CITY OF FORT WAYNE MASTER UPDATED: 1/5/15

SECTION 33 05 41

NTS: This section covers Corrugated Metal (CMP) Utility Piping. Edit this section to suit project requirements. Coordinate this section with 33 41 00 Storm Utility Piping Installation. CMP is only approved for storm utility installation. Installation and jointing methods are included in the applicable piping installation section. End treatments are included in 33 44 13 Drainage Structures. Trenching and backfill information is in 31 00 05 Trenching and Earthwork.

1. GENERAL
	1. DESCRIPTION
		1. Scope:
			1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install corrugated metal piping (CMP) and fittings as shown and specified.
		2. Coordination:
			1. Review installation procedures under this and other applicable sections and coordinate installation of items to be installed with or before CMP Work.
		3. Related Sections:

NTS: List below only sections covering products, construction, and equipment specifically identified in this section and specified in another section and directly referenced in this specification. Do not list administrative and procedural Division 01 sections. Insert at (--1--) the number and name of the Division 33 installation section or any other referenced sections.

Remove 33 41 00, Storm Utility Piping Installation if Corrugated Metal Utility Piping is used for a project other than a storm project.

* + - 1. Section 31 00 05, Trenching and Earthwork.
			2. Section 33 41 00, Storm Utility Piping Installation.
			3. Section (--1--).

NTS: Section “1.2” is to be included if project is bid on unit price basis. Section to be deleted or revised if project is to be bid on lump sum basis.

NTS: Insert at (--1--), (--2--) and (--3--) below the various CMP types and diameters to be used for project. Adjust Section “1.2” below for additional work item numbers as needed. In extreme cases consider separating the work items by diameter and depth.

The measurement and payment is based on using this pipe for culvert applications. Edit as necessary if project uses manholes.

Review Paragraph “A.4”: below and modify to suit the project.

* 1. MEASUREMENT AND PAYMENT
		1. Corrugated Metal (CMP) Utility Piping
			1. Work Item Number and Title

 **33 05 41-A (--1--) CMP Non-Pressure Utility Piping**

 **33 05 41-B (--2--) CMP Non-Pressure Utility Piping**

 **33 05 41-C (--3--) CMP Non-Pressure Utility Piping**

* + - 1. The quantity of pipe installed shall be the number of linear feet actually installed, tested and backfilled, as measured from upstream end of culvert to downstream end of culvert, as measured along the centerline of the pipe.
			2. The payment of pipe shall be based on the unit price per linear foot as listed on the submitted Bid schedule for each size successfully installed. Payment for any associated restoration shall be paid for under its respective Work item.
			3. These Work items shall include all costs to furnish all labor, materials, tools, and equipment, both permanent and temporary, to install the CMP as shown and specified. The Work includes, but is not limited to, trench excavation, dewatering, furnishing and placement of bedding, pipe, placement of required backfill, disposing of excess excavated material, required fittings, testing of materials, compaction of bedding and backfill, temporary sheeting, shoring and bracing, restoration/replacement of all disturbed items not included under other Work items, protection of existing utilities and structures, and incidentals for performing all Work as specified unless otherwise broken down as a separate Work item.
	1. REFERENCES

NTS: Retain applicable standards and add/delete as required.

* + 1. Standards referenced in this Section are listed below:
			1. American Association of State Highway and Transportation Officials.
				1. AASHTO Standard Specifications.
			2. ASTM International.
				1. ASTM A760 Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains.
				2. ASTM A929 Standard Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe
				3. ASTM A762 Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
				4. ASTM A742 Standard Specification for Steel Sheet, Metallic Coated and Polymer Precoated for Corrugated Steel Pipe
				5. ASTM A849 Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
				6. ASTM B745 Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
				7. ASTM B744 Standard Specification for Aluminum Alloy Sheet for Corrugated Aluminum Pipe
				8. ASTM A761 Standard Specification for Corrugated Steel Structural Plate, Zinc-Coated, Field-Bolted Pipe, Pipe-Arches, and Arches
				9. ASTM B746 Standard Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
				10. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
				11. ASTM D1056 Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber
	1. QUALITY ASSURANCE

NTS: Edit or delete Paragraph “A” below if project requirements prohibit an experience clause.

* + 1. Qualifications:
			1. Manufacturer: Shall have a minimum of 5 years’ experience producing CMP and fittings and shall be able to submit documentation of satisfactory service in at least 5 completed installations in operation for at least 5 years each.
		2. Component Supply and Compatibility:
			1. All pipe of each material type shall be furnished by the same manufacturer.
			2. CMP Supplier shall prepare and review all Shop Drawings and other submittals for all materials furnished under this section.
			3. Materials shall be suitable for specified service conditions and shall be integrated into overall assembly by CMP Supplier.
	1. SUBMITTALS

NTS: Review Paragraph “A” and “B” below and modify or eliminate to suit the project.

* + 1. Action Submittals: Submit the following:
			1. Product Data:
				1. Submit product data on pipe, fittings, gaskets, hardware, pipe gasket lubricant and appurtenances sufficient to demonstrate compliance with the Contract Documents.
		2. Informational Submittals: Submit the following:
			1. Certificates:
				1. Submit manufacturer’s certificate of compliance standards referenced in this Section.
			2. Source Quality Control Submittals:
				1. When requested by Engineer, submit results of source quality control tests. Ensure the quality control tests were completed on the same material installed.

NTS: Edit or delete Paragraph “3” below if project requirements prohibit an experience clause.

* + - 1. Qualifications Statements:
				1. Submit qualifications of manufacturer when requested by Engineer.
				2. Submit qualifications of installer when requested by Engineer.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Ship and store in accordance with manufacture’s recommendations.
		2. Inspect all materials during unloading process.
		3. Notify Owner of any cracked, flawed or otherwise defective material.
		4. Remove all materials from the Site that are found to be unsatisfactory.
		5. Comply with Section 01 65 00 Product Delivery Requirements and Section 01 66 00 Product Storage and Handling Requirements.
1. products
	1. MATERIALS

NTS: Edit Paragraph “A” to suit the project.

* + 1. General:
			1. Pipe materials shall be suitable for services intended.
			2. Pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, and other defects. Unless otherwise shown or indicated, pipe shall be uniform in color, opacity, density, and other physical properties.
			3. Buried pipe shall be capable of withstanding external live load, including impact, equal to AASHTO H-20 loading, with cover shown or indicated in the Contract Documents.
	1. CURRAGATED METAL (CMP) PIPING

NTS: Paragraphs “A”, “B” and “C” cover CMP typically used in buried gravity sewer applications. Pipes listed below are typical CMP types that provide varying levels of corrosion and abrasion resistance. Consider the following environmental factors including, but not limited to Soil Resistivity, Soil and Water pH, and Abrasion. Edit to suit the project. Delete Paragraph “A.” “B.” or “C.” if not required.

Corrugated Metal Pipe may be specified with various corrugation and rib patterns. Varying corrugation and rib patterns allow for different flow characteristics, select corrugation and rib patterns for project specific requirements. Insert at (--1--) below the corrugation or rib requirements.

Corrugated Metal Pipe can be fabricated with perforations and typically used for underground detention. If project requires perforations add in perforation requirements below.

The following material is introduced for storm sewer applications. Add in additional project requirements as necessary. For storm sewers a minimum pipe gauge of 14 is required.

* + 1. Aluminized Steel (Diameter 12 inch to 144 inch).
			1. Material:
				1. Pipe shall comply with ASTM A760.
				2. Material shall comply with ASTM A929.
			2. Fittings:
				1. Gasketed fittings shall comply with ASTM D1056.
				2. Unless otherwise shown or indicated on drawings Gaskets shall be rubber O-ring.
				3. Fittings shall match pipe material.
			3. Joints:
				1. Provide external semi-corrugated (Hugger) coupling band joints complying with ASTM A760
			4. Corrugations:
				1. Provide (--1--) corrugations complying with ASTM A760.
		2. Polymer-Coated Steel (Diameter 12 inch to 144 inch).
			1. Material:
				1. Pipe shall comply with ASTM A762.
				2. Material shall comply with ASTM A742.
				3. Coatings applied after fabrication shall comply with ASTM A849.
			2. Fittings:
				1. Gasketed fittings shall comply with ASTM D1056.
				2. Unless otherwise shown or indicated on Drawings gaskets shall be rubber O-ring.
				3. Fittings shall match Pipe Material.
			3. Joints:
				1. Provide external semi-corrugated (Hugger) coupling band joints complying with ASTM A762.
			4. Corrugations:
				1. Provide (--1--) corrugations complying with ASTM A762.
		3. Aluminum Alloy (Diameter 12 inch to 120 inch)
			1. Material:
				1. Pipe shall comply with ASTM B745.
				2. Material shall comply with ASTM B744.
			2. Fittings:
				1. Gasketed fittings shall comply with ASTM D1056.
				2. Unless otherwise shown or indicated on Drawings gaskets shall be rubber O-ring.
				3. Fittings shall match Pipe Material.
			3. Joints:
				1. Provide external semi-corrugated (Hugger) coupling band joints complying with ASTM B745.
			4. Corrugations:
				1. Provide (--1--) corrugations complying with ASTM B745.

NTS: Corrugated Structural Plate Pipe is typically used in the construction of pipe, pipe-arches, arches, underpasses, box culverts, and special shapes for field assembly. Edit Paragraph “D” and “E” below for project specific requirements.

* + 1. Corrugated Structural Plate Pipe
			1. Material: Galvanized Steel
				1. Pipe shall comply with ASTM A761.
				2. Material shall comply with ASTM A761.
			2. Joints:
				1. Joints shall be field bolted.
		2. Corrugated Structural Plate Pipe
			1. Material: Aluminum Alloy
				1. Pipe shall comply with ASTM B746.
				2. Material shall comply with ASTM B209.
			2. Joints:
				1. Joints shall be field bolted.
	1. SOURCE QUALITY CONTROL
		1. Shop Tests:
			1. Pipe manufacturer shall maintain continuous quality control program.
			2. Where applicable and when requested by Engineer, submit results of source quality control tests specified in reference standards.
1. EXECUTION
	1. INSPECTION
		1. Inspect pipe materials for defects in material and workmanship. Verify compatibility of pipe and fittings.

NTS: Edit article 3.2 and 3.3 below for project specific requirements. Requirements below are for storm projects.

* 1. INSTALLATION
		1. Buried Piping Installation
			1. Refer to Section 33 41 00 Storm Utility Piping Installation.
		2. Bedding and Backfill
			1. Refer to Section 31 00 05 Trenching and Earthwork.

NTS: Specifier to consider known construction sequencing and procedures when determining pipe design. Heavy construction loading should be avoided for installed pipes with shallow cover.

* + 1. Contractor shall be responsible for verification of pipe loading during construction. Pipe design is based on final installation depth and required cover.
	1. FIELD QUALITY CONTROL
		1. Complete pipe-testing requirements in accordance with Section 33 41 00 Storm Utility Piping Installation.

+ + END OF SECTION + +