



# Arkansas Department of Health

## Engineering Section

### POLCY STATEMENT: PVC PIPE (AWWA C900 OR ASTM D 2241) FOR USE IN PUBLIC WATER SYSTEMS OCTOBER 2008

This policy supercedes the policy issued in September, 1987 and pertains to 2-inch through 12-inch PVC (AWWA C900 OR ASTM D 2241) public water system pipe. Proposals for over 12-inch pipe will be considered on an individual basis and be expected to conform to applicable AWWA and ASTM standards. Applications utilizing other types of pipe such as DI, CI, PVC0, and HDPE, etc. should be designed in accordance with the applicable AWWA Standard.

PVC pipe should not be installed where soils are or will be exposed to solvents, gasoline, petroleum products, etc. The PVC pipe shall be designed or selected in Accordance with Appendix A of AWWA C-900. The Hydrostatic Design Basis shall be 4,000 psi at 73.4 F and the Factor of Safety shall be 2.0 resulting in a design stress of 2000 psi.

All PVC pipe shall be PVC 1120 pressure pipe made from class 12454 material as defined by ASTM D-1784 with outside diameter dimensions of steel or cast iron pipe. The PVC compounds shall be treated or certified suitable for potable water products by the National Sanitation Foundation (NSF) Testing Laboratory (NSF Standard No. 61).

All PVC pipe shall be manufactured to meet the requirements of ASTM D 2241 or AWWA C900, and shall have provision for expansion and contraction at each joint by use of elastomeric gaskets.

The pipe fittings and specials for pipe sizes of 6-inches and above shall conform to AWWA cast iron fittings using a mechanical joint with hardened or duck tipped type of rubber gaskets in accordance with AWWA C-110 and AWWA C-111. The pipe and fittings shall be installed in accordance with the recommendations of the pipe manufacturer and consulting engineer.

Pipe fittings less than 6-inches may be schedule 40 PVC (ASTM D-2466) or schedule 80 PVC (ASTM D-2467) or which meet the requirements of AWWA C-900 may be used in systems having working pressures less than the design fitting class. When the maximum working pressures are 125 psi or less, schedule 40 is permissible; higher pressures require schedule 80. When AWWA C900 pipe is utilized and the working pressures are below 150 psi, fittings that meet the requirements of AWWA C907 (4-inch through 12-inch) are acceptable.

The maximum working pressures of the water system shall not exceed the maximum working pressure in Table 1 for a proposed pipe, except as outlined in the accompanying waiver criteria. The total system pressure (maximum working pressure plus any routine pressure surge) under any circumstances shall be less than the respective pressure rating or pressure class of a proposed pipe. The occasional or "emergency" surges must not be greater than 1.6 times the calculated pressure rating or pressure class of the pipe.

The pipe shall be installed, embedded, leakage tested, and in all ways be in accordance with AWWA C605 and AWWA M23. Where the requirements of AWWA C900 and AWWA M23 conflict, AWWA C900 takes precedence.

The pipe shall be disinfected in accordance with AWWA C-651.

TABLE 1

Maximum Working Pressure (PSI)	ASTM-224 SDR	C-900 DR	ASTM-2241 Pressure Rating (PSI)	C-900 Pressure Class (PSI)
275	13.5		315	
265		14		305
215	17		250	
200		18		235
170	21		200	
135		25		165
130	26		160	

#### Criteria For Waiving Surge Allowance

1. A written request is submitted from the water system management or governing board requesting a waiver from the surge allowance and stating the planned life expectancy for the application, not to be less than 50 years unless justified by unusual circumstances.
2. Documentation and calculations indicating that maximum working pressure plus the occasional or “emergency” surges are not expected to be greater than 1.6 times the calculated pressure class.
3. Documentation and calculations indicating that routine or cyclical surges will not result in pipe fatigue based upon the life expectancy indicated as part of the waiver request. (See AWWA C-900, Appendix B).
4. Documentation and calculations indicating that the total system pressures (maximum working pressures plus routine surge pressures) does not exceed the respective pressure rating or pressure class of the pipe. Routine pressure surges resulting from velocity changes will reduce the allowable working pressures.

#### Definitions:

Working Pressure: The maximum pressure that water system exerts on the pipe resulting from the hydraulic grade line established by a tank or prime mover.

Routine Pressure Surge: The pressure fluctuations that routinely occur as the result of normal (routine) velocity changes in the pipe.

Occasional (Emergency) Pressure Surge: The pressure surges that occasionally occur due to a malfunction of some type (pump failure, valve failure, improper operation of fire hydrants, etc).

Total System Pressure: Maximum Working Pressure plus Routine Surge Pressure