimum of 2 feet (0.6 m) of fill over roadway culverts.
- 3. If necessary to accommodate construction traffic, increase depth of fill over roadway culverts to the nominal diameter of the pipe or 3 feet (1 m), whichever is greater.

C. Installation.

~~Use Class A bedding when installing corrugated metal pipe or polyethylene pipe for roadway culverts.~~

- 1. **Class A B Bedding.**

~~Use a uniform uncompacted cushion of sand as detailed in the contract documents and meeting the gradation requirements of Gradation No. 1 or 32 of the Aggregate Gradation Table~~

in Section 4109. When installing corrugated metal pipe or polyethylene pipe for roadway culverts, use Class B Bedding described in [Article 2416.03, D, 2.](#)

2. Deflection Testing for Polyethylene Pipes.

a. General.

- 1) No sooner than 30 calendar days following pipe installation compaction and placing backfill material, or before paving, perform deflection testing on at least 10% of the pipe locations along their entire length at locations determined by the Engineer.
- 2) The internal diameter of a pipe is not to be reduced by more than 5.0% of its nominal inside diameter.
- 3) If any pipe fails post installation testing, the Engineer may require the Contractor to perform post installation testing on any additional pipes or all of the remaining pipes.
- 4) Pipes failing post installation testing will be considered unacceptable. Replace with new pipe or reinstall undamaged pipe. Test for deflection.

b. Pipe Diameter of 30 Inches (750 mm) or Less.

Perform deflection testing using a properly sized nine-point mandrel test.

c. Pipe Diameter Greater than 30 Inches (750 mm).

Ensure the internal diameter of the entire length of the pipe is not reduced by more than 5.0% of its nominal inside diameter.

2417.04 METHOD OF MEASUREMENT.

Measurement for the items associated with corrugated pipe culverts will be as follows:

- A. Pipe culvert: measured length, in feet (meters), of culvert installed, excluding aprons, to the nearest foot (0.1 m). Quantity of pipe will be determined along the axis. Measurement for pipe laterals terminating at a tee will be from the point of inlet to a point 6 inches (150 mm) from the outside of the main, less the length of the apron, if any.
- B. Aprons: quantity shown in the contract documents.
- C. Appurtenances (elbows, tees, and other fittings): not measured for payment, but quantity will be shown on the contract documents.
- D. Excavation for culverts:
 1. Roadway culverts: [Article 2402.04, E](#), applies.
 2. Entrance culverts: not measured for payment.
- E. Granular Backfill (when required and furnished): [Article 2402.04, E](#), applies.
- F. Foundation treatment material (when placed at the direction of the Engineer): [Article 2402.04, F](#), applies.
- G. Beveled Pipe and Guard: Quantity shown in the contract documents.
- H. Removal and Reinstallation:
 1. Aprons: Each apron removed and reinstalled will be counted for each size class.
 2. Pipe culvert: Measurement of pipe removed for each size class specified will be in linear feet (meters) from end to end.

2417.05 BASIS OF PAYMENT.

Payment for the items associated with corrugated pipe culvert will be at the contract unit price as follows:

- A. Pipe culvert: per linear foot (meter) for type and size specified.
- B. Aprons: per unit for the size specified
- C. Appurtenances: included in the contract unit price per linear foot (meter) for the pipe culvert.

D. Excavation for culverts:

1. Roadway culverts and the quantity of extra excavation for embankments: per cubic yard (cubic meter).
2. Entrance culverts: incidental to the contract unit price for corrugated pipe culvert.

E. Granular Backfill (when required and furnished): [Article 2402.05, G](#), applies.

F. Foundation treatment material (furnished and placed): [Article 2402.05, F](#), applies.

G. Deflection testing required according to the contract documents: incidental to the contract unit price for polyethylene pipe.

H. Beveled Pipe and Guard: Per unit for the size specified.

I. Removal and Reinstallation:

1. Aprons: Per unit for each size class of apron removed and reinstalled. Payment is full compensation for removal and reinstallation of apron.
2. Pipe culvert: Per linear foot (meter) for each size class of pipe removed and reinstalled. Payment is full compensation for removal and reinstallation of pipe.