

## DIVISION 4

### PRESSURE PIPE DESIGN CRITERIA

#### Section 4.01 GENERAL

The following pressure pipe design criteria shall apply to all pressure pipe designs in the City. Design shall comply with the current applicable AWWA standards. Additional design criteria are specified in the Standard Drawings.

#### Section 4.02 CULINARY WATER PIPE DESIGN

##### Sub-Section A. Pipe Material:

Ductile iron pipe shall be used in all areas east of 400 West and PVC pipe or ductile iron pipe wrapped in polyethylene will be used in all areas west of 400 West.

Ductile iron pipe shall conform to all requirements of ANSI/AWWA C151/A21.51, "American National Standard for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined molds, for Water or Other Liquids." Minimum pressure Class will be 250 for pipes larger than 12-inch diameter. Pipes of 12-inch diameter and smaller shall be pressure Class 350. If thickness class pipe is used, pipes of diameters from 4 inches through 10 inches shall be minimum Class 51 and pipe from 12-inch diameter and larger shall be minimum Class 50.

Polyvinyl Chloride (PVC) pipe for the transmission and distribution of water shall be manufactured in accordance with AWWA C900-81, "AWWA Standard for Polyvinyl Chloride Pressure Pipe, 4-inch through 12-inch, for Water". The PVC pipe shall have a cast-iron-pipe-equivalent outside diameter. PVC pipe 14 inches and larger shall be manufactured in accordance with AWWA C905-88, "AWWA Standard for Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14-inch through 36-inch". All PVC pipe 4-inch and larger shall be DR. 18 with a working pressure of 150 PSI. Pipe smaller than 4-inch shall be schedule 40 PVC.

##### Sub-Section B. Fire Hydrant Spacing:

Fire Hydrants shall be placed in locations that allow for accessibility by the lay of a fire hose of no more than two hundred fifty (250) feet from the hydrant to the most remote point of any structure intended for occupancy. Buildings that are to be equipped with sprinkled fire suppression are to have a hydrant within one hundred (100) feet of the "Fire Department Connection" (FDC). Other requirements shall be based on the "International Fire Code" or as specified by the Springville City Fire Marshall.

##### Sub-Section C. Blow-off Locations:

If a fire hydrant is not located at the end of a cul-de-sac or temporary dead-end street, a blow-off hydrant shall be placed at those locations.

#### Section 4.03 PRESSURE IRRIGATION PIPE DESIGN

##### Sub-Section A. Pipe Material:

Polyvinyl Chloride (PVC) pipe for the transmission and distribution of water shall be manufactured in accordance with AWWA C900-81, "AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch, for Water:" PVC pipe fourteen inches (14") and larger shall be manufactured in accordance with AWWA C905-88, "AWWA Standard for Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14-inch through 36-inch." All PVC pipe four-inch (4") and larger shall be dimension ratio (DR) 18 with a working pressure of 150 psi. The PVC pipe shall have a cast-iron-pipe-

equivalent outside diameter. Pipe smaller than four inches (4") shall be schedule 40 PVC. Pressure Irrigation pipe shall be purple in color for easy identification.

**Sub-Section B. Blow-off Locations:**

A blow-off hydrant shall be placed at the end of all cul-de-sacs and temporary dead-end streets unless a irrigation pipe drain is placed at those locations.

**Sub-Section C. Pipe Drainage Facilities:**

Pressure irrigation pipe drains must be designed at all low-lying locations that will collect water at the end of the irrigation season. Care should be taken in the design process to assure the fewest number of drains as possible. Springville City must approve the location of all drains. Details of acceptable pipe drains are included in the standard drawings.

**Section 4.04 PIPE LOOPING**

Circumstances that require a culinary pipe to be placed under a sanitary sewer pipe require special construction. There must be 18" to 36" clear distance between the pipes. The culinary pipe must be in a casing that extends ten (10) feet on each side of the crossing. A detail of an acceptable pipe crossing is included in the standard drawings.

**Section 4.05 AIR VALVES**

The design engineer must give special consideration in the design of a pressure pipe system to include air valves of the appropriate type and location where necessary. Generally, special valves that may need to be designed into the system include vacuum relief valves, air and vacuum valves and combination air valves. Air valves are essential in the design of an expansive system in order to operate effectively. Without the proper application and placement of air valves, pipeline capacity may be reduced. Valves are especially necessary for pressure irrigation systems that are drained annually. In pressure irrigation systems, manual valves that provide air inlet and removal are generally acceptable. The design engineer should work closely with the City Engineer, Public Works Director and Water Superintendent to determine the most appropriate type and location of valves.

The following is a description of the application concerning the specified valves:

- a) Vacuum Relief Valves shall be of the type that automatically admits large quantities of air to enter a system on negative pressure.
- b) Air and Vacuum valves shall be of the type that automatically exhausts large quantities of air during the filling of a pipeline and to close water tight when the water enters the valve and allows air to re-enter during the draining or when a negative pressure occurs. The discharge orifice area shall be equal to or greater than the inlet of the valve.
- c) Combination Air Valves shall be of the single housing style that combines the operating features of both an Air/Vacuum and Air Release Valve. The Air/Vacuum portion shall automatically exhaust large quantities of air during the filling of the pipeline and automatically allows air to re-enter the pipeline when the internal pressure of the pipeline approaches a negative value due to column separation, draining of the pipeline, power outage, pipeline break, etc. The Air Release portion shall automatically release small pockets of air from the pipeline while the pipeline is in operation and under pressure.
- d) Air Inlet and Removal Valves using manual controls are used to flush air from the pressure irrigation system upon annual filling and emptying. Refer to the Standard Drawings for details.