

**CITY OF WOODCREEK, TEXAS****SPECIFICATION FOR CORRUGATED METAL PIPE**

Description: Furnish and install corrugated metal pipes, materials for constructing corrugated metal pipe culverts, or corrugated metal storm drain mains, laterals, stubs, and inlet leads.

Materials: When joining to existing pipe match with the same pipe material, type, diameter and gauge. Provide pipe with helical end corrugations only when necessary to join new pipe to existing pipe with helical end corrugations.

For new construction: Furnish as required by the project specifications and in Table 1. and Table 2., accordance with 2004 TEXDOT Specification Provide corrugated metal pipe of all types with annular corrugations, helical corrugations, or spiral ribs (corrugations) projecting outward. For pre-coated galvanized steel pipe, provide a minimum polymer coating thickness of 10 mils on each side. Galvanized metal sheets and coils used for galvanized corrugated metal pipe may be sampled and tested in accordance with Tex-708-I.

Repair damaged galvanized coating in accordance with 2004, TEXDOT Item 445.3.D, "Repairs." Repair damaged aluminized or polymer coating in accordance with AASHTO M 36 and M 245 respectively.

Protective Coating: When required, furnish bituminous coating that meets AASHTO M 190 and that tightly adheres to the metal, does not chip off in handling, and protects the pipe from deterioration as evidenced by samples prepared from the coating material successfully meeting the Shock Test and Flow Test in accordance with Tex-522-C. Uniformly coat the pipe inside and out to a minimum thickness of 0.05 in. measured on the crests of the corrugations. When smooth lining is specified, coat the pipe with additional material applied to the full inner circumference to form a smooth inside lining with a minimum thickness of 1/8 in. above the crest of the corrugations.

Coupling Bands: Furnish coupling bands and other hardware for galvanized or aluminized steel pipe in accordance with AASHTO M 36 for steel pipe and AASHTO M 196 for aluminum pipe. Do not use coupling bands that are more than 3 nominal sheet thicknesses lighter than the thickness of the pipe to be connected or that are lighter than 0.052 in. for steel or 0.048 in. for aluminum. Provide coupling bands made of the same base metal and coating as the pipe.

Construction: Excavation, Shaping, Bedding, and Backfill. Excavate, shape, bed, and backfill in accordance with 2004 TEXDOT specification Item 400, "Excavation and Backfill for Structures," except where jacking, boring, or tunneling methods are shown on the plans or are permitted. Jack, bore, or tunnel in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box."

Provide uniform backfill material and uniformly compacted density throughout the length of the structure so that equal pressure is provided. Unless otherwise shown on the plans or permitted in writing, no heavy earth-moving equipment is allowed over the structure until a minimum of 4 ft. of compacted fill (permanent or temporary) has been placed over the top of the structure. Before adding each new layer of loose backfill material, inspect the inside periphery of the structure for local or unequal deformation caused by improper construction methods.

Continue inspections until a minimum of 24 in. of cover is obtained. Evidence of such deformation will be reason for corrective measures as directed. Remove and replace pipe damaged by the Contractor at no additional cost to the city.

Laying Pipe: Unless otherwise authorized, lay pipes on the bedding from the outlet end and join the separate sections firmly together with outside laps of annular joints pointing upstream and longitudinal laps on the sides. If any metal in joints is not protected by galvanizing or aluminizing, coat it with a suitable asphalt paint. Lower sections of pipe into the trench without damaging the pipe or disturbing the bedding and the sides of the trench. Remove and re-lay, without extra compensation, pipe that is not in alignment or that shows excessive settlement after laying.

Lay multiple installations of corrugated metal pipe and pipe arches with the centerlines of individual barrels parallel. Unless otherwise indicated on the plans, maintain the clear distances between outer surfaces of adjacent pipes in accordance with 2004 TEXDOT Table 9., Required Pipe Clear Distances.

Jointing: Provide field joints that maintain pipe alignment during construction and prevent infiltration of side material during the life of the installation. Unless otherwise shown on the plans or directed, provide one of the following jointing systems:

1. Coupling Bands. Use coupling bands with annular corrugations only with pipe with annular corrugations or with helical pipe or spiral rib pipe in which the ends have been rerolled to form annular corrugations. Provide bands with corrugations that have the same dimensions as the corrugations in the pipe end or that are designed to engage the first or second corrugation from the end of each pipe.

The band may also include a U-shaped channel to accommodate upturned flanges on the pipe. When helical end corrugations are allowed, field-join pipe with helically corrugated bands or bands with projections (dimples).

Coupling bands with projections may be used with pipe that has annular or helical end corrugations or spiral ribs. Provide bands formed with the projections in annular rows with 1 projection for each corrugation of helical pipe or spiral rib pipe. Provide 2 annular rows for bands 10-1/2 in. or 12 in. wide and 4 annular rows of projections for bands 16-1/2 in. or 22 in. wide. Use a coupling band width that conforms to Table 10. Connect the bands using suitable galvanized devices in accordance with AASHTO M 36. Lap coupling bands equally on each of the pipes to form a tightly closed joint after

installation. For corrugations not shown in Table 10, provide at least the minimum coupling band width recommended by the manufacturer.

The minimum diameter of bolts for coupling bands is 3/8 in. for pipe diameters 18 in. and less and 1/2 in. for pipe diameters 21 in. and greater. For bands 12 in. wide or less, provide at least 2 bolts. For bands wider than 12 in., provide at least 3 bolts. Provide galvanized hardware in accordance with 2004 TEXDOT specification Item 445, "Galvanizing."

Pipe Connections and Stub Ends: Make connections of pipe to existing pipe or appurtenances as shown on the plans or as directed. Mortar or concrete the bottom of the existing structure, if necessary, to eliminate any drainage pockets created by the new connection. Insulate portions of aluminum pipe that are to be in contact with metal other than aluminum by a coating of bituminous material meeting the requirements of 2004 TEXDOT Specification Section 460.2.B, "Protective Coating." Extend the coating a minimum of 1 ft. beyond the area of contact.

When connecting pipe into existing structures that will remain in service, restore any damage that results from making the connection. Seal stub ends for connections to future work not shown on the plans by installing watertight plugs into the free end of the pipe.

Measurement: This Item will be measured by the foot. Pipe will be measured between the ends of the barrel along the flow line, not including safety end treatments. Safety end treatments will be measured in accordance with Item 467, "Safety End Treatment." Pipe that is required to be jacked, bored, or tunneled will be measured in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box." Where spurs, branches, or connections to existing pipe lines are involved, measurement of the spur or new connecting pipe will be made from the intersection of the flow line with the outside surface of the pipe into which it connects.

Where inlets, headwalls, catch basins, manholes, junction chambers, or other structures are included in lines of pipe, the length of pipe tying into the structure wall will be included for measurement but no other portion of the structure length or width will be included. For multiple pipes, the measured length will be the sum of the lengths of the barrels. This is a plans quantity measurement Item. The quantity to be paid is the quantity shown in the proposal, unless modified by Article 9.2, "Plans

Quantity Measurement: Additional measurements or calculations will be made if adjustments of quantities are required.

Payment: The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Corrugated Metal Pipe," "Corrugated Metal Pipe Arch," "Spiral Rib Corrugated Metal Pipe," or "Spiral Rib Corrugated Metal Pipe Arch" of the type, size, and coating specified. This price is full compensation for furnishing, hauling, placing, and joining of pipes; jointing materials; all connections to new or existing

structures; breaking back, removing, and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends on skew or slope; and equipment, labor, tools, and incidentals. Protection methods for excavations greater than 5 ft. deep will be measured and paid for as required under Item 402, "Trench Excavation Protection," or Item 403, "Temporary Special Shoring." Excavation, shaping, bedding, and backfill will be paid for in accordance with Item 400, "Excavation and Backfill for Structures."