Water Quality Division, Cross-Connection Control Program
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Required Levels of Backflow Protection for Potable Water Systems

The type of backflow protection required for a potable water service connection must be consistent with the degree of potential health hazard to the public water supply presented by hazards on a customer's premises. The higher the potential health hazard, the higher the required level of protection.

Containment

The types of backflow protection that may be required for **containment at connections** to the public water system, listed according to increasing level of protection, are a double-check valve assembly (DC), reduced pressure principle backflow prevention assembly (RP), and air gap separation. The minimum required levels of backflow protection by hazard criterion are set forth in the California Code of Regulations, Title 17, section 7604. As authorized by the San Francisco Health Code, Article 12A, the San Francisco Public Utilities Commission (SFPUC) has imposed stricter standards in some cases. These standards supersede those in the California Plumbing Code. The required levels of protection in San Francisco are set forth in **Table 1, attached**.

Isolation

For **isolation of a hazard within a property**, the minimum level of backflow protection must be as set forth in the California Plumbing Code, **except that an RP is required in the situations specified in Table 1.**

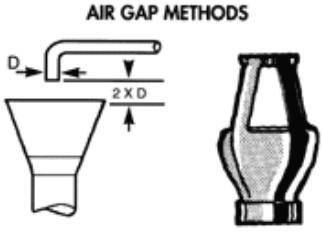
Auxiliary Water Systems

Auxiliary water systems that are interconnected in any way with the potable water supply must have a containment RP on the water service line at the point of connection to the public water system. In addition, an isolation backflow preventer must be provided where the potable water pipe connects with the auxiliary water system. If the auxiliary water system contains rainwater, an RP may be installed. For all other types of auxiliary water, an air gap is required.

Air Gap Separation

An air gap is a physical break between a supply pipe and a receiving vessel. Air gaps can be fabricated from commercially available plumbing components or purchased as separate units and integrated into plumbing and piping systems, but they must be able to be visually verified during inspection. Requirements for air gaps are set forth in the California Plumbing Code, Chapter 6, Section 603:

- The outlet of a pipe and the top of the reservoir (overflow rim) or drain must have a vertical separation of at least twice the inner diameter (ID) of the pipe upstream of the air gap or 1 inch, whichever is greater.
- If the air gap is near a wall, where "near" is defined as less than three times the ID of the pipe, the vertical separation must be at least three times the ID of the pipe or 1½ inches, whichever is greater.



- If the air gap is near a corner, where "near" is defined as less than four times the ID of the pipe away from intersecting walls, the vertical separation must be at least four times the ID of the pipe or 2 inches.

Table 1: Hazard Criteria and Required Backflow Protection for Containment
(Some requirements are more stringent than those in the California Plumbing Code)

Attention: See footnotes for important information.

Hazard Criteria	Required Level of Protection
Part I: Containment	
Sewage and Hazardous or Potentially Hazardous Substances	
Properties where there are wastewater treatment processes, handling and/or pumping equipment (see Part II of this table for isolation requirements)	AG or RP[1]
Properties where hazardous substances are handled in any manner in which the substance may enter the public water system (PWS) (see Part II of this table for isolation requirements)	AG or RP[1]
Properties with a piping system conveying a fluid not from an approved water supply that **is** interconnected with the PWS (see Part II of this table for isolation requirements)	AG or RP[1]
Piping system conveying a fluid not from an approved water supply that **is not** interconnected with the PWS	RP
Properties with a recreational vehicle dump station that is interconnected with the PWS (see Part II of this table for isolation requirements)	AG or RP[1]
Auxiliary Water Supplies (Nonpotable)	
Properties where there is an auxiliary supply that is interconnected with the PWS (see Part II of this table for isolation requirements)	AG or RP[1]
Fire Protection Systems	
Properties where the fire protection system is supplied from the PWS and interconnected with an onsite auxiliary water supply	AG
Properties where the fire protection system is supplied from the PWS with no interconnections with auxiliary water supplies	DCDA or DCDA-II
Properties where chemicals are injected into the fire system	RPDA or RPDA-II
Properties under the jurisdiction of the San Francisco Port Authority	RPDA or RPDA-II
Marina and Port Facilities Under Jurisdiction of Port Authority	
Standard, irrigation, or combination services	RP
Properties with Multiple Service Connections to the PWS	
Properties with multiple standard service connections, at least one of which requires backflow protection for containment	Varies[2]
Irrigation Systems	
Properties with dedicated irrigation meters	RP
Properties with irrigation systems into which fertilizers, herbicides, or pesticides are or can be injected	RP
Water Storage Facility Not under Control of the PWS	
Water storage facility not under control of the PWS	AG
Repeated History of Cross-Connections	
Properties where there is a repeated history of cross-connections being established or re-established	RP or AG[1,3]

Hazard Criteria	Required Level of Protection
Restricted Entry	
Properties where entry is restricted so that inspections for cross-connections cannot be made in accordance with these rules and regulations	RP
Unabated Internal Cross-Connections	
Properties where internal cross-connections are not abated in accordance with these rules and regulations	RP or AG[1]
Buildings Higher than 40 Feet	
Properties where there are buildings with a highest point equal to or greater than 40 feet in height above the point of connection	DC
Temporary Construction Meter, Non-Standard Service	
Connection to existing water service line during construction	RP
Temporary (Non-Fire) Connections to Fire Hydrants	
Connections for temporary uses, such as for construction, street sweeping, or water supply for events	RP or Single swing-check valve[1,4]
Temporary Connections to Fire Hydrants for Firefighting	
Fire trucks that are connected to potable hydrants may not also be connected to the Auxiliary Water Supply System	Spring-loaded check valve
Part II: Isolation	
Sewage and Hazardous or Potentially Hazardous Substances: at the connection of potable water piping within a facility to a system conveying a fluid that is not potable	AG
Makeup potable supply to Auxiliary Water Supplies (Nonpotable): All auxiliary water except rainwater	AG
Makeup potable supply to Auxiliary Water Supplies (Nonpotable): Rainwater	RP
Carbonators in systems with upstream copper pipe	AG or RP
Industrial water chillers	RP

Notes:

1 To be determined by Water Quality Division based upon the level of hazard.
2 The same level of protection must be provided for all standard service connections; the level of protection must address the highest degree of hazard on the property that cannot be isolated.
3 A Water User Supervisor might also be required.
4 All customer plumbing must be downstream of the meter and valve attached to a hydrant.