

SECTION 709**METAL AND THERMOPLASTIC PIPE**

SCOPE

709.01.01 MATERIAL COVERED

- A. This specification covers the quality of metal pipes, metal arch pipes, metal end sections, structural plate pipe, perforated metal pipe, and thermoplastic pipe used for culverts, drainage structures, conduits, underdrains, and storm sewer.
- B. The quality of pipe for the sanitary sewer shall be in accordance with **Section 630, "Sanitary Sewers,"** or Responsible Agency specifications.
- C. Plastic pipe shall be manufactured in an annually certified plant.
 - 1. Certification shall be by the Plastic Pipe Institute (PPI) or other Contracting Agency approved program.
 - 2. The quality program from the certification process and this specification shall be initially submitted to the Regional Transportation Commission Specification Subcommittee for approval.
 - 3. Once approved, the facility is considered "Authorized" and submittals of the QC program will not be required on a per-project basis unless required in the project specifications.
- D. The metal pipe manufacturer shall be authorized and be annually certified by a procedure approved by the Regional Transportation Commission Specification Subcommittee.
 - 1. The Quality Program used for the certification and this specification shall be submitted prior to construction activities.
 - 2. Once approved, the facility is considered "Authorized" and submittals of the QC program will not be required on a per-project basis unless required in the project specifications.
 - 3. All pipes shall be clearly marked with certification program identification.
- E. Design in accordance with AASHTO LRFD Bridge Design Specifications, Section 12, and to withstand a backfill dead load of 120 pounds per cubic foot and an HS-20 live load, unless otherwise shown in the contract or approved by the Engineer. The minimum cover over a pipe shall be placed on the plans and/or specifications being submitted for plan review.
- F. The design shall consider any flotation effects with the use of controlled low strength material for backfill.
- G. For storm drain application, the design shall consider the abrasion effects of parameters outlined in the Clark County Regional Flood Control District design manual or Federal Highway Administration (FHWA) publication FHWA-DF-88-003, Federal Lands Highway Project Development and Design Manual.
- H. The trench section installation configuration as demonstrated in Figure 1 in **Section 208, "Trench Excavation and Backfill,"** shall only be permitted when approved by the Engineer.

- I. The designing engineer shall comply with the intent of the pipe material as defined as either rigid or flexible in conformance with the AASHTO LRFD Bridge Design and Construction Specifications and this section.
1. Special attention shall be given to the sidewall material properties as this section assumes a minimum AASHTO A1 or A3 material.
 2. Other sidewall material type shall be given special consideration for minimum trench widths, the use of CLSM, or other critical processes that would affect the pipe ability to withstand the load and shall also be noted on the plans and specifications for the project.
- J. The type of pipe and applicable installation requirement (trench and embankment) to be used as demonstrated by the design and approved by the Engineer shall be clearly noted on the drawings and specifications along with installation procedures that may differ from this section.
- K. The design shall include definition of either rigid or flexible pipe as defined by the South African Standard SABS 0102 as outlined on the Clark County QAQC web page:
- L. https://www.clarkcountynv.gov/government/departments/public_works_department/professional_services/materials-qaqc
- M. The minimum design life before first maintenance on all pipes shall be 50 years. The definition of first maintenance is as follows:
1. **Flexible Pipe:** Point of first perforation from designed use.
- N. Joints shall be specified in accordance with the following:

Table 1 - Joint Types				
Pipe Type	Joint Type	Description	Test Pressure	Application
Non-pressure	Silt Tight	Rubber Gasketed	2.0 psi	Storm
Pressure	Water Tight (pressure)	Rubber Gasketed	10.8 psi	Storm

The amount of corrugation coverage for the joint shall be fully engaged in accordance with the banding requirements for the pipe being testing.

REQUIREMENTS

709.02.01 BASIS OF MANUFACTURED LOT ACCEPTANCE

- A. Unless otherwise specified or designated by the Engineer, pipe shall be accepted based on manufacturer's tests and inspection as indicated in **Subsection [709.04.01](#), "Production Quality Control Inspection and Testing,"** Table 4 through Table 7.
- B. The Contractor shall submit to Engineer the manufacturer's Certificate of Compliance for each type of pipe furnished, in accordance with **Subsection [106.05](#), "Certificate of Compliance,"** and these specifications.
1. The certificate shall certify that the pipe complies with the specifications, and shall include the pipe classification, diameter, and the date of manufacture.
 2. The batch test results of each material lot delivered to the project shall be attached to the certificate.

PHYSICAL PROPERTIES AND TESTS

709.03.01 CORRUGATED METAL PIPE AND PIPE ARCHES

- A. These conduits and the coupling bands shall conform to AASHTO M36 for the specified sectional dimensions and coating.
- B. Special sections, such as elbows, tees, and wyes for these conduits shall be of the same gauge as the conduit to which they are joined, and shall conform to AASHTO M36.
- C. When metal end sections are required, the following requirements shall pertain:
 - 1. Metal end sections shall be of the gauge shown on the plans.
 - 2. The end of the pipe shall be furnished with annular corrugations to conform to metal end sections so that no leakage results from the connection; however, other designs may be used if approved by the Engineer.
 - 3. Where connector sections are used, the connector section shall be helical or annular as required to match the type of pipe used.
- D. Gauges of conduits shall conform to the requirements shown on the plans.
- E. Connecting bands may be 2 gauges lighter than that used for pipe but not more than 12 gauge or less than 18 gauge. Unless otherwise approved by the Engineer, 2-piece bands shall be required for pipe greater than 48 inches in diameter.
- F. Pipe thickness and coating shall be designed to withstand native soil corrosivity factors including, but not limited to, pH and electrical resistivity of the soil, for a minimum life of 50 years to first perforation.
- G. The electrical resistivity of the soil shall be determined by California Test Method 643, "Method for Estimating the Service Life of Steel Culverts."
 - 1. Test Method 643 will also be used to determine the anticipated service life for galvanized pipe.
 - 2. For pipe coatings other than galvanized, the estimated service life shall be determined by applying appropriate correction factors to the value determined by California Test Method 643, or as indicated in the following sections.

709.03.02 BITUMINOUS COATED CORRUGATED METAL PIPE AND PIPE ARCHES

- A. These conduits and the coupling bands shall conform to AASHTO M36 for the specified sectional dimensions and gauges, and to AASHTO M190 for the type of bituminous coating.
 - 1. Coupling bands shall be fully coated with bituminous material.
 - 2. Shop-formed elliptical pipe and shop strutted pipe shall be furnished where specified.
- B. Special sections, such as elbows and flared end sections, for these conduits shall be of the same gauge as the conduit to which they are joined, and shall conform to AASHTO M190. Coating and invert paving shall be of the type specified.

709.03.03 ALUMINIZED TYPE II COATED CORRUGATED STEEL PIPE

- A. This pipe shall conform to AASHTO M36 and more specifically to the metallic coating specification AASHTO M274.

- B. In addition, the use of aluminized Type II coated corrugated steel pipe shall be limited by the following conditions:
1. Minimum Resistivity $R > 1500$ for $5 < \text{pH} < 9$
 2. Minimum Resistivity $R > 1000$ for $6.1 < \text{pH} < 8.2$

709.03.04 CORRUGATED ALUMINUM PIPE

- A. This pipe shall conform to AASHTO M196.
- B. In addition, the use of corrugated aluminum pipe shall be limited by the following condition in accordance with FHWA-DF-88-003, Federal Lands Highway Project Development and Design Manual:
1. Minimum Resistivity $R > 500$ ohm-cm and $4 < \text{pH} < 9$

709.03.05 POLYMER COATED CORRUGATED STEEL PIPE

- A. This pipe shall conform to AASHTO M36 and more specifically to the coating specification AASHTO M245.
- B. In addition, the use of polymer coated corrugated steel pipe shall be limited by the following condition:
1. Minimum: Resistivity $R > 250$ ohm-cm and $3 < \text{pH} < 12$

709.03.06 CONCRETE LINED CORRUGATED STEEL PIPE

- A. This pipe shall conform to **Subsection 709.03.03, "Aluminized Type II Coated Corrugated Steel Pipe,"** for pipe and to ASTM A849 except as modified by the following concrete lining specifications:
1. **Composition.** Concrete for the lining shall be composed of cement, fine aggregate, and water that are well mixed and of the consistency to produce a dense, homogeneous, non-segregated lining.
 2. **Mixture.**
 - a. The aggregates shall be sized, graded, proportioned, and thoroughly mixed with proportions of cement and water to produce a homogeneous concrete mixture of such quality that the pipe will conform to this specification.
 - b. In no case, however, shall the concrete mixture be less than a 6-sack mix in accordance with **Section 701, "Hydraulic Cement."**
- B. The lining shall have a minimum thickness of 1/8 inch above the crest of the corrugations.
- C. The lining shall be applied:
1. To produce a homogeneous non-segregated lining throughout.
 2. In a 2-course application.
- D. The lining shall be mechanically trowelled.

709.03.07 CORRUGATED METAL PIPES FOR DOWNDRAINS

- A. Downdrain flumes and pipe shall conform AASHTO M36.
- B. Type III inlets shall conform to AASHTO M36.

- C. Type I and Type II inlets shall conform to ASTM A525 except 2.00 ounce coating shall be required.
- D. When specified, pipe, flumes, and inlets shall be bituminous coated conforming to AASHTO M190.
- E. All anchor assemblies, hardware, and accessories shall conform ASTM A153 and ASTM A123.

709.03.08 CORRUGATED METAL PIPE FOR UNDERDRAINS

- A. This pipe shall conform to AASHTO M36, Type III for the specified diameters.
- B. Unless otherwise specified, any 1 of the first 3 classes shown may be furnished.

709.03.09 BITUMINOUS COATED CORRUGATED METAL PIPE FOR UNDERDRAINS

- A. This pipe shall conform to AASHTO M36 and shall be coated with the bituminous material to meet AASHTO M190, Type A coating, except that minimum coating thickness shall be 0.03 inch.
- B. Coupling bands shall be full coated.
- C. The specified minimum diameter for perforations shall apply after coating.

709.03.10 THERMOPLASTIC, PLASTIC PIPE CULVERTS AND DRAINS

- A. Plastics are composed of thermoplastic and thermosetting resins such as acrylonitrile butadiene styrene (ABS), polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), fiber-reinforced (CCFRPM or FRP), or saturated fibers (CIPP).
- B. For this specification, the applicable plastics are PE, PP, and PVC and are generally identified by cell classification in accordance with AASHTO M294, M304, and M330.
 - 1. The cell classification is a series of numbers and letters that correspond to the ranges of properties in the plastic compound.
 - 2. The pipe strength is expressed as pipe stiffness as psi per linear inch, the product of the initial flexural modulus, and pipe wall cross section moment of inertia.
- C. PE pipe shall conform to AASHTO M252 and AASHTO M294.
- D. PVC pipe shall conform to AASHTO M278 and AASHTO M304.
- E. PP pipe shall conform to AASHTO M330.
- F. Thermoplastic pipe shall be fabricated in accordance with this section.
- G. Thermoplastic pipe or end sections greater than a 30-inch diameter shall not be allowed within a minimum of 8 feet of an open outfall. Thermoplastic pipe up to a 60-inch diameter shall be allowed within a closed storm drain pipe system.
- H. The thermoplastic material properties shall comply with this section.
- I. Joints shall be specified in accordance with the following Table 2.

Table 2 - Joint Types				
Pipe Type	Joint Type	Description	Test Pressure	Application
Corrugated HDPE (D), (S)	Silt Tight	Bell/Spigot O-Ring	2.0 psi	Storm

Ribbed HDPE, Ribbed PVC, Spiral Wound PVC, Corrugated HDPE, Corrugated PP, Corrugated PVC	Water Tight (pressure)	Bell/Spigot O-Ring	10.8 psi	Storm
---	------------------------	--------------------	----------	-------

J. Reference specifications:

1. **Corrugated Polyethylene Pipe, Type S:**

- a. Type S corrugated polyethylene pipe shall be manufactured from high density polyethylene (HDPE) virgin compounds with the exception that up to 3 percent grindings from original pipe trimming may be reintroduced.
- b. The pipe shall conform to AASHTO M252 for pipe sizes 4 inches to 10 inches, and AASHTO M294 for pipe sizes 12 inches to 60 inches, unless otherwise specified herein or in the Special Provisions.
- c. The pipe wall shall be corrugated exterior construction with a smooth inner liner.

2. **Corrugated Polyethylene Pipe, Type D:**

- a. Type D corrugated PE pipe shall be manufactured from HDPE virgin compounds with the exception that up to 3 percent grindings from original pipe trimming may be reintroduced.
- b. Nominal sizes of 42 inches through 60 inches shall conform to AASHTO M294, unless otherwise specified herein or in the Special Provisions.
- c. The pipe shall consist of an essentially smooth waterway braced circumferentially or spirally with projections or ribs joined to an essentially smooth outer wall.
- d. Both walls shall be fused to, or continuous with, the internal supports.

3. **Corrugated Polypropylene Pipe**

- a. Corrugated polypropylene pipe shall be manufactured from polypropylene (PP) virgin compound.
- b. The pipe shall be dual gasket and conform to AASHTO M330 for pipe sizes from 12-inches to 60-inches.
- c. The pipe wall shall be corrugated exterior construction with a smooth inner liner.
- d. The pipe shall be joined using a bell and spigot joint meeting the requirements of AASHTO M330. The joint shall be watertight according to the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F477.

4. **Ribbed Profile Wall or Spiral Wound Polyethylene Pipe:**

- a. Ribbed wall PE pipe shall be manufactured from HDPE virgin compounds with the exception that up to 3 percent grindings from original pipe trimming may be reintroduced.
- b. The pipe shall conform to ASTM F894.
- c. The pipe wall shall be of either solid or hollow rib exterior construction with a smooth inner surface.

5. **Ribbed Profile Wall or Spiral Wound Polyvinyl Chloride Pipe:**
 - a. Ribbed profile wall PVC pipe shall be manufactured from PVC virgin compounds and shall conform to AASHTO M304, unless otherwise specified herein or in the Special Provisions.
 - b. The pipe wall shall be of solid rib exterior construction with a smooth inner surface.
6. **Corrugated Polyvinyl Chloride Pipe with a Smooth Interior:**
 - a. Corrugated profile wall PVC pipe shall be manufactured from PVC virgin compounds and shall conform to ASTM F949, unless otherwise specified herein or in the Special Provisions.
 - b. The pipe wall shall be corrugated exterior construction with a smooth inner liner.
7. **Solid Wall Polyvinyl Chloride Pipe:**
 - a. Solid wall PVC pipe and fittings shall be type PSM PVC pipe and fittings in accordance with ASTM D3034, SDR 35, or ASTM F679 with a T-1 wall thickness or Class P550 PVC pipe and fittings conforming to AASHTO M278.
 - b. Additives and fillers shall not exceed 10 parts by weight per 100 parts of PVC resin in the material compound.
8. **Acrylonitrile Butadiene Styrene Composite Pipe:**
 - a. Acrylonitrile butadiene styrene (ABS) composite pipe shall conform to AASHTO M264.
 - b. Couplings shall be Type SC.
 - c. The ends of the pipe shall be formed so that, when laid together and jointed, the pipe will form a continuous line with a smooth interior surface.
 - d. Immediately prior to assembling the pipe joints, the exposed cross-sectional ends of the pipe shall be coated with the same adhesive cement used for joining the couplings to the pipe.
9. **Special Fittings:**
 - a. Special fittings such as elbows, tees, and wyes for these conduits shall be of the same material as the conduits to which they are joined, and shall conform to applicable requirements for type of material being used.
 - b. When thermoplastic pipe end sections are required, the following requirements shall pertain:
 - 1) End fittings shall be of the sizes shown on the plans.
 - 2) The end of the pipe shall be furnished with corrugation to conform to the end fittings. However, other designs may be used if approved by the Engineer.
 - 3) Where connector fittings are used, the connector fittings shall be helical or annular as required to match the type of pipe used.

709.03.11 CORRUGATED POLYETHYLENE PIPE FOR PERFORATED UNDERDRAINS

- A. Type CP pipe shall conform to AASHTO M252 for nominal sizes of 3 inches through 10 inches, and to AASHTO M294 for nominal sizes of 12 inches through 60 inches.

- B. Type SP pipe shall conform to AASHTO M252 for nominal sizes of 4 inches through 10 inches, and to AASHTO M294 for nominal sizes of 12 inches through 60 inches.

709.03.12 STRUCTURAL PLATE PIPE, ARCHES, AND PIPE ARCHES

- A. This pipe shall conform to AASHTO M167 for steel and to AASHTO M219 for aluminum.

709.03.13 DUCTILE IRON PIPE

- A. This pipe shall conform to ASTM A74, for "Sanitary Sewer Pipe" or with AWWA C151, for "Culinary Water Pipe," as applicable.

709.03.14 STEEL WATER PIPE

- A. This pipe shall conform to AWWA C200.

INSPECTION AND TESTING

709.04.01 PRODUCTION QUALITY CONTROL INSPECTION AND TESTING

- A. Material shall be tested, inspected, and certified in accordance with the frequencies table below and submitted to the Engineer as required in the approved, authorized quality control program.
- B. If the facility is not authorized, then prior to the use of these materials, the Contractor shall submit to the Engineer for approval a document certifying that the material meets these specifications and requirements.
 - 1. Test and inspection data shall be included with the certifying document.
 - 2. Subsequent submittals and reports shall be reviewed by the Contractor for compliance, then transmitted to the Engineer for approval.
- C. The laboratory shall be accredited by American Association for Laboratory Accreditation (A2LA) or by another nationally recognized program approved by the Engineer in the appropriate test method, where applicable.
 - 1. Any structural integrity test shall be reviewed and stamped by a Nevada professional engineer who has responsible charge of the work.
 - 2. Chemical testing does not require a professional engineer review and stamp.

Review the Clark County web site for any exceptions to the test methods listed below at https://www.clarkcountynv.gov/government/departments/public_works_department/professional_services/materials-qaqc

Product	Subsection	Reference	Requirement	Frequency
Plant QC Program, Plastic Pipe	709.01.01	AASHTO M294, Appendix A, AASHTO M330, and Plastic Pipe Institute or other Agency approved program	Certified annually	1 per new plant or revision
Plant QC Program, Metal Pipe		AASHTO M294, Appendix A, AASHTO M330, and Agency approved program		
All Pipe	709.03.01 through 709.03.14	Applicable AASHTO and/or ASTM standards	Design submittal	1 per type

Product/Material	Subsection	Referenced Standard or Test Procedure	Requirement	Frequency
Pipe				
Corrugated PE Pipe, Type S, and Type D	709.03.10.1.1 709.03.10.1.2 709.03.11	Applicable AASHTO standards; AASHTO M252 AASHTO M294 AASHTO M304 AASHTO M330	Basis of manufactured lot acceptance	See Components below
Ribbed Profile Wall or Spiral Wound PE Pipe	709.03.10.1.3	Applicable AASHTO standards; ASTM F894		
Components				
Pipe Raw Material		ASTM D1505 ASTM D1238 ASTM F2136 AASHTO M294 AASHTO M330	Resin Test, Density, Melt Index, SP-CLS Test, ESCR Test 32-hour	1 per lot
Gasket		Name of Gasket Manufacturer and Type; ASTM F477		
Pipe		AASHTO M294 ASTM D638 ASTM D790 AASHTO M330	Pipe Stiffness, Flattening, and Brittleness tests, Elongation, Tensile Strength, Modulus of Elasticity, Unit Weight	3 per week or 1 per lot, whichever is greater
		ASTM D5397	NCTL Test	1 per lot
		AASHTO M294	ESCR Test	
Pipe Joint		ASTM D3212	Joint Hydrostatic Test	1 per setup or change
		AASHTO M294 AASHTO M330	Joint Shear Test	
Inspection		AASHTO M294 ASTM D2122 ASTM F894 AASHTO M330	Wall Thickness, Inside Diameter, Length, Markings	Each piece

Table 5 - PVC Pipe				
Product/Material	Subsection	Referenced Standard or Test Procedure	Requirement	Frequency
Pipe				
Ribbed Profile Wall or Spiral Wound PVC Pipe, Corrugated PVC	709.03.10.1.4	Applicable AASHTO standards; AASHTO M304; ASTM F949, Section 10.E	Basis of manufactured lot acceptance	See Components below
Solid Wall PVC Pipe	709.03.10.1.6	Applicable AASHTO standards; ASTM D3034, SDR 35, or ASTM F679		
Components				
Pipe Raw Material		ASTM D1505 ASTM D1238 ASTM F2136	Resin Test, Density Melt Index, SP-NCLS Test	1 per lot
		AASHTO M304, ASTM F2136	ESCR Test 32-hour	
Gasket		Name of Gasket Manufacturer and Type; ASTM F477	Gasket Volume and Durability Test	
Pipe		AASHTO M304	Pipe Stiffness, Flattening, and Brittleness tests, Elongation, Tensile Strength, Modulus of Elasticity, Unit Weight	3 per week or 1 per lot, whichever is greater
		ASTM D2152	Acetone Immersion	1 per lot
		ASTM D5397	NCTL Test	
Pipe Joint		AASHTO M264	ESCR Test	1 per setup or change
		ASTM D3212	Joint Hydrostatic Test	
Pipe Joint		AASHTO M304	Soil Tight Joint	
		AASHTO M304 and ASTM D2122, ASTM D3034, or ASTM F679	Wall Thickness, Inside Diameter, Length, Markings	Each piece

Table 6 - ABS Pipe				
Product/Material	Subsection	Referenced Standard or Test Procedure	Requirement	Frequency
Pipe				
ABS Composite Pipe	709.03.10.1.7	Applicable AASHTO standards; AASHTO M264 (ASTM D2680)	Basis of manufactured lot acceptance	See Components below
Components				
Pipe Raw Material		ASTM D1505 ASTM D1238 ASTM F2136	Resin Test, Density, Melt Index, SP-NCLS Test	1 per lot

Table 6 - ABS Pipe				
Product/Material	Subsection	Referenced Standard or Test Procedure	Requirement	Frequency
		ASTM D1693 ASTM F2136	ESCR Test 32-hour	
		ASTM D2152	Extrusion Quality	
Gasket		Name of Gasket Manufacturer and Type; ASTM F477	Gasket Volume and Durability Test	
Pipe		AASHTO M264 ASTM D2412 ASTM D638 ASTM D790	Pipe Stiffness, Flattening, and Brittleness tests, Elongation, Tensile Strength, Modulus of Elasticity, Unit Weight	3 per week or 1 per lot, whichever is greater
		ASTM D2152	Acetone Immersion	1 per lot
		ASTM D5397	NCTL Test	
		AASHTO M264	ESCR Test	
Pipe Joint		ASTM D3212	Joint Hydrostatic Test	1 per setup or change
Inspection		ASTM D2680 ASTM D2122	Wall Thickness, Inside Diameter, Length, Markings	Each piece

Table 7 - Metal Pipe				
Product/Material	Subsection	Referenced Standard or Test Procedure	Requirement	Frequency
Pipe				
Corrugated Metal Pipe and Pipe Arches (and Bituminous Coated)	709.03.01 709.03.02 709.03.05 709.03.06 709.03.07 709.03.08 709.03.09	Applicable AASHTO/ ASTM standards; AASHTO M36 or AASHTO M196	Basis of manufactured lot acceptance	See Components below
Aluminized Type II Coated Corrugated Steel Pipe	709.03.03	Applicable AASHTO/ ASTM standards;		
Corrugated Aluminum Pipe	709.03.04	Applicable AASHTO/ ASTM standards;		
Concrete Lined Corrugated Steel Pipe	709.03.06	Applicable AASHTO/ ASTM standards;		
Structural Plate Pipe and Pipe Arches	709.03.12	Conform to the Contract Special Provisions		
Ductile Iron Pipe	709.03.13			
Steel Water Pipe	709.03.14			

Table 7 - Metal Pipe				
Product/Material	Subsection	Referenced Standard or Test Procedure	Requirement	Frequency
Components				
Pipe Raw Material		AASHTO M218 and ASTM A924	Certification of Tension Test and Base Metal Analysis, Corrugated Metal Pipe and Pipe Arches	1 set per lot
		AASHTO M274 and ASTM A463	Certification of Tension Test and Base Metal Analysis, Aluminized Type II Coated Corrugated Steel Pipe	
		AASHTO M218	Certification of Tension Test and Base Metal Analysis, Concrete Lined Corrugated Steel Pipe	
		AASHTO M196 AASHTO M197 ASTM B209	Certification of Tension Test and Base Metal Analysis, Corrugated Aluminum Pipe	
Sheet (Coil)		AASHTO M197 AASHTO M218 AASHTO M274	Thickness	Each coil
Corrugation		AASHTO M36, Section 7.2	Profile	Each setup
Band MTLs		AASHTO M36 Section 9	Thickness and Width	
Lock Seam		AASHTO T249	Inspection and Tensile Test	Each day
Pipe Coating		AASHTO M218 AASHTO M190 AASHTO T65 ASTM A754	Thickness (Corrugated Metal Pipe and Pipe Arches including Bituminous Coated)	Each piece
		AASHTO M274 AASHTO T213 or ASTM A754	Supplier Certificate of Thickness for Corrugated Aluminum, Aluminized Steel, and Concrete-Lined Steel (excluding water pipe)	Per lot
Pipe		AASHTO M218 ASTM A924	Thickness, Diameter (Corrugated Metal Pipe and Pipe Arches including Bituminous Coated)	Each piece
Pipe Inspection		AASHTO M36 Section 8.1.1	Dimensions	Each setup per shift
		AASHTO M36 Section 9 AASHTO M196 Section 10.1	Workmanship	Each piece
Pressure Pipe Joint		ASTM D3212	Hydrostatic Test	1 per setup or change