

SECTION 33 41 01
STORM DRAIN PIPING

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section and supplemental Data Sheets:
1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. M36, Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.
 - b. M190, Standard Specification for Asphalt- Coated Corrugated Metal Culvert Pipe and Pipe Arches.

1.02 SUBMITTALS

- A. Informational Submittals:
1. Manufacturer's Certification of Compliance.
 2. Manufacturer's data sheets and installation instructions.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

- A. Pipe:
1. General:
 - a. Physical Characteristics:
 - 1) Internally label each section of pipe with the manufacturer's name or trademark, nominal diameter, and manufacture date. Include the pipe class, gauge, and coating according to the pipe material type.
 - 2) Place the pipe so that the location of the label is above the spring line of the pipe.
 - b. Performance Characteristics:
 - 1) Provide pipe according to the size, material or interior roughness, and joint type specified.
 - a) Meet the joint requirements of AASHTO PP63 for silt-tight and leak-resistant joints.
 - b) Determine the strength and thickness of the pipe required based on the cover over the pipe. Refer to the plans.

- c) Maintain the same type of pipe material, joint, strength, and thickness throughout the entire length of pipe.
- d) Submit the material and manufacturer literature for Contracting Officer review and approval.
- c. Functional Characteristics: None.

B. Steel End Section:

- 1. Physical Characteristics: None.
- 2. Performance Characteristics:
 - a. End Section: Galvanized steel sheeting according to AASHTO M218.
 - b. Smooth Tapered Sleeve, When Required: Galvanized steel sheeting according to AASHTO M218.
 - c. Refer to S Series Standard Drawings in the plan set.
- 3. Functional Characteristics: None.

C. Corrugated-steel Pipe and Fittings:

- 1. Physical Characteristics: None.
- 2. Performance Characteristics: Furnish pipe, special sections (such as elbows, branch connections, and prefabricated flared end sections) and coupling bands conforming to AASHTO M36 and either AASHTO M218, AASHTO M274, or AASHTO M289 for the dimensions and thicknesses specified.
- 3. Functional Characteristics: None.

PART 3 EXECUTION

3.01 INSTALLATION OF PIPE, FITTINGS, AND APPURTENANCES

A. General:

- 1. Pipe invert may deviate from line or grade up to 1/2 inch for line and 1/4 inch for grade, provided that finished pipe line will present a uniform bore, and such variation does not result in a level or reverse sloping invert, or less than minimum slope shown.
- 2. Bed pipe to form continuous and uniform bearing and support for pipe barrel between joints. Do not rest pipe directly on pipe joint.
- 3. Prevent entry of foreign material into gasketed joints.

B. Excavation and Backfill:

1. Perform the work described under Section 31 23 13, Subgrade Preparation.
2. Keep trenches free from water.
3. Grade and prepare the bottom of the trench to provide a firm and uniform bearing throughout the entire length of the pipe.
 - a. Do not use blocking to bring the pipe to grade.
 - b. Shape the pipe foundation and bedding to have recesses to fit any projecting hubs or bells.
4. Remove and relay or replace pipe that is out of alignment, not joined properly or damaged before placing backfill.

C. Furnish prefabricated steel end sections compatible with the adjoining pipe.

D. Prepare a smooth foundation free of rock and debris, capable of uniformly supporting the end section.

E. Follow manufacturer's recommendations for connecting pipes and for connecting pipe to end sections, concrete headwalls, catch basins, and similar structures.

1. Do not allow pipes of different types of metal to contact each other.

F. Place the end section at the same alignment and slope as the adjoining pipe.

G. Embed the toe plate for steel end sections.

H. Connect the end section to the adjoining pipe according to the Standard Drawings in the plan set.

1. Use a 3/8-inch polychloroprene flat gasket when connecting to a dissimilar metal. Refer to ASTM D1056.

I. Backfill and grade slopes to match the end section.

3.02 POST INSTALLATION PIPE INSPECTION

A. Inspect pipes after installation of pipe, placement of backfill and before placing pavement or finished grade for deflection.

B. Inspection is not required for pipes less than 20 feet in length.

- C. Notify the Contracting Officer at least 24 hours before performing an inspection. Clean and flush the pipe with water immediately before the inspection.
1. Remove and dispose material and debris from pipes.
 2. Observe and document the following:
 - a. Deflection:
 - 1) Take the following measurements every 10 feet along the length of the pipe to the nearest 1/4 inch:
 - a) Vertically from the crown to invert.
 - b) Horizontally at the spring line.
 - c) Two measurements, each diagonally at 45 degrees to the pipe springline.
 - b. Joint Gaps: Measure the widest separation at each joint to the nearest 1/4 inch.
 - c. Damage.

3.03 FIELD QUALITY CONTROL

A. General:

1. Each pipe is accepted for payment after verifying that the following criteria have been met:
 - a. Alignment.
 - b. Deflection.
 - c. Joint gap.
 - d. Damage.
2. Proposed resolutions for nonconforming pipes require the seal of a licensed professional engineer competent in the structural design of the pipe material being evaluated.

- B. Alignment: Do not exceed the installation horizontal and vertical alignment tolerances in Table 1.

Table 1 – Installation Alignment Tolerances		
Design Grade	Horizontal	Vertical* Inch/100 feet
>1%	Not to exceed the pipe manufacturer’s requirements	1-1/2
0.5% - 1%		1
<0.5%		1/2
* Increase tolerance by 50 percent for pipes with silt tight joints.		

- C. Deflection: Do not exceed a 5 percent shape change from the nominal diameter.
1. Proposals for acceptance of pipes with a deflection greater than 7.5 percent will be rejected.
- D. Joint Gap: Do not exceed the joint separation, measured along the length of pipe, in Table 2.
1. Repair or replace joints that show visible signs of soil or water infiltration.

Table 2 – Joint Gap Tolerances	
Nominal Diameter (inches)	Separation (inches)
12 to 36	0.75
42 to 48	1.00

- E. Damage:
1. Pipes are to be free from:
 - a. Punctures.
 - b. Loss or delamination of coatings.

END OF SECTION

