MATERIAL SPECIFICATIONS

A. PIPES AND FITTINGS

A.1. Unplasticized Polyvinyl Chloride (uPVC)

A.1.1. Pipes and fittings shall conform to the requirements of AWWA C900, ISO 1452 or PNS 65 or the latest revision or its equivalent and shall be pressure Class 150 (Series 8) with machine installed **Integral Fixed Seal**. The seal should be polypropylene (PP) with flexible EDPM Rubber homogenously bonded to stiff piping

A.1.2. PVC Pipes and fittings shall be made from clean, blue-pigmented, virgin, NSF approved Class 12454-A or 12454-B PVC compound conforming to the requirements of ASTM D1784.

A.1.3. All pipes shall be furnished in lengths of 6 meters.

Table 1. uPVC Pipe Dimensions

Nominal Pipe Size, in	2	3	4	6	8	10	12
Nominal Diameter, mm	50	75	100	150	200	250	300
Outside Diameter, mm							
Min	63	90	110	160	225	280	315
max	63.3	90.3	110.4	160.5	225.7	280.9	316.0
Wall Thickness, mm							
min	3.6	5.2	6.6	9.5	13.4	16.6	18.7
max	4.16	5.92	7.13	10.32	14.39	17.80	20.00

A.2. Galvanized Iron (GI)

A.2.1. Pipes shall conform to the requirements of the ASTM A53/A53M (Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless) or the latest revision or its equivalent and shall be Schedule 40.

Pipe fittings shall conform to the requirements of ASME/ANSI B16.3 (Malleable Iron Threaded Fittings Class 150 and 300) and shall be Class 150.

A.2.2. The pipe shall be practically straight and both ends of the pipe shall be at right angle to the axis of the pipe. The inside and outside surfaces of the pipe shall be free from injurious defects. Unless otherwise specified, the length of the pipe shall be 6 meters. The tolerance shall be plus 6 meters without negative tolerance. Pipes shall be clearly marked with Trademark, Nominal Size, Length and Class of Pipe.

A.2.3. The pipe and fitting threads shall be made according to "American Standard Pipe Taper Thread (NPT) with taper angle equal to 1°47'.

A.2.4. Pipes and fittings shall be coated with zinc, both inside and outside surfaces, in accordance to ASTM A153/A153M–05 (Standard Specification for Zinc Coating (Hot–Dip) on Iron and Steel Hardware)

Table 2. GI Pipe and Fitting Dimensions

Nominal Pipe Size, in	½	¾	1	1¼	1½	2	3	4
Nominal Diameter, mm	15	20	25	32	40	50	75	100
Pipes								
Outside Diameter, mm	21.3	26.7	33.4	42.2	48.3	60.3	88.9	114.3
Wall Thickness, mm	2.8	2.9	3.4	3.6	3.7	3.9	5.49	6.02
Tolerance								
outside diameter,	±0.397	±0.397	±0.397	±0.397	±0.397	±1%	±1%	±1%

MATERIAL SPECIFICATIONS

A.1. PE (POLYETHYLENE) PLASTIC TUBING (BLUE)

A.1.1. Materials – The extrusion compound shall be either Grade P33, Class C or Grade P34, Class C (PE3306 or PE3406) as defined by ASTM D1248. All compounds used shall be virgin plastic except that clean rework material from the manufacturer's own pipe production may be used so long as the original was virgin material. The pipe shall meet the requirements of the National Sanitation Foundation (NSF) for potable water use as tested by the National Institute of Science and Technology or other approved testing laboratories and shall be made from non-toxic, non-lead based plasticizer approved by the Engineer.

A.1.2. Dimensions – The Standard Dimension Ration (SDR) shall be 11 with nominal dimensions as follows (in English units):

Table 1. PE Pipe Dimensions

Nominal Pipe Size, in	1/2	3/4	1	1-1/2	2	2-1/2
Outside Diameter, mm	20	25	32	50	63	75
Standard Length. m	300	150	100	60	60	60
Wall Thickness, mm						
min	2.3	2.3	3.0	4.6	5.8	6.8

A.1.3. Rating – All service tubing shall be rated for use with water at 23.0° C (73.40° F) and at a minimum working pressure of 1.1 MPa (160 psi). Other requirements shall be in accordance with ASTM D2737.

A.1.4. Marking – All tubing shall be clearly marked at intervals of not more than 0.6 M with nominal size, type of material (PE 3306, or PE 3406). Standard Dimension Ratio (SDR 11), manufacturer's trade name and production code, and the seal of approval from an accredited testing laboratory.

A.1.5. Installation – The installation and method of end connections of PE plastic tubing shall be as shown on the drawings and as specified in Section 23.10. All procedures and tools used shall comply with recommendations of the manufacturer and be approved by the Engineer.