

# City of Benson

## Material Specifications

**ALL REQUIRED IMPROVEMENTS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE LATEST VERSION OF THE STANDARD SPECIFICATION FOR PUBLIC WORKS IMPROVEMENTS AS COMPILED BY THE PIMA COUNTY AND CITY OF TUCSON AND SUCH OTHER STANDARDS AS MAY BE ADOPTED BY CITY OF BENSON PUBLIC WORKS DEPARTMENT.**

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**WATER**

**1.0 Materials**

**A. Poly Vinyl Chloride (PVC) Pipe**

1. The supplier/contractor shall furnish the City of Benson with any information requested to enable a complete evaluation of materials shipped. Refusal to submit requested information in a reasonable time will result in rejection of materials.
2. All pipe supplied shall be new and shall conform to AWWA Specification D-900, latest revision. All pipe will be Class 200, DR 14, unless otherwise specified on the Material List.
3. Pipe will be supplied with integral bell with elastomeric gaskets. Joints shall provide for up to 2 ½ degrees pipe deflection.
4. Pipe shall be marked per AWWA C-900 Specifications and will include the date of manufacture and the manufacturer's code.
5. Pipe will be supplied in nominal 20 foot 0 inch lengths, +/- one inch.

**B. Shipping**

1. Shipping, handling, unloading, cutting, joining, installation and storage of PVC pipe shall be accomplished per the manufacturer's guidelines to insure the integrity and quality of the PVC pipe.
2. Storage shall be accomplished in such a manner as to protect the PVC pipe from prolonged exposure to sunlight and/or extreme heat.
3. Lubricant supplied for joining of PVC pipe joints shall be completely compatible for use with a potable water system and meet pipe manufacturer's guidelines.

**C. Ductile Iron Pipe- Water-Sewer (Revised 5/2/06)**

1. All pipe supplied shall be new and conform to AWWA Specification C151/C150, latest revision, and ANSI A21.50, A2151.
2. Pipe shall be supplied with mechanical joint, and provide for up to 5 degrees pipe deflection.
3. All pipe shall meet control test ATSM Standard E8 for tensile strength and ASTM Standard E23 charpy impact.
4. Outside pipe coating shall be asphaltic approximately one mil thick. Inside pipe shall be lined per ANSI/AWWA C104/A21.4. Mechanical joint accessories shall meet AWWA C111 and ANSI 421.11 Specifications. Pipe shall be supplied in 18 foot nominal laying lengths.

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5. Ductile Iron Pipe will only be used at wash crossings as required by engineering specifications and shall not substitute for PVC piping in the water system.
6. All Ductile Iron Pipe on SEWER LINES must have SP2000 coating

**D. Affidavit of Compliance**

1. Affidavits of compliance by the manufacturer that the materials comply with all applicable provisions of the AWWA C-900 for PVC and AWW C-150/C-151 for ductile iron pipe specifications.
2. Affidavits of compliance by the pipe manufacturer will be required of all test applicable under AWWA Specification C-900 for PVC and AWWA Specification C-900 for PVC and AWWA C-150/C-151 ductile iron pipe latest revision, except that all inspection and testing shall be performed in the United States of America at the pipe manufacturer's plant, or at an approved testing laboratory in the United States.

**E. High Density Polyethylene Pipe (HDPE)3408**

All pipe supply shall conform to AWWA C906 and C901, latest revision. HDPE pipe shall be manufactured from extra high molecular weight polyethylene pipe materials meeting the requirements of Type III, Class C, Category 5, Grade P34 as defined in ASTM D 1248. The pipe material shall meet the requirements of cell classification PE345434C, as defined by ASTM D 3350 and designated as PE 3408. Pipe shall meet the requirements of ASTM D 3035 or F 714 design Pressure Specifications.

**F. HDPE Fittings**

All fittings shall be manufactured from the same material as extruded pipe, and shall be rated for pressure service at least equal to that as the system pipe. Outlets shall be manufactured to the same DR as system pipe, fittings shall be manufactured to ASTM D 3261 and socket fittings to ASTM D 2583.

**2.0 Butterfly and Gate Valves**

**A. General**

The material supplier will furnish the City of Benson any information requested so that the products furnished under these specifications can be properly evaluated for acceptance or rejection. Only products meeting City approval will then be accepted.

**B. Butterfly Valves**

1. All butterfly valves shall be Class 150, and shall be designed, manufactured, and tested in accordance with AWWA C504 Specifications.
2. Valve body shall be ductile iron and meet ASTM A536 grad 65-45-12 Specifications. Flanged ends shall be per ANSI B16.1 Class 125. Mechanical joints shall be per ANSI A21.11.

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3. Markings shall be cast on body of each valve and shall show the manufacturer's name, year casting was made, size of valve, and working pressure.
4. Valves shall be complete in all details when shipped. Valves shall be drained and completely closed before shipment and shall be securely fastened to skips to prevent damage and allow safe unloading.
5. Affidavits that the valves comply with all applicable provisions of the American Water Works Association will be required.

**C. Gate Valves**

1. All gate valves shall meet the requirements of either ANSI/AWWA C-500-86 or ANSI/AWWA 509-87 and shall be internally coated in accordance with ANSI/AWWA 550-881.
2. Gate valves shall be designed for 200 psi water working pressure.
3. Valves shall meet ANSI A21.11 specifications for mechanical joint ends and flanged ends per ANSI B16.1, Class 125.
4. Markings shall be cast on the bonnet or body of each valve and shall show the manufacturer's name or mark the year the casting was made, the size of the valve, and the working water pressure "200 W".
5. Valves shall be complete in all details when shipped. Valves shall be drained and completely closed before shipment and shall be securely fastened to skips to prevent damage and allow safe unloading.
6. Affidavits that the valves comply with all applicable provisions of the American Water Works Association will be required.

**3.0 Tapping Sleeve**

1. Tapping sleeves shall be stainless steel with a working pressure of 200 psi. Steel sleeve thickness shall be a minimum of ¼ inch and shall be lined and coated with corrosion-resistant epoxy and shall be provided with neoprene gasket and stainless steel bolts.
2. Tapping valves are to meet the above requirements for gate valves with connections suitable for the sleeve used. Ends and seat rings are to be of sufficient size to permit the use of full size cutters.

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#### 4.0 Valve Boxes

Valve boxes shall be one piece with inside fitting cover, with minimum inside diameter of seven inches. These boxes shall be heavy cast iron, furnished with a lid marked "Water" and shall be equipped with lugs or lips for setting in concrete. The skirt on the inside fitting cover shall not be less than three inches in depth.

#### 5.0 Fire Hydrants

1. Hydrants shall be designed, manufactured and tested in compliance with the latest edition of AWWA C-502 "Standard for Dry-Barrel Fire Hydrants" as published by the American Water Works Association.
2. Hydrant shall be "TRAFFIC" type with a replaceable "breakable" unit immediately above the ground line for minimizing repairs due to traffic damage.
3. Hydrants shall be of the compression type, constructed such that the main valve closes with water pressure to assure no loss of water in the event of damage to the upper portion of the fire hydrant.
4. Main valve opening shall have a minimum of 5 ¼ inches to assure optimum flow.
5. Hydrant shall be of the "dry top" design with o-ring seals to insure that the operating threads will be protected from water entry. "Dry top" design to include factory lubricated operating mechanism which allows supplemental lubricant to be added in the field without removal of top section. Standard lubricant shall be either -40 degrees F to + 150 degrees F.
6. Hydrants shall have two 2 ½ inch nozzles and one 4 ½ inch pumper nozzle with threads in conformance with NFPA No. 194 for National (American) Standard Fire Hose Coupling Screw Threads.
7. Operating and outlet nozzle cap nuts to be pentagonal in shape and measure 1 ½ inch from point to flat at the base of the nut and 1 7/16<sup>th</sup> inch at the top, height of the nut shall be not less than one inch. Caps to be provided with rubber gaskets.
8. Hydrant nozzle section shall be capable of rotation through 360 degrees with respect to the standpipe.
9. Minimum distance allowable between centerline of lowest nozzle and ground line is 16 inches to allow adequate operating room for standard 15-inch hydrant wrench.
10. Hydrants are to be opened to the left (counter clockwise) with the word "open" and directional arrow cast in the top of the hydrant.
11. Hydrants shall have permanent markings identifying the manufacturer by name, designation of main valve size of opening and year of manufacture.

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12. Hydrants shall have an automatic drain that is operated by the main valve rod. Drain valve to open as the main valve is closed and close as the main valve is opened. Port and seat of drain valve to be bronze.
13. The outside of the hydrant top section shall be painted a minimum of one coat of primer and one finished coat of industrial enamel and shall be yellow.
14. The shoe or base of the hydrant shall have a side inlet provided with the end for mechanical joint and shall be suitable for connection to pipe of 8 inches in nominal diameter, unless otherwise specified. The internal surfaces of the shoe shall be coated with a two part thermosetting epoxy protective coating with a minimum thickness of four mils.
15. The bronze valve seat shall be threaded into a bronze drain ring or shoe bushing to prevent electrolysis between these components.
16. Hydrants shall be designed to permit the use of extension sections and allow all parts to be removable from ground level without requiring excavation of the hydrant.
17. Installation shall be in accordance with Standard Detail 500 and testing shall be in accordance with AWWA Standard C-500 and AWWA Manual M-17.
18. Fire hydrants shall be:

Mueller                      A-423 (Centurion)

Or as approved by City Engineer

## **6.0 Fittings**

### **A. General**

1. Fittings for polyvinyl chloride pipe shall be in accordance with ANSI/AWWA C-110/21.10-87 and shall be cement mortar lined in accordance with ANSI/AWWA C-104/A21.4-85.
2. All fittings shall be supplied with mechanical joints. Hydrant tees will be supplied with mechanical joints for the run of the pipe and flange fittings for the side outlet.
3. Exterior coating or fittings shall be a petroleum asphalt coating approximately one mil thickness.
4. Fittings shall have distinctly cast on them the pressure rating, nominal diameters of openings, manufacturers and the degrees or fraction of circle on all bends.
5. Sizes shall be as shown on the Plans.

### **B. Megalug Mechanical Joint Restraint**

1. Mechanical joint restraint shall be incorporated in design of the follower gland and shall include a restraining mechanism which, when actuated, imparts

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2. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80. Restraining device shall be of ductile iron heated to a minimum hardness of 370 BEN. Dimensions of the gland shall be such that it can be used with standardized mechanical joint bell and tee head bolts conforming to ANSI/AWWA A212.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist-off nuts shall be used to insure proper actuating of the restraining device. Device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1.

### **7.0 Service Saddles**

1. Body—shall be Ductile iron ASTM-536.
2. STRAPS—Single strap shall be 2.00" wide. Double strap shall be 1.50" wide. Type 304 stainless steel.
3. STUDS—shall be type 304L stainless steel premium grade 5/8"
4. NUTS—shall be type 304 stainless steel teflon coated.
5. WASHERS—shall be stainless steel.
6. GASKETS—shall be a minimum of Buna N compound.
7. FINISH—shall be fusion bonded nylon to a minimum of 12 mils in thickness.
8. TAP—shall be cc or iron pipe size.

### **8.0 Corporation Stops**

1. Corporation stops shall be manufactured and tested to ANSI/AWWA C800 Standard.
2. Body—shall be case from 85-5-5-5 ASTM B62 brass alloy.
3. Inlet Threads—shall be AWWA iron pipe thread or cc thread.
4. Outlet—shall be compression copper tube size connection or copper tube flare.

### **9.0 Curb Stop Valves**

1. Curb valve stops shall be manufactured and tested to ANSI/AWWA C800 Standard. Curb stops shall be of ball valve design.
2. Body—shall be constructed of solid 85-5-5-5 ASTM B62 brass.

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3. Inlet—shall be compression or copper tube flare.
4. Outlet—shall be AWWA female iron pipe thread.
5. Key—shall be provided with lockwing.

### 10.0 Service Line

Service line shall be **polyethylene pipe**; SDR 9 (copper tube size),  $\frac{3}{4}$  inch through 2 inch, and meet AWWA C901 and ASTM D-2737 specifications.

### 11.0 Meter Box

Meter box shall be constructed of concrete and meet ASTM C-33 standard design. Lids shall be steel. In traveled areas, meter box shall be traffic rated.

### 12.0 Pressure Reducing Valve

1. Pressure reducing valve shall be a hydraulically operated, diaphragm type globe valve with pilot control system and include pressure setting adjustment feature. Valve shall meet or exceed the following requirements:
  - A. Main valve body – Cast iron ASTM A48
  - B. Valve ends – 125 Class ANSI B16.1
  - C. Valve trim – Bronze ASTM B61
2. Brass QQ-B-626
  - A. Pilot Control System – Cast Bronze ASTM B62 with 303 Stainless Steel Trim.

### 13.0 Air release Valve

Air release valves shall be of the simple lever, float operated type. The inlet and outlet shall have national pipe thread connections. The working pressure shall be 150 psi or specified otherwise. Valves shall meet or exceed the following requirements:

- A. Body and cover – ASTM A-48, Class 35 cast iron
- B. Lever frame – ASTM A-240 Stainless Steel
- C. Float – ASTM A-240 Stainless steel
- D. Seat – S.A.E. 30303 Stainless steel

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**14.0 Check Valves**

Check valves shall be of the silent closing type with appropriately drilled ANSI flanged ends for 150 psi working pressure or as specified otherwise. Valve shall meet or exceed the following requirements:

- A. Body – ASTM A-126 Class B cast iron (semi-steel)
- B. Trim – (seat, plug, and bushing) ASTM B-62
- C. Spring – ASTM A-276 Stainless steel

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**SEWER**

**1.0 Materials**

**A. Manufacture**

Except as modified herein, all materials, manufacture and testing for PVC gravity sewer pipe shall be in accordance with ASTM D 3034.

**B. Quality of Pipe**

Materials. Gravity PVC pipe shall meet the extra strength minimum of SDR-35 of the requirements of ASTM D 3034, be of clean, virgin PVC, and have a cell classification of 12454-B, 12454-C, or 13364-B meeting the requirement of ASTM D 3034 as designed in ASTM D 1784. Rubber gaskets shall conform with the low-head requirements of ASTM F 477.

**C. Dimensions and Tolerances**

Standard pipe lengths shall be 12.5 feet. Random lengths of not more than 15 percent of the total footage may be shipped. The requirements for pipe diameter and wall thickness are set forth in ASTM D 3034. The maximum allowable ordinate as measured from the concave side of the pipe shall not exceed 1/16 inch per foot of length.

**D. Imperfections**

Any imperfections which, in the opinion of the Engineer, may adversely affect the performance of the pipe or joints shall be cause for rejection of PVC pipe.

**E. Testing**

1. PVC gravity pipe shall be tested in accordance with ASTM D 3034. The minimum pipe stiffness at five percent deflection shall be 46 for all sizes when tested in accordance with ASTM D 2412.
2. In addition to the tests at the manufacturer's plant, the Engineer may require that tests be performed on pipe specimens selected at random at the point of delivery or at the job site. The Engineer shall bear the costs of such tests, which shall be in accordance with ASTM D 2412 and D 2444.

**Section 2.0 Quality of Pipe**

**A. Repair**

There will be no provisions for repair of PVC.

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**B. Appurtenances**

1. Joints for PVC gravity pipe shall be made with flexible elastomeric seals (gaskets) in accordance with ASTM D 3212. All pipe shall have a home mark on the spigot end to indicate proper penetration when the joint is made. All surfaces of the joint upon which the gasket may bear shall be smooth and free of any imperfections which could adversely affect sealability.
2. Fittings and stoppers shall meet the testing requirements for PVC pipe. Joints shall be capable of passing all tests specified in ASTM D 3212.

**C. Installation**

PVC pipe shall be supplied with manuals detailing installation in accordance with ASTM 2321.

**D. Handling and Storage**

1. PVC pipe shall be delivered to the job site from the factory and stored at the job site in palletized units less than 40 inches high. Care shall be taken during the transportation of the pipe to ensure that the tie-down methods do not damage or deflect the pipe.
2. PVC pipe stored at the job site for a period of three months or more shall be covered with an opaque material to protect it from the sun's rays. Air circulation shall be provided under the covering. PVC pipe shall not be removed from the pallet or laid out along the ditch more than 24 hours prior to being placed in the bedding.
3. Pipe shall be supplied with sufficient lubrication material to allow for complete installation. Lubricant shall be of type approved by the pipe manufacturer.

**3.0 High Density Polyethylene Pipe**

HDPE pipe shall be manufactured from extra high molecular weight polyethylene pipe materials meeting the requirements of Type III, Category 5, Grade p34 as defined in ASTM D 1248. The pipe material shall meet the requirements of cell classification PE345434C as defined in ASTM D 3350 and designated as PE3408, SDR 26. The manufacturer shall certify the material meeting this specification has exceeded 5000 hours without failure when tested under ASTM 1248 and has a hydrostatic design basis of 1600 psi at 73F and 800 psi at 140F when tested under ASTM d 2837.

**4.0 Gasketed Sewer Fittings**

All gasketed sewer fittings shall be rigid Polyvinyl Chloride SDR 35, and meet or exceed standards set by ASTM D1784, cell classification 1254-B. Elastomeric seals

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shall meet or exceed the requirements of ASTM F477 and STM F913. All fittings shall be compatible with pipe manufactured to ASTM D3034.

## **5.0 Precast Concrete Manholes**

### **A. Barrel and Cone Sections**

1. Barrel and cone sections of various heights conforming to ASTM C 478 and MAG Standard Details shall be used in order to bring the top of the manhole to the designated elevation.
2. The minimum wall thickness of any section is 1/12 the inside diameter of the barrel or the largest cone diameter. The wall thickness shall be not less than described by design by more than five percent or 3/16 inch, whichever is greater. The variations in laying lengths of two opposite sides of manhole sections shall be not more than 5/8 inch. The underrun in length of a section of manhole base, riser, or conical top shall be not more than ¼ inch per foot of length with a maximum of ½ inch in any one section.
3. Manhole sections shall be subject to rejection because of any one of the following:
  - A. Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.
  - B. Defects that indicate imperfect proportioning, mixing, and molding.
  - C. Surface defects indicating honeycombed or open texture.
  - D. Damaged or cracked ends, where such damage would prevent making a satisfactory joint.
  - E. Any continuous crack having a surface width of 0.01 inch or more and extending for a length of 12 inches or more, regardless of position in the section wall.
4. The joints between sections of the manhole shall be formed with male and female ends to make a continuous and uniform manhole. The joint surfaces shall be thoroughly cleaned prior to sealing.
5. The manhole sections shall be sealed to each other with a preformed flexible gasket conforming to the following requirements:
  - A. The flexible plastic gasket shall be in conformance with Federal Specification SS-S-00210, "Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints".

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- B. The plastic sealing compound shall be packaged in extruded preformed rope-like shape of proper size to completely fill the joint when fully compressed. The material shall be protected by a suitable, removable wrapper. The sealing compound shall be impermeable to water, have high immediate bonding strength to the primed concrete surface and shall maintain permanent plasticity, resistance to water, acids, and alkalis.
- C. All surfaces of the tongue and groove of the manhole barrel shall be clean prior to the installation of the sealing compound. The application of the sealing compound shall be accomplished in strict conformance with the manufacturer's instructions as to the method of application, quantity of material, the grade of the materials and the application temperatures.
- D. All lifting holes shall be sealed with the plastic sealing compound.

## **6.0 Frames and Covers**

### **A. General**

1. Frames and covers shall be made in accordance with MAG Standard Details, shall conform to ASTM A 48 and shall be designed to withstand H-20 loading.
2. The bearing surfaces of the frames and covers shall be machine-finished, and the cover shall seat firmly onto the frame so that there shall be no movement of the cover under traffic with the cover in any position on the ring. The tops of the covers and frames shall be flush, and there shall be 1/8 inch clearance all around between frame and cover.
3. The top surface of each cover shall be cast with a studded pattern, including lettering. The letter and studs shall be raised 5/16 inch. The letter shall not be less than 1 ½ inches high. Each cover except waterproof covers, shall be provided with not less than four ventilating holes, each of which is ¾ inch in diameter unless otherwise specified on the plans.
4. The castings shall be dipped in asphalt at not less than 200 degrees F after they have been thoroughly cleaned.

### **B. Castings**

1. All castings shall be true to pattern in form and dimension and free from pouring faults, sponginess, cracks, blowholes, or other defects in locations affecting their strength and value for the service intended. Castings shall be filleted boldly at angles, and the risers shall be sharp and true. Before the castings are removed from the foundry, they shall be thoroughly cleaned and the parting lines, gates and risers ground flush. No plugging or other stopping of holes will be allowed. The castings shall be thoroughly cleaned of all lumps and subject to a careful hammer test.
2. Test coupons shall be cased separately of the castings using a mold as described in ASTM A 48. Two test coupons are required for each melt poured. Additional copies shall be cast for use as replacements or in case a retest is required. The Owner may

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discard or replace specimens which show obvious lack of continuity of metal or if the machining is defective.

3. The manufacturer shall machine the tension specimens to the dimension specified for specimen "B" of ASTM A 48. When approved by the Engineer, transverse tests may be made in lieu of tensile tests.

**7.0 Steps**

Steps for manholes shall be polypropylene plastic-coated number 3 deformed bars conforming to the requirements of ASTM C 478. Steps for pre-cast concrete manhole shall conform to the PAG Standard Details. Steps shall be placed at equal intervals of 12 to 15 inches. The lower step shall not be more than 18 inches from the top of the manhole bench, and the upper step shall not be more than 24 inches below the top of the frame. Steps shall be located above a solid bench. Brick manholes will not be accepted.

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## **GAS**

### **1.0 Materials**

All pipe shall be **Driscoplex PE 2406/2708** or other approved material. IP size.

### **2.0 Quality of Pipe**

#### **A. Materials.**

Polyethylene pipe shall be made of a medium density polyethylene resin. This polyethylene resin shall be classified according to ASTM 1248, Standard Specification for Polyethylene Plastic Molding and Extrusion Materials, as Type III, Class B, Category 5, Grade P24. The cell classification shall meet ASTM D 3350, Standard Specification for Polyethylene Plastic Pipe and Fitting Materials, PE 235333 E. Pipe shall conform to ASTM 2513 Thermoplastic Gas Pressure Pipe, Tubing, and Fittings, and to the Department of Transportation's Title 49, Part 192, Transportation of Natural and Other Gas by Pipeline- Minimum Safety Regulations.

#### **B. Marking**

Each length of pipe shall be identified in accordance with ASTM 2513 as to size, material, manufacture, pressure rating, temperature rating, type, grade, and model.

#### **C. Dimensions and Tolerances**

PE pipe shall have a minimum wall thickness of 0.090 inches, except that pipe with an outside diameter of 0.875 inches or less may have a minimum wall thickness of 0.062 inches. Standard pipe lengths shall be:

- A.  $\frac{3}{4}$ " = 500ft coil
- B. 1" = 500 ft coil
- C. 2" = 500ft coil
- D. 3" = 40ft straight length
- E. 4" = 40ft straight length
- F. 6" = 40ft straight length

#### **D. Imperfections.**

Any imperfections which, in the opinion of the City of Benson, may adversely, affect the performance of the pipe or joints shall be cause for rejection of the PE pipe.

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### **3.0 Fittings**

#### **A. Materials**

Fittings shall be 100% injection molded and shall meet the requirements of ASTM D2513. In addition, butt fittings shall meet the requirements of ASTM 3261, while socket fittings conform to ASTM 2683. Fittings shall be **Driscoplex PE 2406/2708**.

#### **B. Marking**

Each fitting shall be identified in accordance with ASTM 2513 as to size, material, manufacture, pressure rating, temperature rating, type, grade and model.

### **4.0 Polyvalves**

#### **A. Materials**

Polyvalves shall be tested, qualified and manufactured per the requirements of ANSI Specification B16.40. Materials used for polyvalve bodies shall conform to the requirements of ASTM D 2513, and shall be long-term hydrostatic pressure tested at 140F. Valves shall be Nordstrom Polyvalve II.

#### **B. Marking**

Each valve shall be identified in accordance with ASTM D 2513 as to size, material, manufacture, pressure rating, temperature rating, type, grade, and model.

### **5.0 Meter Valves**

#### **A. Materials**

Meter valves shall be tested, qualified and manufactured per the requirements of ASME B16.33. Each valve shall be FIP thread ANSI B1.10.1 and have a lockwing. The body shall be cast iron and meet ASTM A126CLB. Key and washer shall be bronze and meet B584 alloy C84400. The O-ring shall be rubber and meet ASTM D 2000. The valve shall have a maximum working pressure of 175 psi, 263 psi test pressure.

#### **B. Marking**

Each valve shall be marked "gas" with the pressure rating and manufacturer.

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**6.0 Service Riser**

**A. Materials**

1. Each service riser shall meet all applicable requirements of ASTM D 2513. ANSI B1.20 and ANSI B31.8. The service riser shall be long term hydrostatic tested and rated at 140F. Pressurization shall be in accordance with ASTM D 2513. All risers shall be manufactured with polyethylene 2406 and shall be classified according to ASTM D 3350. The riser leg shall be NPT and pigtail PE 2406.
2. Gaskets and O-rings shall be manufactured with Nitrile Buna N and shall be tested according to ASTM D 395 and ASTM D 2240. The riser coating shall be fusion bonded epoxy powder coating.

**B. Dimensions**

The riser leg shall measure 36" in height and base leg shall measure 24" in length.

**C. Marking**

Each riser shall be marked to identify the manufacturer, part number, order number, rating and date manufactured.

**7.0 Valve Box and Support**

The valve box shall be of slip-type design to protect the valve from downward pressure, box supports shall prevent movement or settling of the valve and to avoid transmitting of external loads. Valve box lids shall have a heavy duty cast iron flange for in road installation. Lids shall be marked "Gas". The tube shall be 6 inch with bell dimensions as follows: 6" for a 2" valve, 9" for a 4" valve, and 12" for a 6" valve. The adjustment range shall be from 24" to 30".