2. Pipe Materials and Fittings.

a. General.

- 1) <u>Standard pipe materials and fittings</u>. Ensure that all designs allow for the use of materials that conform to all applicable sections of the Specifications and the Standard Details.
- 2) Special pipe materials and fittings. Submit any special design features and/or materials required due to the specific nature of the contract for approval, prior to being incorporated into the contract documents. If approved, it will be for the specific case in question and is not to be considered a general approval for use elsewhere (other contract documents). Provide Special Provisions to the Specifications and Modifications to the Standard Details, see Part Three, Section 6 (Modifications to Specifications and Standard Details).

b. Pipe Material.

- 1) Standard Pipe Material.
 - a) DIP in accordance with the Specifications, with the class of pipe noted on the drawings.
 - (1) Design the class of pipe (wall thickness) for the allowable cover, see Part One, Section 4 (Selection of Pipe Material).
 - (2) All DIP smaller than 16-inch diameter must have polyethylene encasement in accordance with the Specifications. DIP 16-inch and larger at a minimum will require polyethylene encasement, see Part Three, Section 28 (Corrosion Control).
 - (3) Standard exterior coating, in accordance with the Specifications. Special coatings or protection may be required, see Part Three, Section 28 (Corrosion Control).
 - (4) DIP larger than 48-inch diameter:
 - (a) Verify with the pipe manufacturer that the material specified can be produced. For example: Larger sized DIP may be available in Pressure Class instead of Class of Pipe.
 - (b) The design pipeline must be reviewed for acceptable working pressure and cover over the pipe, and Special Provisions to the Specifications will be required to be submitted for review.
 - (5) Allowable pipe joints see Part One, Section 3 (Pipe and Fitting Joints).
 - b) <u>PVC</u> for design of water pipelines must be approved by WSSC as an alternate pipeline material.
 - (1) PVC in accordance with AWWA C900/C905 and the Specifications, with the class of pipe noted on the drawings.
 - (2) Operating pressure, allowable cover and pipe dimension ratio (DR), see Part One, Section 4 (Selection of Pipe Material) for design information.

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- (3) Allowable pipe joints see Part One, Section 3 (Pipe and Fitting Joints).
- (4) Alternatives to the insulating flanges as shown in Standard Details C/3.1, C/3.2, and C/3.3, see Standard Details C/3.2a and C/3.3a for PVC insulating spool. For operating pressure, allowable cover and pipe dimension ratio (DR), see Part One, Section 4 (Selection of Pipe Material) for design information.
- c) <u>Steel Pipe.</u> The use of steel pipe for water pipelines is for special cases only, where it proves to be the most suitable material for the particular design.
 - (1) Pipe in accordance with AWWA M-11 (Steel Pipe A Guide for Design and Installation) and AISI Welded Steel Pipe, Steel Plate Engineering Data, Volume 3.
 - (2) Specify continuous interior lining and exterior coatings.
 - (3) Continuous butt-welded pipe joints, unless otherwise approved.
 - (4) Design the steel pipeline generally the same as for DIP.

c. Fittings.

- 1) Standard Fitting Material.
 - a) Fittings for DIP, in accordance with the Specifications and the following:
 - (1) Ductile iron in accordance with AWWA C110 or AWWA C153.
 - (2) Polyethylene encasement, see requirements for DIP material.
 - (3) Standard exterior coating, in accordance with the Specifications. The design may require special coatings or protection, see Part Three, Section 28 (Corrosion Control).
 - (4) Larger than 48-inch diameter fittings are rated at working pressure of 150 psi and 48-inch and smaller diameter fittings are rated at working pressure of 250 psi.
 - (a) Each fitting's working pressure must be reviewed and if the working pressure is over the pressure rating of the fitting, then approval and Special Provisions to the Specifications will be required.
 - (5) Allowable joints on fittings, see Part One, Section 3 (Pipe and Fitting Joints).
 - (6) Allowable fittings and special design requirements, see Part One, Section 7 (Allowable Fittings).
 - b) Fittings for PVC, in accordance with the Specifications and the following:
 - (1) PVC fittings for design of water pipelines must be approved by WSSC as an alternate pipeline material.
 - (2) PVC in accordance with AWWA C907, Class 150 for injection-molded fittings or AWWA C900, Class 200 and C905, Class 235 for fabricated fittings.

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- (3) Ductile iron in accordance with AWWA C110 or AWWA C153, and polyethylene encasement, see requirements for DIP material.
- (3) Allowable joints on fittings, see Part One, Section 3 (Pipe and Fitting Joints).
- (4) Allowable fittings and special design requirements, see Part One, Section 7 (Allowable Fittings).
- c) Fittings for Steel Pipe. The use of fittings for steel pipelines is for special cases only, see requirements for steel Pipe in this section.
 - (1) Fittings in accordance with AWWA M-11 (Steel Pipe A Guide for Design and Installation) and AISI Welded Steel Pipe, Steel Plate Engineering Data, Volume 3.
 - (2) Specify continuous interior lining and exterior coatings.
 - (3) Continuous butt-welded pipe joints, unless otherwise approved.

