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

SECTION 33 05 51

NTS: Dual walled polypropylene pipe is the only polypropylene (PP) pipe product that is approved. Polypropylene pipe can only be used on gravity storm sewers and gravity sanitary sewers. Polypropylene pipe shall be installed using direct bury installation method.

This section contains detailed descriptive requirements of the product(s) of the named manufacturer(s). If the product of another manufacturer is to be included, this section may require editing.

Coordinate this section with applicable requirements of Division 33 installation. Installation and jointing methods are included in the applicable piping installation section. 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, test, and place in satisfactory service the Polypropylene (PP) utility pipe and fittings as shown and specified.
		2. Coordination:
			1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the Polypropylene utility pipe 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.

* + - 1. Section 31 00 05, Trenching and Earthwork.
			2. 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 Polypropylene pipe 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.

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

* 1. MEASUREMENT AND PAYMENT
		1. Polypropylene (PP) Non-Pressure Utility Piping
			1. Work Item Number and Title

 **33 05 42-A (--1--) PP Non-Pressure Utility Piping**

 **33 05 42-B (--2--) PP Non-Pressure Utility Piping**

 **33 05 42-C (--3--) PP Non-Pressure Utility Piping**

* + - 1. The quantity of pipe installed shall be the number of linear feet actually installed, and backfilled, as measured from outside wall of structure to structure, 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 pipe size successfully installed. Payment for any associated restoration shall be paid for under its respective Work item.
			3. This item shall include all costs to furnish all labor, materials, tools, and equipment, both permanent and temporary, to install the PP pipe as shown and specified. The Work includes, but is not limited to, trench excavation, dewatering, furnishing and placement of bedding, pipe, filter sock when applicable, 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 all applicable standards below 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 M 330 Standard Specification for Polypropylene 12 in. to 60 in. Diameter
			2. ASTM International.
				1. ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
				2. ASTM D6707 Standard Specification for Circular-Knit Geotextile for Use in Subsurface Drainage Applications
				3. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
				4. ASTM F2736 Standard Specification for 6 in. to 30 in. Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
				5. ASTM F2881Standard Specification for 12 in. to 60 in. Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications
	1. QUALITY ASSURANCE

NTS: Edit or delete Paragraph "A" below, if project requirements prohibits experience clause.

* + 1. Manufacturer’s Qualifications:
			1. Manufacturer shall have a minimum of 5 years’ experience producing substantial similar type materials and shall be able to show evidence of at least 5 installations in satisfactory operation for at least 5 years.
		2. Component Supply and Compatibility:
			1. All pipe and fittings of each material type shall be furnished by the same manufacturer.
			2. PP pipe Supplier shall prepare, 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 PP pipe Supplier.
	1. SUBMITTALS

NTS: Review Paragraph “A” and “B” below and modify or eliminate to suit the project. Piping layout should only be requested for special circumstances.

* + 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 with 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 batch of material, as 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. MATERIAL
		1. General
			1. PP piping system shall be specifically designed, constructed, and installed for the service intended.
			2. The PP pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties.
			3. Clean rework or recycled material generated by the manufacturer's own production may be used as long as the pipe or fittings produced meet all the requirements of this Section.
			4. Material Properties
				1. Polypropylene compound for pipe and fitting production shall be impact modified copolymer meeting the material requirements of ASTM F2736, ASTM F2881, and AASHTO M330 for the respective diameters.

NTS: Edit or delete Sections 2.2, 2.3, and 2.4 below as required for specific project requirements.

NTS: For storm applications polypropylene pipe may be specified with or without perforations. PP pipe may be specified with soil or watertight joints according to ASTM F2881. 12 inch to 30 inch, water tight, non-perforated, polypropylene pipe may be specified according to ASTM F2736. For stormwater use it is recommended to use only 12” to 48” diameter. If larger diameters are to be used coordinate with the Owner.

* 1. POLYPROPYLENE NON-PERFORATED PIPE DUAL-WALLED
		1. Pipe shall be dual-wall corrugated PP piping with smooth interior walls.
		2. Pipe shall have smooth interior and annular exterior corrugations.
		3. Pipe Material
			1. 8- through 30-inch shall meet ASTM F2736 or AASHTO M330.
			2. 36- through 48-inch shall meet ASTM F2881 or AASHTO M330.
		4. Joints
			1. Pipe shall be joined using a bell and spigot joint meeting ASTM F2736 for diameters 6 through 30 inches, ASTM F2881 for diameters 36 through 48 inches, and AASHTO M330. Joint shall be water-tight in accordance with ASTM D3212.
			2. Gaskets shall meet the requirements of ASTM F477.
			3. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris.
			4. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.
		5. Fittings
			1. Pipe fittings shall be standardized for the type of pipe and joint specified.
			2. In general, all fittings shall be constructed of the same pipe material and material class as the sewer pipe.
			3. Fittings shall meet the requirements of ASTM F2736 for diameters 8 through 30 inches, ASTM F2881 for diameters 36 through 48 inches, and AASHTO M330.

NTS: For storm applications polypropylene pipe may be specified with or without perforations. PP pipe may be specified with soil or watertight joints according to ASTM F2881. 12 inch to 30 inch, water tight, non-perforated, polypropylene pipe may be specified according to ASTM F2736. For stormwater use it is recommended to use only 12” to 48” diameter.

PP perforated pipe dual-walled (ASTM F2736 and ASTM F2881) is available from 8 to 60 inch diameters. For stormwater use it is recommended to use only 12” to 48” diameter. If larger diameters are required coordinate with the Owner.

Edit “C” below based on project specific requirements.

* 1. POLYPROPYLENE PERFORATED PIPE DUAL-WALLED
		1. Pipe shall be flexible, perforated dual wall PP piping with smooth interior walls and a corrugated exterior, unless otherwise noted on the plans.
		2. Perforations shall be cleanly cut, placed in the valley of the corrugation rib, and uniformly spaced along the length of the circumference of the pipe. Pipe connected by bell and spigot joints shall not be perforated in the area of the bells and spigots. Dimensions of the perforations and the minimum perforation inlet area are as follows:

|  |  |
| --- | --- |
| Pipe Inside Diameter (in) | Type of Perforation |
| Circular |
| Maximum Diameter (in) | Minimum Inlet Area (in2/ft) |
| 12”-18” | 0.375 | 1.5 |
| 21”-48” | 0.375 | 2.0 |

Note: Table per ASTM F2881.

* + 1. Pipe Material:
			1. 12- through 48-inch shall meet ASTM F2881or AASHTO M330.
		2. Unless specified otherwise, perforated pipe shall be wrapped in a filter sock, meeting the requirements of ASTM D6707. Pipe trench may be lined with a non-woven geotextile fabric in lieu of the pipe being wrapped in a filter sock.
		3. Pipe joints shall not be perforated in the bells and spigots.

NTS: Edit Section F below to suit the project.

* + 1. Joints
			1. Pipe shall be joined using a bell and spigot joint meeting ASTM F2881 and AASHTO M330 for the respective Diameter.
			2. Joint shall be a soil-tight.
			3. Gaskets shall meet the requirements of ASTM F477.
			4. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris.
			5. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.
		2. Fittings
			1. Pipe fittings shall be standardized for the type of pipe and joint specified.
			2. In general, all fittings shall be constructed of the same pipe material and material class as the sewer pipe.
			3. Fittings shall meet the requirements of ASTM F2881 and M330 for the respective diameter.
	1. MARKING FOR IDENTIFICATION
		1. Pipe Markings:

NTS: Delete Paragraph “1.” if there is no laying schedule on the project.

* + - 1. Factory-mark each length of pipe and each fitting with designation conforming to those on approved laying schedules.
			2. Manufacturer shall cast or paint on each length of pipe and each fitting pipe material, diameter, and pressure or thickness class.
	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.
		2. Pipe may be rejected for failure to conform to these Specifications or following:
			1. Fractures or cracks passing through pipe wall, except single crack not exceeding 2 inches in length at either end of pipe which could be cut off and discarded. Pipes within one shipment shall be rejected if defects exist in more than five percent of shipment or delivery.
			2. Cracks sufficient to impair strength, durability or serviceability of pipe.
			3. Defects indicating improper proportioning, mixing, and molding.
			4. Damaged ends, where such damage prevents making satisfactory joint.
			5. Gouges or scrapes exceeding ten percent of the specified wall thickness.
		3. Acceptance of fittings, stubs or other specifically fabricated pipe sections shall be based on visual inspection at Site and documentation of conformance to these Specifications.
1. EXECUTION
	1. INSPECTION
		1. Inspect pipe materials for defects in material and workmanship. Verify compatibility of pipe and fittings.
	2. INSTALLATION
		1. Buried Piping Installation
			1. Refer to the applicable Division 33 piping installation section.
		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.

NTS: Coordinate article “3.3” below with project specific testing requirements listed within the appropriate installation Section. Insert at (--1--) below either, 33 31 00, Sanitary Sewer Piping Installation, and/or 33 41 00, Storm Utility Piping Installation.

* 1. FIELD QUALITY CONTROL
		1. Complete pipe-testing requirements in accordance with Section (--1--).

+ + END OF SECTION + +