

SECTION 02510

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the requirements for high density polyethylene (HDPE) pipe and fittings. All work shall conform to MDOT Standards and Specifications as modified by the Holland BPW. All non-itemized work shall be considered incidental.
- B. All work shall conform to AWWA C605 and specifications contained herein.

1.2 SUBMITTALS

- A. Bid
 - 1. Written, verifiable proof that the Contractor is certified by the fusion systems manufacturer(s) as a fully-trained user.
 - 2. Procedures describing equipment capacity and setup requirements.
 - 3. If the above submittals are not acceptable to the Holland BPW, the next low bidder will be contacted and the same submittals reviewed until a suitable bidder is awarded the project.
- B. Other
 - 1. Provide physical property data on pipe, fittings and restraints. Include manufacturer's recommendation for handling, storage and repair of damaged pipe and fittings. Furnish certified transcripts indicating that the pipe and fittings meet or exceed material requirements indicated herein.
 - 2. Furnish butt fusion charts identifying recommended fusion temperature, interface pressure and cooling time.
 - 3. Record actual locations of mains, valves, connections, bends, major fittings, hydrants, thrust restraints, and top of pipe elevations (to USGS datum). Identify and describe unexpected subsoil conditions and uncharted utilities.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

- A. Material shall consist of resin classification PE 3408 and cell classification 345434C as determined by ASTM D3350. Material shall be NSF 14 and NSF 61 certified meeting the requirements of AWWA C906.

2.2 PIPE

- A. Pipe shall be DIPS OD SDR 11, sized as indicated in the contract documents.

- B. Pipe material shall be a Type III, Class C, Category 5, P34 material as described in ASTM D1248. Pipe shall be listed as PPI TR-4 with a manufacturing standard of ASTM F714 containing no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification. The pipe shall be made from virgin material, homogeneous throughout and free of visible cracks, holes, inclusions, blisters, ridges, discoloration, spot roughness, pitting, varying wall thickness or other deleterious faults.
- C. Pipe shall be legibly marked, at intervals of no more than 5 feet, with pipe size, PE 3408, SDR 11, NSF 61, NSF PW, AWWA C906, cell classification, date of manufacture and point of origin. Pipe color shall black with a solid blue stripe on the exterior and black on the interior.
- D. Storage, Handling and Repair:
 - 1. Pipe shall be stored on clean, level ground. Stacking shall be in accordance with the manufacturer's recommendations. The pipe shall not be dragged over sharp objects or cut by chokers or lifting equipment.
 - 2. Segments of pipe having cuts or gouges in excess of 10% of the wall thickness shall be removed. Undamaged portions of the pipe shall be rejoined via butt fusion.
 - 3. A thorough cleaning shall take place immediately before the joint is fused. All foreign matter shall be removed from the inside the pipe. The open end of the pipeline shall be closed by a suitable cover until laying operations resume.

2.3 FITTINGS

- A. Fittings shall have a pressure rating equal to or greater to that of the pipe.
- B. Butt fusion fittings, flanged and mechanical joint (MJ) adapters shall have a manufacturing standard of ASTM D3261.
- C. Electrofusion fittings shall have a manufacturing standard of ASTM F1055.
- D. Service connections shall be performed using Central Plastics PE3408/4710 Electrofusion Corp Saddles or Holland BPW approved equal. The saddle shall consist of an injection molded fitting base and shall incorporate a Brass 360 Alloy threaded outlet with an O-ring seal that is restrained with a Stainless Steel 304 compression ring. The saddle shall incorporate a constant 40 volt fusion coil for the purpose of joining the fitting onto the outer pipe wall of the water main.

PART 3 - EXECUTION

3.1 JOINING PIPE

- A. All work performed in accordance with this specification shall meet or exceed the requirements of ASTM D2657 – Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.

- B. The pipe faces shall be perfectly square around their full circumference, perpendicular to the pipe centerline on each pipe with no detectable gap prior to heating and joining. Surfaces shall be clean and free of all foreign debris.
- C. Pipe ends should be heated according to the pipe manufacturer's recommended temperature, interface pressure and time duration enabling heat to penetrate into the pipe ends to form a molten bead of material. Heater plate thermometers should be tested for accuracy with a polymer or melt sticks at least daily.
- D. Pipe ends should be brought together with sufficient pressure to properly mix the pipe materials and form a homogeneous joint. The ends should be held immobile under pressure until the join has cooled to such an extent that the joint can be touched with bare hands without discomfort. Care should be taken to ensure that fusion times and procedures compensate for ambient temperatures.
- E. The joints shall be visually inspected against the manufacturer's recommended appearance guidelines. The beads should be uniformly shaped and sized at points along the joint. Failure to meet this requirement shall be adequate cause for testing
- F. Should visual inspection raise concern regarding joint integrity, Contractor shall perform and bear the cost of non-destructive testing consisting of ultrasonic inspection per ASTM D2657.
- G. Should non-destructive testing raise concern regarding joint integrity, Contractor shall perform and bear the cost of destructive testing consisting of removing and replacing the joint per ASTM D2657.
- H. The inside of the pipe shall be made free of any and all material shavings created prior to butt fusion. These shall be removed prior to placing the pipe into service.

3.2 TRACER WIRE

- A. Tracer wire shall be placed with all HDPE water main and shall be insulated, #10 solid copper core rated for underground service. The tracer wire shall be connected to all valves and fire hydrant flange bolts. All spliced or repaired wire connections in the tracer wire system shall be made using a Wing Nut Wire Connector (for two to four number ten wires), and made waterproof using an approved buried service wire closure.
- B. The tracer wire shall be tested upon completion of the installation to ensure conductivity for locating. If any areas appear to be disconnected or conductivity appears incomplete, the tracer wire shall be excavated, inspected and repaired.

3.3 SERVICE CONNECTIONS

- A. The saddle shall be installed so that the service connection is no more than 30 degrees above horizontal.

3.4 MECHANICAL JOINING

- A. Where butt fusion cannot be used for polyethylene pipe and fittings, they may be joined using electrofused flange or MJ adapters with ductile iron back-up rings installed per manufacturer's recommendations.

- B. Refer to Standard Detail **WM-5, "HDPE CONCRETE THRUST ANCHOR"**.

3.5 PRESSURE TESTING

- A. The main shall be pressurized to 150 psi and allowed to stand for a period of 4 hours to allow for pipe expansion. During this 4 hour period, the pressure shall be checked every hour and liquid added as needed to restore pressure to 150 psi.
- B. At the end of the 4-hour pressurization period, the pressure shall be adjusted to 140 psi. If, after an additional 1-hour period, the pressure remains above 133 psi, without the addition of water, the line shall have passed the pressure test.

3.6 DISINFECTION AND BACTERIOLOGICAL TESTING

- A. Flush and disinfect system in accordance with **SECTION 02516** with the following modifications:
1. Disinfecting solutions shall not exceed 12.5% active chlorine.
 2. All disinfection procedures shall be witnessed by the Engineer.

END OF SECTION