NAC 445A.67185 Cross-connections and backflow: General requirements. A supplier of water shall:

1. Ensure that there are no unprotected connections between the supplies of water, systems for the pumping, storage and treatment of water, and distribution system of the public water system and any source of pollution or contamination pursuant to which any unsafe water or other degrading material can be discharged or drawn into the public water system as a result of backsiphonage or backpressure.

2. Develop and carry out a program for the control of cross-connections that is approved by the health authority. Except for a program that has been approved by a health authority before February 20, 1997, a program for the control of cross-connections must:

(a) Be submitted to the health authority for its approval no later than:

(1) January 1, 1999; or

(2) Eighteen months after the public water system begins operation,

whichever is later.

(b) Include:

(1) A schedule for implementation.

(2) A plan for inspecting the properties served by the public water system to determine the potential risk of cross-connection and backflow.

(3) A plan for testing and tracking all primary assemblies for the prevention of backflow which are intended to protect the public water system upstream from a service connection. The plan must provide for the annual testing of those assemblies and for the retention of records from that testing.

(4) A list of the particular assemblies for the prevention of backflow which may be used in the public water system or on service connections to the public water system.

(5) A list of the measures the supplier of water will take to enforce the program if any customers of the system fail to comply with the program.

(c) Ensure compliance with NAC 445A.67185 to 445A.67255, inclusive.

(d) Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, comply with the provisions of:

(1) The Uniform Plumbing Code;

(2) Recommended Practice for Backflow Prevention and Cross-Connection Control; and

(3) The Manual of Cross-Connection Control.

If there is any conflict between any of the provisions described in this paragraph, the most stringent of those provisions prevails.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.6719 Cross-connections and backflow: Assemblies for prevention of backflow.

1. Each service connection must have an assembly for the prevention of backflow, of a type that is commensurate with the degree of hazard that exists on the property of the customer of a public water system. Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, the assembly may consist of any one of the following, as listed in the order of least to most protection:

(a) A double check valve assembly.

(b) A reduced pressure principle assembly.

(c) An air gap.

2. A reduced pressure principle assembly may be substituted for a double check valve assembly, and an air gap may be substituted for a reduced pressure principle assembly.

3. With the approval of the supplier of water:

(a) A double check detector check assembly may be substituted for a double check valve assembly; and

(b) A reduced pressure detector assembly may be substituted for a reduced pressure principle assembly.

4. A double check valve assembly or double check detector check assembly may be used only for protection against pollution.

5. A reduced pressure principle assembly or reduced pressure detector assembly may be used for protection against pollution or contamination, but a reduced pressure principle assembly must not be used for protection against sewage or reclaimed wastewater.

6. An assembly for the prevention of backflow must not be composed solely of a single check valve.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.67195 Cross-connections and backflow: Minimum types of protection for particular service connections. Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, or authorized by the health authority, the minimum type of protection from cross-connection required for a service connection to:

1. A public building or any building:

(a) That contains a hotel, motel, casino, condominium or town house, or any apartments;

(b) Used for commercial purposes where a specific business activity has not been identified; or

(c) In which one or more sewage pumps or sewage ejectors have been installed,

consists of a reduced pressure principle assembly.

2. A building that:

(a) Has multiple stories and booster pumps or elevated tanks to distribute potable water; or

(b) Exceeds 40 feet in height, as measured from the service connection to the highest water outlet,

consists of a double check valve assembly.

3. A class 1, class 2 or class 3 fire sprinkler system consists of a double check valve assembly.

4. A class 4, class 5 or class 6 fire sprinkler system consists of a reduced pressure principle assembly.

5. A hydronic heating system that contains any chemical additives consists of a reduced pressure principle assembly.

6. A baptismal font of a church consists of a reduced pressure principle assembly.

7. A facility for bottling beverages consists of a reduced pressure principle assembly.

8. A brewery consists of a reduced pressure principle assembly.

9. A cannery, facility for the processing of food, packing house or rendering facility consists of a reduced pressure principle assembly.

10. A facility for cold storage consists of a reduced pressure principle assembly.

11. A dairy processing facility consists of a reduced pressure principle assembly.

12. A restaurant or other facility in which food is served consists of a reduced pressure principle assembly.

13. A dental clinic consists of a reduced pressure principle assembly.

14. A hospital, medical building or clinic consists of a reduced pressure principle assembly.

15. A convalescent home or nursing home consists of a reduced pressure principle assembly.

16. A sanitarium consists of a reduced pressure principle assembly.

17. A morgue, mortuary or facility for conducting autopsies consists of a reduced pressure principle assembly.

18. A laboratory, including, without limitation, a laboratory of a teaching institution or another biological or analytical facility, consists of a reduced pressure principle assembly.

19. A facility of a school, college or university consists of a reduced pressure principle assembly.

20. A facility for the production of motion pictures consists of a reduced pressure principle assembly.

21. A facility for the publishing or printing of a newspaper consists of a reduced pressure principle assembly.

22. A veterinary clinic, pet shop or facility for grooming pets consists of a reduced pressure principle assembly.

23. A laundry or dry cleaning facility consists of a reduced pressure principle assembly.

24. A dyeing facility consists of a reduced pressure principle assembly.

25. A facility for mechanical, chemical or electrochemical plating consists of a reduced pressure principle assembly.

26. Any portable spraying or cleaning equipment consists of an air gap.

27. A pool or spa consists of a reduced pressure principle assembly.

28. A park for mobile homes or recreational vehicles consists of a reduced pressure principle assembly.

29. A facility located on a waterfront, including, without limitation, a fishery, fish hatchery, dock or marina, consists of a reduced pressure principle assembly.

30. A facility for the production of power consists of a reduced pressure principle assembly.

31. A facility for the production, storage or transmission of oil or gas consists of a reduced pressure principle assembly.

32. A facility that handles, processes or stores radioactive materials or substances consists of a reduced pressure principle assembly.

33. A facility for processing sand or gravel consists of a reduced pressure principle assembly.

34. A system for storm drainage, the collection of sewage or the distribution of reclaimed wastewater consists of an air gap.

35. A facility in which:

(a) Water is used to manufacture, store, compound or process chemicals for industrial purposes;

(b) Chemicals are added to water used in the compounding or processing of products;

(c) Chemicals are added to the supply of water; or

(d) The supply of water is used for the transmission or distribution of chemicals,

consists of a reduced pressure principle assembly.

36. A facility for the manufacture of aircraft or missiles consists of a reduced pressure principle assembly.

37. A facility for the manufacture, repair or washing of motor vehicles consists of a reduced pressure principle assembly.

38. A facility for the manufacturing or processing of film consists of a reduced pressure principle assembly.

39. A facility for the manufacturing of ice consists of a reduced pressure principle assembly.

40. A facility for the manufacturing, processing or cleaning of metal consists of a reduced pressure principle assembly.

41. A facility for the manufacturing of natural or synthetic rubber consists of a reduced pressure principle assembly.

42. A facility for the manufacturing of paper or paper products consists of a reduced pressure principle assembly.

43. Any other facility for manufacturing, processing or fabricating consists of a reduced pressure principle assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.67205 Cross-connections and backflow: Minimum types of protection for service connection to auxiliary supply of water or irrigation system. Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, the minimum type of protection required for a service connection to:

1. An auxiliary supply of water must consist of a double check valve assembly or reduced pressure principle assembly, as determined by the supplier of water and approved by the health authority.

2. An irrigation system, including a system for irrigating median strips, must consist of:

(a) A pressure vacuum breaker or double check valve assembly, as determined by the supplier of water and approved by the health authority; or

(b) Except as otherwise authorized by the health authority, if facilities have been installed for pumping, injecting or applying fertilizers, pesticides or other hazardous systems, a reduced pressure principle assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.6721 Cross-connections and backflow: Minimum types of protection for other service connections; resolution of conflicting requirements; imposition of more stringent requirements.

1. The health authority shall determine, on a case-by-case basis, the minimum type of protection from cross-connection required for any type of service connection which is not specified in NAC 445A.67185 to 445A.67255, inclusive.

2. If there is any conflict between any of the provisions of NAC 445A.67185 to 445A.67255, inclusive, regarding the type of protection from cross-connection required for a particular type of service connection, the most stringent of those provisions prevails.

3. The health authority or supplier of water may impose requirements regarding the installation and use of assemblies for the prevention of backflow which are more stringent than the provisions ofNAC 445A.67185 to 445A.67255, inclusive.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.67215 Cross-connections and backflow: Service connection to fire sprinkler system.

1. A supplier of water shall ensure that:

(a) An appropriate assembly for the prevention of backflow is installed at each service connection between the public water system and a fire sprinkler system; and

(b) The assembly is:

(1) Tested upon installation; and

(2) Maintained and tested, and the results of those tests logged, annually.

The testing required by this subsection must be conducted by a certified backflow prevention assembly tester.

2. An assembly for the prevention of backflow installed on a service connection between a public water system and a fire sprinkler system must:

(a) Be of such a type and installed in such a manner that the assembly:

(1) Protects the public water system; and

(2) Does not interfere with the capability of the fire sprinkler system, as engineered, to protect the safety of persons in the public or private facility in which the fire sprinkler system is located; and

(b) Prevent any pollution or contamination of drinking water, by any nonpotable water contained in the fire sprinkler system, which may be caused by any backpressure or backsiphonage that may occur during normal or abnormal operation of the fire sprinkler system or the public water system.

3. The supplier of water shall determine the type of assembly required on a particular service connection between the public water system and a fire sprinkler system based upon the degree of risk posed by the fire sprinkler system to the supply of potable water, considering the chemical and biological contents of the fire sprinkler system, the materials used to construct the fire sprinkler system and the possibility that backflow will occur.

4. Any reduced pressure principle assembly or reduced pressure detector assembly used on a service connection between a public water system and a fire sprinkler system must not have any holes drilled in the check valve clappers.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.6722 Cross-connections and backflow: Design of fire sprinkler system. The designer of a fire sprinkler system shall ensure that, based upon the placement of any reduced pressure principle assembly or reduced pressure detector assembly:

1. An antifreeze loop or the total line of the fire sprinkler system is able to accommodate the thermal expansion of any antifreeze; or

2. If necessary, an expansion tank is provided to accommodate the thermal expansion of any antifreeze.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.67225 Cross-connections and backflow: Conditions to provision of service to certain fire sprinkler systems. If any backflow involving a fire sprinkler system threatens a public water system, the supplier of water shall require, as a condition to the provision of service to the fire sprinkler system:

1. The installation of an assembly for the prevention of backflow in accordance with the requirements of NAC 445A.67215.

2. An analysis to determine how the assembly will affect the pressure and rate of flow of water available to the fire sprinkler system.

3. The modification of the fire sprinkler system, and the riser and water service lateral for the fire sprinkler system, in such a manner as necessary to ensure adequate fire flow.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.6723 Cross-connections and backflow: Installation of air gap. Except as otherwise authorized by the health authority, if an air gap is installed on a service connection:

1. The air gap must be located as closely as practicable to the service connection, on the opposite side of the service connection from the public water system.

2. All piping from the service connection to the receiving tank must be above grade and visible.

3. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the air gap.

4. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.67235 Cross-connections and backflow: Installation of reduced pressure principle assembly. Except as otherwise authorized by the health authority, if a reduced pressure principle assembly is installed on a service connection:

1. The reduced pressure principle assembly must be installed:

(a) In a horizontal and level position, except that the reduced pressure principle assembly may be installed in a vertical position if the assembly has been:

(1) Specifically designed for operation in that position; and

(2) Tested and certified to be suitable for operation in that position by an approved backflow testing laboratory.

(b) As closely as practicable to the service connection, on the opposite side of the service connection from the public water system.

(c) Above ground and, to the extent possible, not less than 12 inches nor more than 36 inches above the finished grade, as measured from the bottom of the assembly.

(d) At a site with adequate drainage, or with drain piping, for any fluid that is discharged when the assembly is activated.

(e) In such a manner that no part of the assembly will be submerged during normal conditions of operation and weather.

(f) In such a manner as to be readily accessible for maintenance and testing.

2. The reduced pressure principle assembly must not be installed below grade, in any subsurface vault, or in any vault, chamber or pit where there is any potential that the relief valve could become submerged.

3. The reduced pressure principle assembly must have a free-flowing drain with an air gap.

4. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the reduced pressure principle assembly.

5. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.

6. The reduced pressure principle assembly may be installed indoors if the installation complies with subsections 1 to 5, inclusive, and has a clearance of:

(a) At least 12 inches on top;

(b) At least 24 inches on the side with test cocks; and

(c) At least 12 inches on the other sides.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.6724 Cross-connections and backflow: Installation of double check valve assembly. Except as otherwise authorized by the health authority, if a double check valve assembly is installed on a service connection:

1. The double check valve assembly must be installed:

(a) In a horizontal and level position, except that the double check valve assembly may be installed in a vertical position if the assembly has been:

(1) Specifically designed for operation in that position; and

(2) Tested and certified to be suitable for operation in that position by an approved backflow testing laboratory.

(b) As closely as practicable to the service connection, on the opposite side of the service connection from the public water system.

(c) Above ground and, to the extent possible, not less than 12 inches nor more than 36 inches above the finished grade, as measured from the bottom of the assembly.

(d) In such a manner as to be readily accessible for maintenance and testing.

2. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the double check valve assembly.

3. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.

4. The double check valve assembly may, if above-grade installation is impracticable and the health authority approves of the installation, be installed in a below-grade vault in such a manner that:

(a) The top of the double check valve assembly is not more than 8 inches below grade.

(b) There is:

(1) At least 12 inches of clearance between the bottom of the vault and the bottom of the double check valve assembly;

(2) At least 24 inches of clearance between the side of the vault and the side of the double check valve assembly with test cocks; and

(3) At least 12 inches of clearance between the side of the vault and the other sides of the double check valve assembly.

(c) To the extent warranted by climatic conditions, the double check valve assembly is protected from freezing.

(d) The vault has adequate drainage to prevent the accumulation of water, which drains to daylight, to free-draining soil or to a sufficient amount of gravel placed under the vault to provide for free drainage and prevent the accumulation of water under the

vault. A vault that does not have an integrated bottom must be placed on a layer of gravel which is not less than 3 inches deep.

(e) The vault is protected from vandalism.

(f) The vault is not located in an area subject to vehicular traffic.

5. The double check valve assembly may be installed indoors if:

(a) The installation complies with subsections 1 to 4, inclusive; and

(b) The double check valve assembly has a clearance of:

(1) At least 12 inches on top;

(2) At least 24 inches on the side with test cocks; and

(3) At least 12 inches on the other sides.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.67245 Cross-connections and backflow: Duties of certified backflow prevention assembly tester. A certified backflow prevention assembly tester shall:

1. Perform his field testing of assemblies for the prevention of backflow in accordance with the provisions of the Manual of Cross-Connection Control.

2. Use, for the testing of reduced pressure principle assemblies, double check valve assemblies and pressure vacuum breakers, a differential pressure gauge that has:

(a) A differential range of at least zero to 15 psi; and

(b) Graduations of not more than 0.2 psi.

3. Ensure that his testing equipment:

(a) Is calibrated to the manufactures' specifications not less than annually; and

(b) Has all necessary hoses and fittings.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.6725 Cross-connections and backflow: Use of vacuum breakers.

1. An atmospheric vacuum breaker or pressure vacuum breaker may be used only for protection against pollution or contamination under conditions of backsiphonage.

2. If an atmospheric vacuum breaker is used:

(a) The vacuum breaker must be installed not less than 6 vertical inches above the highest point of the downstream piping.

(b) Any associated shutoff valve must be installed upstream from the vacuum breaker.

(c) The vacuum breaker must not be subjected to operating pressure for more than 12 hours in any 24-hour period.

(d) Flow from the protected fixture must be to the atmosphere.

3. If a pressure vacuum breaker is used, the vacuum breaker:

(a) Must be installed:

(1) Upstream from the terminal shutoff valve; and

(2) Not less than 12 vertical inches above the highest point of the downstream outlet, valve or piping.

(b) Must not be installed at a location where backpressure will occur.

(Added to NAC by Bd. of Health, eff. 2-20-97)

NAC 445A.67255 Cross-connections and backflow: Restrictions on use of certain valves and piping assemblies.

1. A stop and waste valve must not be used on a service line.

2. If a valve or piping assembly, including a frost-free riser, has an opening that is subject to flooding, the valve or piping assembly must not be used on a service line unless:

(a) The valve or piping assembly is adequately protected by an assembly for the prevention of backflow; and

(b) If the piping assembly is a frost-free riser, the riser is equipped with appropriate valves and a connection for the introduction of compressed air, pursuant to which water may be purged and the system prepared for winter.

(Added to NAC by Bd. of Health, eff. 2-20-97)