

SECTION 02622

PLASTIC PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope

1. Furnish and install plastic piping complete with all fittings, jointing materials, tracer wire, anchors, blocking, marker tape, encasement and other necessary appurtenances
2. Interior potable water; non-potable water; service water; chemical service and drain, waste and vent piping is specified in Section 15060 – Pipe and Pipe Fittings

B. Additional Requirements Specified Elsewhere

1. Section 01340: Shop Drawings, Product Data, and Samples
2. Section 01600: Material and Equipment

C. Related Requirements Specified Elsewhere

1. Section 02200: Earthwork
2. Section 02615: Ductile Iron Pipe
3. Section 02617: Steel Pipe
4. Section 02641: Valves and Accessories
5. Section 02708: Pressure Pipelines and Appurtenances
6. Section 02709: Gravity Pipelines and Appurtenances
7. Section 03300: Cast-in-Place Concrete

1.2 QUALITY ASSURANCE

A. Source Quality Control

1. Identification marks: Clearly and permanently mark all fittings and pipe at intervals of not more than 5' with the following information
 - a. Nominal size and O.D. base
 - b. Material code designation
 - c. Applicable dimension ratio, pressure class or schedule number
 - d. Applicable standard designation number
 - e. Manufacturer's name or trademark

1.3 SUBMITTALS

A. Shop drawings and product data in accordance with Section 01340

1. Material specification data
2. Pipe layout drawings

3. Installation instructions

- B. Certificates: Manufacturer's certification that materials meet specification requirements

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Avoid damage to pipe and fittings from impact, bending, compression or abrasion during handling and storage
- B. Do not drop pipe or fittings
- C. Store pipe on flat surfaces which provide even support for the pipe barrel with ends overhanging
 - 1. Do not stack pipe higher than 5 feet
- D. Do not store pipe and fittings in direct sunlight for extended periods (greater than two to three weeks)
- E. Ship rubber gaskets in cartons and store in a clean area away from grease, oil, ozone producing electric motors, heat, and the direct rays of the sun
- F. Use only nylon protected slings to handle pipe
 - 1. Use of hooks or bare cables will not be permitted
- G. Assure materials are kept clean and dry

PART 2 - PRODUCTS

2.1 POLYVINYL CHLORIDE (PVC) PIPE

- A. Non-Pressure Sewer Pipe
 - 1. For all non-pressure pipe applications unless otherwise directed
 - a. Conformance
 - 1) 4" through 15": ASTM D3034, Type PSM, SDR 35
 - b. Joints: ASTM D3212, push-on
 - c. Gaskets: ASTM F477
 - d. Laying length
 - 1) 13' joints where installed flatter than 1.5% grade
 - 2) 13' or 20' joints, Contractor's option for grades steeper than 1.5%
 - e. Color: Green
 - 2. Effluent discharge pipe
 - a. Conformance: 15" – 27"; ANSI/ASAE S376.1; SCS 430-DD; SDR 41
 - b. Joints: Push-on
 - c. Gaskets: ASTM F477
 - d. Pressure rating: 100 psi
 - e. Laying lengths: 22' joints
 - f. Color: Blue

- g. Warning tape
 - 1) Application: Installed on all pressure rated pipe used as sewer lines
 - 2) Wording: "Caution – Buried Sewer Line Below"
 - 3) Color: Green
 - 4) Width: 3"
 - 5) Standard, non-detectable warning tape

B. Pressure Pipe (12" and smaller, buried service)

- 1. Conformance: AWWA C900
- 2. O.D. basis: DR 25, DR 18 and DR 14 as detailed on the Drawings
- 3. Joint type: Gasket bell end push on joint or mechanical joint or flanged connection as indicated on the Drawings
- 4. Schedule: Size, class and service
 - a. Color
 - 1) Process pipe: Green
 - 2) Potable water: Blue
 - 3) Reuse water: Purple
 - b. Service as noted on the Drawings and/or in pipe schedules
 - c. Size and class as shown on the Drawings and/or in pipe schedules

C. Pressure Pipe (12" and smaller, buried service)

- 1. Conformance: ASTM D2241, iron pipe size (IPS)
- 2. O.D. basis: SDR 26, Class 160 and SDR 21, Class 200 as detailed on the Drawings
- 3. Joint type: Gasket bell end push on joint or mechanical joint or flanged connection as indicated on the Drawings
- 4. Schedule: Size, class and service
 - a. Color
 - 1) Process pipe: Green
 - 2) Potable water: Blue
 - 3) Reuse water: Purple
 - b. Service as noted on the Drawings and/or in pipe schedules
 - c. Size and class as shown on the Drawings and/or in pipe schedules

D. Pressure Pipe (14" and larger, buried service)

- 1. Conformance: AWWA C905
- 2. O.D. basis: DR 25 as detailed on the Drawings
- 3. Joint type: Gasket bell end push on joint or mechanical joint or flanged connection as indicated on the Drawings
- 4. Schedule: Size, class and service
 - a. Color
 - 1) Process pipe: Green
 - 2) Potable water: Blue
 - 3) Reuse water: Purple
 - b. Service as noted on the Drawings and/or in pipe schedules
 - c. Size and class as shown on the Drawings and/or in pipe schedules

E. Pressure Pipe (12" and smaller, buried or exposed service)

1. Conformance
 - a. ASTM D1785
 - b. Schedule 80
 - c. PVC 1120
 - d. NSF approved and labeled (When application requires)
2. Joint type
 - a. Buried: Solvent welded or threaded
 - b. Exposed: Solvent welded, threaded or flanged as indicated on the Drawings
3. Schedule: Size and service
 - a. Color
 - 1) Wastewater and process piping applications: Green or White
 - 2) Potable water: Blue
 - 3) Reuse water: Purple
 - b. Service as noted on the Drawings and/or in pipe schedules
 - c. Size as shown on the Drawings and/or in pipe schedules
 - d. Chemical service piping
 - e. Potable water service piping
 - f. Non-potable water service piping

F. Pressure Pipe (12" and smaller, buried or exposed service)

1. Conformance
 - a. ASTM D1785
 - b. Schedule 40
 - c. PVC 1120
 - d. NSF approved and labeled (when application requires)
2. Joint type
 - a. Buried: Solvent welded or threaded
 - b. Exposed: Solvent welded, threaded or flanged as indicated on the Drawings
3. Schedule: Size and service
 - a. Color
 - 1) Wastewater and process piping applications: Green or White
 - 2) Potable water: Blue
 - 3) Reuse water: Purple
 - b. Service as noted on the Drawings and/or in pipe schedules
 - c. Size as shown on the Drawings and/or in pipe schedules

G. Pressure Pipe (12" and smaller, buried or exposed service)

1. Conformance
 - a. ASTM D1785
 - b. Schedule 80
 - c. PVC 1120
 - d. NSF approved and labeled (When application requires)
2. Joint type
 - a. Buried: Solvent welded or threaded
 - b. Exposed: Solvent welded, threaded or flanged as indicated on the Drawings
3. Schedule: Size and service
 - a. Color
 - 1) Wastewater and process piping applications: Green or White

- 2) Potable water: Blue
- 3) Reuse water: Purple
- b. Service as noted on the Drawings and/or in pipe schedules
- c. Size as shown on the Drawings and/or in pipe schedules
- d. Chemical service piping
- e. Potable water service piping
- f. Non-potable water service piping

2.2 FITTINGS

A. Non-Pressure Pipe Fittings

- 1. Conformance
 - a. 15" and smaller: ASTM D3034, Type PSM, SDR 35
 - b. 18" through 27": ASTM F679, Type I, SDR 35
- 2. Joints: ASTM D3212, push-on
 - a. Refer to Section 02615 – Ductile Iron Pipe where ductile iron fittings are called for on the Drawings
 - 1) Provide with appropriate transition gaskets
- 3. Gaskets: ASTM F477

B. Non-Pressure Flexible Couplings

- 1. Conformance
 - a. Coupling: ASTM C-594
 - b. Band: No. 305 stainless steel
- 2. Design basis: Fernco, Indiana Seal or equivalent

C. Pressure Pipe Fittings

- 1. For use on C900, C905 and ASTM D2241 PVC piping
 - a. Refer to Section 02615 - Ductile Iron Pipe
 - b. Provide joint restraints and/or thrust blocks as noted on the Drawings
 - c. Provide with appropriate transition gaskets, where required (ASTM D2241 pipe)
- 2. For use on Schedule 40 PVC piping
 - a. Socket-type PVC plastic pipe fittings
 - b. Conformance: ASTM D-2466
 - c. NSF approved and labeled (when application requires)
 - d. Solvent cement: ASTM D-2564
- 3. For use on Schedule 80 PVC piping
 - a. Socket-type PVC plastic fittings
 - 1) Conformance: ASTM D-2467
 - 2) NSF approved and labeled (when application requires)
 - 3) Solvent cement: ASTM D-2564
 - b. Threaded-type PVC plastic fittings
 - 1) Conformance: ASTM D-2464
 - 2) NSF approved and labeled (when application requires)
 - c. Flanged-type PVC plastic fittings
 - 1) Flanges: Diameter and drilling per ANSI B16.5, 150 lb. or ANSI B16.1, 125 lb. as appropriate

- 2) Flange bolts and nuts: ASTM A307, Grade B, galvanized, install such that bolts project $\frac{1}{8}$ " to $\frac{3}{8}$ " beyond the outer face of the nut
 - 3) Flange gaskets: Full face, $\frac{1}{8}$ " thick, neoprene or plasticized PVC
 - 4) NSF approved and labeled (when application requires)
- d. Expansion joints: Belmont "Style 3915", Resistoflex "Style R6905" molded expansion joint or equivalent

2.3 COPPER TRACER WIRE

- A. Solid No. 6 AWG (bare)
- B. Connectors: No. 6 copper connector, compression type, Burndy No. YDS 6W or equivalent
- C. Install on all buried plastic piping

2.4 BEDDING

- A. Class "B" bedding for all plastic pipelines
- B. Refer to Section 02200 – Earthwork for additional requirements

2.5 LUBRICANT

- A. Per manufacturer's recommendation

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas for
 1. Defects such as weak structural components that adversely affect execution and quality of work
 2. Deviations beyond allowable tolerances for piping clearances
- B. Start installation only when conditions are satisfactory
- C. Pipe and Fittings
 1. Carefully examine pipe and fittings for cracks, dents, abrasions or other flaws prior to installation
 2. Mark rejected piping with a yellow crayon and remove from project within 24 hours

3.2 INSTALLATION

- A. Shape trench foundation or bedding as required
 1. Dig bell or coupling holes
 2. Do not support pipe on blocks or mounds of earth

3. Refer to Section 02200 - Earthwork for additional requirements

B. Cutting the Pipe

1. Cut the pipe square with saws or pipe cutters designed specifically for the material
 - a. Protect from serrated holding devices and abrasion
2. Bevel the end in accordance with manufacturer's recommendations
3. Locate a depth mark with a pencil or crayon to assure the spigot end is inserted to the recommended depth
4. Remove burrs and wipe off all dust and dirt from the jointing surfaces

C. Jointing the Pipe

1. Perform in accordance with manufacturer's recommendations
2. Gasketed joints
 - a. Bevel each spigot end to facilitate assembly
 - b. Remove all dirt and foreign material from the spigot, bell end, gasket and gasket groove
 - c. Apply lubricant furnished by the pipe manufacturer to the spigot end of the pipe
 - d. Insert the spigot to the reference mark
 - e. Take care during jointing to avoid disturbing previously installed joints
3. Threaded
 - a. ANSI B2.1, NPT fully and cleanly cut with sharp dies
 - b. No more than 3 threads exposed after installation
 - c. Ream pipe ends after threading to remove burrs
 - d. Apply thread tape to joints in all plastic piping
4. Solvent welded
 - a. Cut PVC pipe ends square and smooth and wipe clean
 - b. Apply solvent cement to outside of the pipe and the inside of the fittings socket with a small brush, apply cement primer per cement manufacturer's instructions
 - c. Immediately push the coated surfaces snugly together and rotate approximately $\frac{1}{2}$ turn to insure uniform cement distribution
 - d. Remove excess cement by wiping
5. Compression
 - a. Cut pipe ends square, remove burrs
 - b. Clean contact surfaces with steel wool
6. Flanged
 - a. Tighten bolts sufficiently to slightly compress gasket and effect a seal, but not so tight as to distort flange
 - b. Tighten bolts spaced 180 degrees apart alternately at uniform rate to assure uniform gasket compression
7. Protect from lateral displacement by placing required embedment
8. Do not lay pipe
 - a. In water
 - b. Under unsuitable weather conditions
 - c. Under unsuitable trench conditions
9. Lay pipe with the bell ends facing the direction of laying except where Engineer authorizes reverse laying

10. Provide expansion joints at not greater than 60' intervals in exposed or submerged piping
 - a. Securely anchor piping at midpoint between expansion joints

D. Tracer Wire

1. Install on all underground plastic pipe
2. Secure wire to plastic pipe with 1" wide plastic tape at 4' intervals
3. Splice wire with compression type fittings to assure electrical continuity
4. Secure wire to all fittings at each side of joint
5. Terminate wire such that access can be gained for location
6. Extend wire to the ground surface at all valve boxes, yard hydrants, clean outs, structures and as otherwise directed by the Engineer

E. Trench Backfill

1. Refer to Section 02200 – Earthwork for additional requirements
2. Carefully place embedment and select backfill in specified maximum layers
3. Carefully and completely compact trench backfill
4. Compact under existing pipelines to prevent any movement of existing facilities

F. Warning Tape

1. Install 12" above all pressure rated pipe being used as sewer line
2. Place on top of Class B pipe embedment material

3.3 FIELD QUALITY CONTROL

A. Refer to Section 01400 - Quality Control for responsibilities

B. Pressure and Leakage Tests

1. Leakage
 - a. All joints shall be watertight and free of leaks
 - b. Repair each leak discovered by Owner during warranty period
2. Pipeline testing
 - a. Gravity pipelines: Air test in accordance with Section 02709 - Gravity Pipelines and Appurtenances
 - b. Pressure pipelines: Hydrostatic test in accordance with Section 02708 - Pressure Pipelines and Appurtenances

END OF SECTION