

Environmental Quality, Dept. of Water Quality

Chapter 12: Design and Construction Standards

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Water Quality Rules and Regulations

Chapter 12

CHAPTER 12

Design and Construction Standards for Public Water Supplies

Section 1. **Authority.** These standards are promulgated pursuant to W.S. 35-11-101 through 35-11-1207. Specifically, W.S. 35-11-302 requires the administrator to establish standards for the issuance of permits for construction, installation, or modification of any public water supply.

Section 2. **Purpose.** The purpose of these standards is to:

(a) Ensure that the design and construction of public water supplies meet the purpose of the Environmental Quality Act.

(b) Prevent, reduce and eliminate pollution and enhance the waters of the State of Wyoming by ensuring that the design and construction of public water supplies are capable of the required treatment and distribution providing continued operation to protect the health, safety and welfare of the users and operators.

These standards pertain only to permits required pursuant to Chapter 3, Wyoming Water Quality Rules and Regulations.

Section 3. **Intent.** The design and construction standards included in these regulations are directed toward conventional public water systems. These standards impose limiting values of design for which a construction, installation, or modification permit application and plans and specifications can be evaluated by the division.

The terms "shall" and "must" are used when practice is sufficiently standardized to permit specific delineation of requirements or when safeguarding public health or protection of water quality justifies such definite action. Other terms, such as "should", "recommend", and "preferred" indicate desirable procedures or methods which allow deviations provided the purpose of these regulations can be accomplished.

The applicant shall use the date referenced copy of other standards referred to in these regulations. Where no date is listed for the referenced standards, the standards used shall be those in effect when these regulations become effective.

Section 4. **Definitions.** The following definitions supplement those contained in W.S. 35-11-103 of the Wyoming Environmental Quality Act.

(a) "Auxiliary source of supply" means any water supply on or available to the water user's system other than an approved public water supply acceptable to the water supplier.

These auxiliary waters may include water from another supplier's public potable water supply or any natural source(s), such as a well, spring, river, stream, harbor, and so forth; used waters; or industrial fluids. These waters may be contaminated or polluted, they may be objectionable or they may be from a water source which the water supplier is uncertain of sanitary control.

(b) "Average daily demand" means the total annual water use divided by the number of days the system was in operation.

(b) "Backflow" means the undesirable reversal of flow of water or mixtures of water and other liquids, gases, or other substances into the distribution system of the public water supply from any other source or sources.

(c) "Backflow incident" means any identified backflow to a public water supply distribution system or to the potable water piping within the water user's system benefitting from a water service connection to the public water supply distribution system.

(d) "Back-pressure" means a form of backflow caused when the pressure of the water users' system is greater than that of the water supply system. This could be caused by a pump, elevated tank, elevated piping, boiler, pressurized process, pressurized irrigation system, air pressure or any other cause of pressure.

(e) "Back-siphonage" means a form of backflow caused by negative or reduced pressure in the water supply system. This situation can be caused by loss of pressure due to high water demands, a line break, excessive fire fighting flows, etc.

(f) "Containment" means the practice of installing approved backflow prevention devices at the water service connection of the water user in order to protect the public water supply from any backflow from the water users system.

(g) "Contamination" means an impairment of a public water supply by the introduction or admission of any foreign substance which degrades the quality of the potable water or creates a health hazard.

(h) "Cross connection" means any actual or potential connection between a potable water supply and any other source or system through which it is possible to introduce contamination into the system.

(i) "Degree of hazard" means either a high or low hazard situation where a substance may be introduced into a public water supply through a cross connection. The degree of hazard or threat to public health is determined by a hazard classification.

(j) "Domestic services" means services using potable water for ordinary living processes and not for commercial or industrial uses, fire protection systems with antifreeze or

other chemicals, heating systems, etc. Examples may include residences, churches, office buildings, schools, etc.

(k) **“Dual check”** means a device conforming to ASSE Standard #1024 consisting of two independently acting check valves. Dual check valves are allowed only for residential water service connections that have a low hazard potential with back pressure or backsiphonage under continuous pressure.

(l) "Groundwater source" includes all water obtained from dug, drilled, bored, jetted or driven wells; springs which are developed so that the water does not flow on the ground and protected to preclude the entrance of surface contamination; and collection wells.

(m) **“Hazard classification”** means a determination by a hazard classification surveyor as to high hazard or low hazard and the potential cause of backflow as either back-pressure or back-siphonage.

(n) **“Hazard classification survey”** means inspection of a premises to identify the potable water systems, the location of any potential cross connections to the potable water systems, the hazard of the potential backflow, the physical identification of any backflow devices or methods present and the inspection status of any backflow devices or methods. The hazard classification survey results must be recorded and certified by a qualified hazard classification surveyor.

(o) **“Hazard classification surveyor”** means an individual certified by the USC-Foundation for Cross-Connection Control and Hydraulic Research as Cross Connection Control Specialist, the American Association of Sanitary Engineers (ASSE) as a Cross Connection Control Surveyor, or by another state certification program approved by the administrator, or by a water distribution system operator also certified as a backflow device tester employed by the public water supplier for the service where the survey is being conducted.

(p) **“High hazard”** means a situation created when any substance which is or may be introduced into a public water supply poses a threat to public health through poisoning, the spread of disease or pathogenic organisms, or any other public health concern.

(q) **“Isolated”** when referring to cross connections means the proper approved backflow prevention devices have been installed at each point of cross connection within the water user's system. This requires the installation of an approved backflow protection device at each source of possible contamination. This type of control has the advantage of protecting health within the water user's system as well as protecting the public water supply.

(r) **“Low hazard”** means a situation created when any substance which is or may be introduced into a public water supply does not pose a threat to public health but which does adversely affect the aesthetic quality of the potable water.

(s) "Maximum daily demand" means the demand for water exerted on the system over a period of 24 consecutive hours, for the period during which such demand is greatest.

(t) "Maximum hour demand" means the highest single hour demand exerted on the system. This may or may not occur on the maximum day.

(u) "Mineralized water" means any water containing more than 500 mg/L total dissolved solids.

(v) "Offstream reservoir" means a facility into which water is pumped during periods of good quality and high stream flow for future release to treatment facilities.

(w) "Surface water source" includes all tributary streams and drainage basins, natural lakes and artificial reservoirs or impoundments upstream from the point of the water supply intake.

(x) "Water service connection" means any water line or pipe connected to a distribution supply main or pipe for the purpose of conveying water to a water user's system.

(y) "Water supplier" means any entity that owns or operates a public water supply, whether public or private.

(z) "Water user" means any entity, whether public or private, with a water service connection to a public water supply. The water user is also identified as a customer of a public water supply.

(aa) "Water user's system" means that portion of the user's water system between the water service connection and the point of use. This system includes all pipes, conduits, tanks, fixtures, and appurtenances used to convey, store or utilize water provided by the public water supply.

Section 5. Facilities and Systems not Specifically Covered by these Standards.

This section is provided to encourage new technology and equipment and provide a process for evaluating and permitting designs which deviate from these regulations. The proposed construction of facilities and processes not in compliance with these regulations will be permitted provided that the facility, when constructed, can operate meeting the purpose of these regulations.

(a) Each application for a permit to construct a facility under this section shall be evaluated on a case-by-case basis using the best available technology. The following information should be included with the application:

(i) Data obtained from a full scale, comparable installation which demonstrates the acceptability of the design; and/or

(ii) Underwater crossings. A minimum cover of 2 feet (0.61 m) shall be provided over the pipe. When crossing water courses which are greater than 15 feet (4.6 m) in width, the following shall be provided:

(A) The pipe shall be of special construction, having flexible watertight joints.

(B) Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily accessible and not subject to flooding; and the valve closest to the supply source shall be located in a manhole.

(i) **Cross-connections.**

(i) Cross-connections. There shall be no water service connection installed or maintained between a public water supply and any water user whereby unsafe water or contamination may backflow into the public water supply.

(A) Applicability. In order to protect all public water supplies from the possibility of the introduction of contamination due to cross connections, the water supplier shall require backflow prevention devices for each water service connection in accordance with Table 1 which appears at the end of this section, with the exception of (B)(I) residential water service connections and (B)(II) domestic non-residential water service connections. The water supplier shall take appropriate actions which may include immediate disconnection for any water user that fails to maintain a properly installed backflow prevention device or comply with other measures as identified in Section 14 (i) of these regulations.

(I) Any high hazard non-residential connection to any public water supply shall be protected by the appropriate backflow prevention device.

(II) Any service connection made to facilities constructed under a permit to construct issued after adoption of this regulation, Section 14 (i), shall be in full compliance with this section. This requirement applies to all service connections made or initially activated after the adoption of this regulation.

(III) Water suppliers shall establish record keeping and management procedures to ensure that requirements of this regulation for installation and maintenance of backflow prevention devices are being met.

(B) The method of backflow control, selected from Table 1, shall be determined based upon the degree of hazard of the cross connection and the cause of the potential backflow. Hazards shall be classified as high hazard or low hazard. The potential cause of the backflow shall be identified as being back-siphonage or back-pressure.

(I) Residential water service connections shall be considered to be low hazard back-siphonage connections, unless determined otherwise by a hazard classification.

(II) Domestic non-residential water service connections shall be considered to be low hazard back-pressure connections, unless determined otherwise by a hazard classification conducted by the water supplier. Examples include schools without laboratories, churches, office buildings, warehouses, motels, etc.

(III) Any water user's system with an auxiliary source of supply shall be considered to be a high hazard, back pressure cross connection. A reduced pressure principle backflow device shall be installed at the water service connection to any water user's system with an auxiliary source of supply.

(IV) All water loading stations shall be considered high hazard connections. A device, assembly, or method consistent with Table 1 shall be provided.

(V) Non-domestic commercial or industrial water service connections shall be considered to be high hazard back pressure connections, unless determined otherwise by a hazard classification. Examples include restaurants, refineries, chemical mixing facilities, sewage treatment plants, mortuaries, laboratories, laundries, dry cleaners, irrigation systems, facilities producing or utilizing hazardous substances, etc. For some of these service connections, a hazard classification may result in a determination of a back-siphonage or low hazard classification. The backflow prevention device required shall be appropriate to the hazard classification. Where potential high hazards exist within the non-residential water user's system, even though such high hazards may be isolated at the point of use, an approved backflow prevention device shall be installed and maintained at the water service connection.

(C) Determination of the hazard classification of a water service connection is the responsibility of the water supplier. The water supplier may require the water user to furnish a hazard classification survey to be used to determine the hazard classification.

(D) Hazard classifications shall be conducted by hazard classification surveyors that are certified by the USC-Foundation for Cross-Connection Control and Hydraulic Research, the American Association of Sanitary Engineers (ASSE), or by another state certification program approved by the administrator, or by a water distribution system operator also certified as a backflow device tester employed by the public water supplier for the service where the survey is being conducted.

(E) All backflow prevention devices must be in-line serviceable (repairable), in-line testable except for devices meeting ASSE Standard #1024, and installed in accordance with manufacturer instructions and applicable plumbing codes.

(F) All backflow prevention devices must have a certification by an approved third party certification agency. Approved certification agencies are:

- (I) American Society of Sanitary Engineers (ASSE),
- (II) International Association of Plumbing/Mechanical officials (IAPMO), and
- (III) Foundation for Cross-Connection Control and Hydraulic Research, University Of Southern California (USC_FCCCHR).

(G) Backflow prevention devices at water service connections shall be inspected and certified by a certified backflow assembly tester at the time of installation. Certification of the assembly tester shall be by one of the following:

- (I) The American Society Sanitary Engineers (ASSE),
- (II) American Backflow Prevention Association (ABPA),
- (III) A state certification program approved by the administrator.

(H) Backflow prevention devices installed at high hazard non-residential cross connections shall be inspected and tested on an annual basis by a certified backflow assembly tester.

(I) The administrator may conduct inspections of backflow prevention devices. If any device is found to be defective or functioning improperly, it must be immediately repaired or replaced. Failure to make necessary repairs to a backflow prevention device will be cause for the water service connection to be terminated.

(J) All public water suppliers shall report any high hazard backflow incident within seven (7) days to the Wyoming Department of Environmental Quality, Water Quality Division. The backflow incident shall be reported on a form provided by the administrator.

(ii) Recycling water. Neither steam condensate nor cooling water from engine jackets or other heat exchange devices shall be returned to the public water supply after it has passed through the water service connection.

TABLE 1
Backflow Prevention Devices, Assemblies and Methods

Device, Assembly or Method	Degree of Hazard				Notes
	Low Hazard		High Hazard		
	Back-Siphonage	Back-Pressure	Back-Siphonage	Back-Pressure	
Airgap	X		X		See Note 1
Atmospheric Vacuum Breaker	X		X		Not allowed under continuous pressure
Spill-proof Pressure-type Vacuum	X		X		
Double Check Valve Backflow Preventer	X	X			
Pressure Vacuum Breaker	X		X		
Reduced Pressure Principle Backflow	X	X	X	X	See Note 2
Dual Check	X				Restricted to residential services

Note 1 Minimum Airgap for Water Distribution. For spouts with an effective opening diameter of one-half inch or less, the minimum airgap when the discharge is not affected by side walls shall be one inch. The minimum airgap when the discharge is affected by sidewalls shall be one and one-half inches. For effective openings greater than one-half inch, the minimum airgap shall be two times the effective opening diameter when the discharge is not affected by side walls. The minimum airgap when the discharge is affected by sidewalls shall be three times the effective opening diameter.

Note 2 Extreme Hazards. In the case of any water user's system where, in the opinion of the water supplier or the administrator, an undue health threat is posed because of the presence of extremely toxic substances or potential back pressures in excess of the design working pressure of the device, the water supplier may require an air gap at the water service connection to protect the public water system.