

Policy for Cross-Connection Control for Fire Protection Systems



Arkansas Department of Health
Bureau of Environmental Health Services
Division of Engineering
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Policy for Cross-Connection Control on Fire Protection Systems

ADH - Division of Engineering

This policy is for new, modified, or expanded fire protection systems for commercial and industrial establishments. The type of fire protection system and the minimum protection for cross-connection¹ for each is listed below. Review for compliance with this policy will be effective July 1, 2000. The local authority may require more stringent requirements than defined by this policy.

I. NEW SYSTEMS¹

CLASS 1 Direct connection from public water mains only; no pumps, tanks, or reservoirs; no physical connection from other water supplies; no antifreeze or other additives of any kind; all sprinkler drains discharging to atmosphere, dry well or other safe outlet.

Required cross-connection control: double check valve assembly.

CLASS 2 Same as Class 1 except that booster pumps installed in the connection from the street main

Required cross-connection control: double check valve assembly. The booster pump shall be equipped with a flow control valve on the discharge side of the pump which, by sensing suction pressure, will modulate the pump's discharge to maintain a minimum suction pressure, normally 20 psi.

CLASS 3 Direct connection from public water supply mains, plus one or more of the following; elevated storage tank; fire pump taking suction from above ground covered reservoir, tank, or pressure tank. Such storage facilities are filled or connected to public water only and the water in the tank is to be maintained in a potable condition. (Note: Unless the storage tank is owned and operated by the public water system, the assumption will be made that the water in the tank is non-potable, making it a Class 4 installation.)

Required cross-connection control: double check valve assembly.

CLASS 4 Directly supplied from public mains, similar to Class 1 and Class 2, with an auxiliary water supply dedicated to fire department use and available to the premises.

Required cross-connection control: reduced-pressure principle backflow-prevention assembly.

Class 5 Directly supplied from public mains and interconnected with auxiliary supplies, such as pumps taking suction from reservoirs exposed to contamination, or rivers and pond; driven wells; mills or other industrial water system; or where antifreeze or other additives are used.

Required cross-connection control: reduced-pressure principle backflow-prevention assembly.

CLASS 6 Combined industrial and fire protection systems supplied from the public water mains only, with or without gravity storage or pump suction tanks.

Required cross-connection control: reduced-pressure principle backflow-prevention assembly.

II. EXISTING SYSTEMS

¹ All Class systems assume a direct piping connection to the public water main. An air gap can be used in any Class system instead of the designated control device, but will normally require additional storage and pumping. Fire protection systems which involve a combination of Class systems can be separately isolated to the degree required for each Class. Class systems are taken from AWWA M-14.

This applies to an existing fire protection system which is modified, extended, or enlarged. Such systems include a modification or extension to an existing network (distribution piping, sprinkler heads control valves, etc are added to or replaced in an existing system), or where an additional fire protection system (new feed line, riser, control valve, distribution piping, sprinkler heads, etc) will connect to a fire main which has an existing cross-connection control device.

The minimum protection for cross-connection control for existing systems is the same as listed for new systems, except as noted below for Class 1 and 2 systems only.

For Class 1 and 2 systems, if the hydraulic analysis for the modified, extended, or enlarged system demonstrates that the installation of a properly sized cross-connection control device will increase the pressure loss so as to make the system noncompliant with the Rules and Regulations for Sprinkler Systems of the Arkansas Fire Protection Licensing Board (less than the minimum flow required by state fire sprinkler regulations), and that reasonable modifications to the system cannot compensate for the additional losses, the Responsible Managing Employee of the fire protection firm will document² that as part of the submittal to the Department of Health.

For these installations, if not already installed, the existing cross-connection control device will be replaced with two check valves in series (one of which can be the alarm valve), each valve meeting AWWA C508-82, UL 312-88, or UL 193-88, or the latest versions thereof, and equipped with a resilient seating surface. The valves or adjacent piping shall be equipped with a sufficient number of resilient seated test cocks (minimum diameter of one quarter to one-half inch) to determine the effectiveness of each valve (there shall be no leakage past any check valve). Sufficient isolation valves - one valve upstream of the valves and one valve downstream of the valves - shall be present or added to the system to permit this testing.

Existing fire protection systems which are not being modified, enlarged, or expanded are not required to upgrade to comply with this policy.

III. CONDITIONS

The following conditions apply to CLASS I through CLASS 6 systems.

1. Backflow preventers must be tested within 10 days of placing the fire sprinkler system "on stream" and annually thereafter by a state certified *Assembly Test Technician*. A copy of the test report must be sent to the local water utility.
2. Reduced pressure type backflow prevention assemblies shall not be installed in pits or vaults. Double check valve assemblies must be installed above ground, if possible. However, if review and approval by the ADH permits below grade installation of a double check valve assembly because of unique conditions at the job site, then the below grade unit must be placed in a vault which is located in a well drained area.
3. Installers of fire protection equipment must be licensed by the Fire Protection Licensing Board.
4. All plans submitted to the Arkansas Department of Health (ADH) for approval shall indicate the name and license number of the RME. Submittals must include plans, a cost estimate, and the appropriate review fee.
5. Plans for connection to fire protection systems must be submitted to the ADH and the local water utility for review and approval prior to beginning installation work. Submittals must include the following elements (include the elements that are appropriate to the project):

² The sprinkler flow and pressure on which the calculation is based is to be the minimum required by NFPA as defined in the latest regulation of the Arkansas Fire Protection Licensing Board. Documentation to the ADH is to include a listing of that minimum flow and pressure, a headloss summary, the desired and calculated sprinkler head output, and a summary of the options examined to reduce headloss.

- A. A utility plan showing the location of the fire main, property lines & easements.
- B. Material of construction of the fire main (and pressure rating if applicable).
- C. Fire sprinkler connection details; including the following:

- Test flow information at the job site, including flow rate & static and residual pressures.
- Make, model number, size and type of assembly (DC, RP, DCDA, RPDA).
- Show where the FDC line takes off from the riser or verbally describe the location.
- Show flow calculation or certify that the flow through the backflow preventer will not exceed the max. rated flow for the unit as described in the table shown below.

6. Reduced pressure backflow prevention assemblies shall not be installed in the vertical position unless approved by the Foundation for Cross-Connection Control and Hydraulic Research (FCCHR). University of Southern California, Los Angeles, CA.

DEFINITIONS:

Double check valve assembly (DC): a complete assembly meeting ANSI/AWWA C510-92 or the latest version thereof consisting of two internally loaded, independently operating check valves between two tightly closing resilient-seated shutoff valves, with four properly placed resilient seated test cocks

Reduced-pressure principle backflow-prevention assembly (RP): a complete assembly meeting ANSI/AWWA C511-92 or the latest version thereof consisting of a mechanical, independently operating, hydraulically dependent relief valve located between two independently operating, internally loaded check valves that are located between two tightly closing resilient seated shutoff valves with four properly placed resilient-seated test cocks.

DCA's and RPBP's are to be sized according to the following:

Maximum Flow Rate – gpm	Minimum DCA/RPBP Size – inches	Maximum DCA Pressure Loss - psi	Maximum RPBP Pressure Loss - psi
50	1	10	18
75	1 ¼	10	18
100	1 ½	10	16
160	2	10	16
225	2 ½	10	16
320	3	10	15
500	4	10	14
1000	6	10	14
1600	8	10	14
2300	10	10	14
3000	12	10	14

Testing and repair of cross-connection control devices is to be by personnel certified by the Arkansas Department of Health. Contact the Division of Protective Health Codes at 661-2642 for additional information.