



SECTION 725

METAL PIPE AND PIPE ARCH CULVERTS

725.1 Description. This work shall consist of providing corrugated metal pipe or pipe arch of the diameter or shape designated, laid upon a firm bed and backfilled as specified. Where pipe is referred to, this specification will also apply to pipe-arch, where appropriate. Pipe shall be in accordance with Section 724.

725.1.1 If the contract specifies corrugated metallic-coated steel pipe culverts of 60-inch diameter or larger, the contractor may substitute structural plate pipe of like sizes, lengths and thicknesses of steel, constructed in accordance with [Sec 727](#), at the contractor's expense.

725.1.2 If the contract specifies corrugated metallic-coated steel pipe or corrugated aluminum alloy pipe, or if the contract specifies pipe culverts by group and the contractor elects to furnish corrugated metallic-coated steel pipe or corrugated aluminum alloy pipe, the thickness of metal and size of corrugation for the respective pipe size shall be as shown on the plans unless otherwise specified. The overfill height shown on the plans or in the contract shall be used to determine the proper sheet thickness and size of corrugation for the individual pipe culvert. The minimum cover shall be measured as shown on the plans.

725.1.3 When Group A pipe is specified and the contractor elects to furnish polymer coated corrugated metal culvert pipe or corrugated aluminum-coated steel culvert pipe, the following shall apply:

725.1.3.1 The thickness of the coated sheet shall be a minimum thickness as follows:

Pipe Dia. Inches	Minimum Gauge of Steel Pipe	
	2 2/3" x 1/2" or 3/4" x 3/4" x 7 1/2" spiral rib Corr.	3"x1" or 5" x 1" Corr.
< 42"	14	14
42" < 60"	12	12
60" < 78"	10	12
78" < 90"	8	12
90" < 108"	N/A	12
108" and above	N/A	10

725.1.3.2 The predominate soil type in the area of any metal pipe installation shall meet the following: pH shall be in the range of 5 to 9 (4 to 9 for polymer coated pipe) using AASHTO T-289 test method and soil resistivity shall be > 1500 ohm-cm (> 750 ohm-cm for polymer coated pipe) using AASHTO T-288 test method. The contractor shall conduct these tests and report to the engineer verifying that the tests were performed in accordance with this specification and the predominant soil type in the area of the pipe meets these parameters at least 30 days prior to the installation.

725.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Corrugated Metallic-Coated Steel Culvert Pipe, Pipe-Arches and End Sections	1020
Bituminous Coated Corrugated Metal Culvert Pipe, Pipe Arch	1021
Corrugated Aluminum Alloy Culvert Pipe and Corrugated Aluminum Allow Structural Plate	1024
Polymer Coated Corrugated Metal Culvert Pipe and Pipe Arches	1027

725.3 Construction Requirements.

725.3.1 Handling. All pipe shall be handled to avoid damage. Pipe having damaged coating, any localized bends in excess of five percent of the specified pipe diameter, or any dent in excess of 1/2 inch will be unacceptable, regardless of previous approvals. Rejected damaged pipe may be used if repaired to the satisfaction of the engineer.

725.3.2 Laying Pipe.

725.3.2.1 The pipe shall be carefully laid true to lines and grades shown on the plans. Riveted pipe shall be installed with the outside laps of circumferential joints pointing upstream and with no longitudinal lap placed on the bottom 120 degrees of the pipe on the sides. Any pipe that is not in true alignment or that shows any undue settlement after laying shall be taken up and re-laid at the contractor's expense. If shown on the plans or directed by the engineer, camber shall be built into the pipe structure to compensate for settlement from fill loads.

725.3.2.2 Transverse field joints shall be of such design that the successive connection of pipe sections will form a continuous line free from appreciable irregularities in the flow line. Each successive length of pipe in a field joint shall be adjusted longitudinally or circumferentially when necessary such that coupling bands will properly engage the corrugations in both lengths of pipe.

725.4 Installation, Bedding And Backfill Material. Metal pipe, bedding, backfill and installation shall be in accordance with AASHTO LRFD Bridge Construction Specifications Section 26 and as shown on the plans and specifications. When conflicts occur between AASHTO Section 26 and the plans and specifications the plans and specifications shall apply.

725.4.1 Bedding and Backfill Material. Bedding and backfill material shall meet the requirements of AASHTO M 145, A-1, A-2-4, A-2-5 or A-3. Backfill shall be free of organic material, stones larger than 1.5 in or frozen lumps. Moisture content shall be in the range of optimum content to permit thorough compaction. For pipes with corrugated exterior backfill gradations shall have a maximum particle size less than 1/2 the corrugation depth. Flowable backfill, such as low strength mortar may also be used providing flotation resistance and adequate void fill coverage.

725.4.2 Foundation and Bedding Construction. A stable and uniform bedding shall be provided for the pipe and protruding features of the drainage structure. The middle of the bedding equal to one-third the pipe outside diameter should be loosely placed, while the remainder shall be compacted to a minimum 90 percent of maximum density based upon standard Procter test. A minimum bedding depth of twice the corrugation depth shall be provided prior to placement of the pipe unless otherwise specified. When rock or unyielding material is present in the trench, a minimum bottom bedding of 6.0 in shall be provided. If soft or unstable material is encountered the material shall be removed to a minimum depth of

10 inches below the bottom of the pipe and replaced with suitable granular material. Payment for any unsuitable material will be made per Sec. 206.

725.4.3 Backfill Construction. Structural backfill shall be placed and compacted in layers not exceeding an loose lift thickness of 8 in. and brought up evenly. The side to side differential shall not exceed 24.0 in or one-third of the rise of the structure. Backfill shall continue to not less than 1.0 ft. above the top of the pipe. Structural backfill shall be worked into the haunch area and compacted by hand. All backfill shall be compacted to a minimum 90 percent standard density based upon standard Procter test. Special compaction means may be necessary in the haunch area. Ponding or jetting structural backfill to achieve compaction shall not be permitted without the permission of the Engineer.

725.5 Shop Elongation. Round corrugated steel pipe 48 inches or greater in diameter may be furnished round or shop elongated. The contractor shall maintain elongation during backfilling and embankment construction such that the vertical height of the opening after the embankment has been completed shall be no less than the diameter of the pipe or greater than the pre-elongated height.

725.6 Corrugated Metal Drop Inlets. The contractor shall install corrugated metal drop inlets of the proper size and length at the locations shown on the plans. The drop inlet shall be constructed of the same base metal and thickness of corrugated metal used in the culvert pipe and shall be in accordance with [Sec 1020](#) or [Sec 1024](#).

725.7 Corrugated Metal Curtain Walls. The contractor shall install metal curtain walls of the proper size and shape at locations shown on the plans. Metal curtain walls shall be constructed of the same base metal used in the culvert pipe and shall be of the thickness of metal shown on the plans and in accordance with [Sec 1020](#) or [Sec 1024](#).