SPS 382.41 Cross connection control. (1) SCOPE. The provisions of this section set forth the requirements for the protection of water within water supply systems when and where there is the possibility of contamination due to cross connections or backflow conditions.

Note: The Department of Natural Resources governs the operation and design of community water systems and under s. NR 810.15 (1) requires the supplier of water to develop and implement a comprehensive cross connection control program.

(2) MATERIALS. (a) All methods, devices, and assemblies intended to protect water supply systems from cross connections shall be of a type recognized and approved in accordance with ch. SPS 384 and as described in sub. (4).

(b) All methods including barometric loops and air gaps intended to protect water supplies relative to cross connection or backflow shall be constructed of materials suitable for water supply systems in accordance with ch. SPS 384.

(3) GENERAL REQUIREMENTS. Water supply systems and the connection of each plumbing fixture, piece of equipment, appliance or nonpotable water piping system shall be designed, installed and maintained in such a manner to prevent the contamination of water supplies by means of cross connections.

(a) *Types of cross connection control.* 1. Water supply systems shall be protected against contamination due to cross connections or backflow conditions by one of the methods or devices specified in Table 382.41–1 depending upon the situation or Table 382.41–2 depending upon the specific application or use, and the limitations specified in sub. (4).

2. For the situations described in par. (b) 3., cross connection control shall be provided as part of the fixture fitting outlet or in the water supply piping for the fixture fitting outlet.

(b) *Classifications.* For the purposes of this section:

1. The designation of a high hazard or low hazard situation shall be determined on the basis of how a toxic or nontoxic solution is intended or recommended by the manufacturer of the solution to interface with the potable water supply system.

2. a. A continuous pressure situation shall be considered to exist when a pressure greater than atmospheric within the water supply system exists for more than 12 continuous hours.

b. A noncontinuous pressure situation shall be considered to exist if the conditions in subd. 2. a. do not occur.

3. A high hazard cross connection situation shall be considered to exist for a connection of the water supply system to:

a. Any part of the drain system; and

b. Any other piping system conveying water from nonpotable sources, including but not limited to lakes, rivers, streams or creeks.

4. Except as provided in subd. 5., a high hazard cross connection situation shall be considered to exist at:

a. A water supply hose bibb, faucet, wall hydrant, sill cock or other outlet which terminates with hose threads allowing a hose to be attached;

b. A water supply faucet, wall hydrant or other outlet which terminates with a serrated nipple allowing a hose to be attached;

c. A water supply faucet, hydrant or outlet serving a sink used for building maintenance in a public building;

d. A chemical pot–feeder or automatic chemical feeder is installed to serve a boiler, cooling tower or chilled water system; and

e. In the water supply piping connecting to the outlet of a fire hydrant for any purpose other than fire fighting.

5. A cross connection may not be considered to exist at the hose threaded outlet installed for the sole purpose of any of the following:

a. Draining a water supply system or any portion thereof.

bm. Connecting individual portable dialysis machines when enclosed in a lockable box.

c. Connecting individual residential–type automatic clothes washers or dryers.

6. a. A high hazard situation shall be considered to exist for the connection of 2 water supply systems one supplied by a public water supply and the other system supplied by a private well.

Note: The interconnection of a public water supply system and another source of water is addressed in ss. NR 811.06 and 811.07 and must be approved by the Department of Natural Resources.

b. Cross connection control devices used in conjunction with automatic fire sprinkler systems shall be listed by an acceptable testing agency for such an application under the standards governing the design and installation of automatic fire sprinkler systems.

7. A cross connection situation shall not be considered to exist when a multipurpose piping system serves a one– or 2– family dwelling provided the sprinkler system is constructed of materials and joints suitable for water distribution systems as specified in ss. SPS 384.30 (4) (e) and 384.40, respectively.

(c) *Containment.* 1. For sewerage treatment facilities which are required to conform with ch. NR 110, in addition to the cross connection control required for each potable water usage or water outlet, a reduced pressure principle backflow preventer shall be installed:

a. In the water service to each building or structure within the complex;

b. In the private water main upstream of all water services serving the facility; or

c. In the water distribution system upstream of all water outlets and in the process piping network upstream of all points of use, if both a water distribution system and a process network is contained within the same building or structure.

2. For marinas, wharves and docks where potable water outlets are provided to serve boats or ships, in addition to the cross connection control required for each potable water outlet or usage, a reduced pressure principle backflow preventer shall be installed in the water supply system to limit backflow into the water supply source.

3. The installation of a cross connection control device in the water supply system for a building or structure shall not alleviate the requirement to provide cross connection control for the connection of each plumbing fixture, piece of equipment, appliance or other piping system.

(d) *Prohibitions.* 1. The use of a toxic solution as a heat transfer fluid in single–wall heat exchanger for potable water is prohibited.

2. A cross connection control method, device, or assembly may not be bypassed without a cross connection control method, device, or assembly of at least equal protection.

(e) *Existing automatic fire sprinkler systems.* An alteration, modification or addition to an existing automatic fire sprinkler shall necessitate conformance with this section, if the:

1. Existing water supply line to the existing sprinkler system is increased in diameter; or

2. Existing device or method which had been previously recognized to address cross connection concerns is to be removed or replaced.

Table 382.41–1

Methods or Assemblies of Cross Connection Control (Standard)	Situations and Conditions							
	Backpressure				Back Siphonage			
	Low Hazard		**High Hazard**		**Low Hazard**		**High Hazard**	
	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure
Air Gaps in Plumbing Systems (For Plumbing Fixtures and Water–Connected Receptors) (ASME A112.1.2)/Air Gap Fittings for Use with Plumbing Fixtures, Appliances, and Appurtenances (ASME A112.1.3)	X	X	X	X	X	X	X	X
Atmospheric Type Vacuum Breakers (ASSE 1001)/CSA B64.1.1						X		X
Anti–Siphon Fill Valves for Water Closet Tanks (ASSE 1002/ASME A112.1002/CSA B125.12)					X		X	
Hose Connection Vacuum Breakers (ASSE 1011)/Hose Connection Backflow Preventers (ASSE 1052)/CSA B64.2 & B64.2.2	X◊	X	X◊	X	X◊	X	X◊	X
Backflow Preventers with Intermediate Atmospheric Vent (ASSE 1012)/Dual Check Valve Backflow Preventers with Atmospheric Port (CSA B64.3)	X	X			X	X		

Table 382.41–1 (Continued)

Methods or Assemblies of Cross Connection Control (Standard)	Situations and Conditions							
	Backpressure				Back Siphonage			
	Low Hazard		**High Hazard**		**Low Hazard**		**High Hazard**	
	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure
Reduced Pressure Principle Backflow Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers (ASSE 1013)/Reduced Pressure Principle (RP) Backflow Preventers (CSA B64.4)	X	X	X	X	X	X	X	X
Backflow Prevention Devices for Hand–Held Showers (ASSE 1014)		X		X		X		X
Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies (ASSE 1015)					X	X		
Trap Seal Primer Valves–Potable Water Supplied (ASSE 1018)					X		X	
Wall Hydrant with Backflow Protection and Freeze Resistance (ASSE 1019)		X		X		X		X
Pressure Vacuum Breaker Assemblies (ASSE 1020)/Pressure Vacuum Breakers (CSA B64.1.2)					X	X	X	X
Backflow Preventer for Beverage Dispensing Equipment (ASSE 1022)					X	X	X	X
Dual Check Backflow Preventers (ASSE 1024)					X	X		

Table 382.41–1 (Continued)

Methods or Assemblies of Cross Connection Control (Standard)	Situations and Conditions							
	Backpressure				Back Siphonage			
	Low Hazard		**High Hazard**		**Low Hazard**		**High Hazard**	
	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure
Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post–Mix Type (ASSE 1032)					X	X	X	X
Laboratory Faucet Backflow Preventers (ASSE 1035)		X		X		X		X
Pressurized Flushing Devices for Plumbing Fixtures (ASSE 1037/ASME A112.1037/CSA B125.37)					X		X	
Reduced Pressure Detector Fire Protection Backflow Prevention Assemblies (ASSE 1047)					X			
Double Check Detector Fire Protection Backflow Prevention Assemblies (ASSE 1048)					X			
Dual Check Backflow Preventer Wall Hydrants–Freeze Resistant Type (ASSE 1053)		X		X		X		X
Chemical Dispensers with Integral Backflow Protection (ANSI/CAN/ASSE/IAPMO 1055)						X		X
Spill Resistant Vacuum Breakers (ASSE 1056)/Spill–Resistant Pressure Vacuum Breakers (CSA B64.1.3)					X	X	X	X
Freeze Resistant Sanitary Yard Hydrants with Backflow Protection (ASSE 1057)		X		X		X		X

Table 382.41–1 (Continued)

Methods or Assemblies of Cross Connection Control (Standard)	Situations and Conditions							
	Backpressure				Back Siphonage			
	Low Hazard		**High Hazard**		**Low Hazard**		**High Hazard**	
	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure	Continuous Pressure	Non–continuous Pressure
Backflow Preventers with Integral Pressure Reducing Boiler Feed Valve and Intermediate Atmospheric Vent Style for Domestic and Light Commercial Water Distribution Systems (ASSE 1081)1	X	X			X	X		
Barometric Loop [s. SPS 382.41(5)(i)]					X	X	X	X
Vacuum Breaker Tee [s. SPS 382.41(5)(j)]					X	X	X	X

◊ = The use a of a hose connection backflow preventer, dual check backflow preventer wall hydrant–freeze resistant or a hose connection vacuum breaker in a continuous pressure situation shall be limited to campgrounds and marinas.

1 = closed loop boiler feed only, standard does not require NSF/ANSI 372 or NSF/ANSI/CAN–61 conformance.

(4) LIMITATIONS. (a) Cross connection control devices shall be limited in use in accordance with the respective standard, unless otherwise specifically permitted under this subsection.

(b) 1. Except as provided in pars. (b) 2. and (o), an atmospheric–type vacuum breaker shall be installed such that the bottom of the device or the critical level mark on the device is at least 6 inches above all of the following:

a. The flood level rim of the receptor serving the water supply port.

b. The highest point downstream from the device where backpressure would be created.

c. The highest point of an injection or aspiration port.

2. A deck–mounted atmospheric type vacuum breaker shall be installed such that the bottom of the device or the critical level mark on the device is at least 1 inch above all of the following:

a. The flood level rim of the receptor serving the water supply port.

b. The highest point downstream from the device where backpressure would be created.

c. The highest point of an injection or aspiration port.

(c) 1. a. The use a of a hose connection backflow preventer, dual check backflow preventer wall hydrant–freeze resistant or a hose connection vacuum breaker in a continuous pressure situation shall be limited to campgrounds and marinas.

b. The use of a hose connection backflow preventer and a hose connection vacuum breaker shall be limited to the discharge side of a control valve such as a faucet or hose bibb.

2. A hose connection backflow preventer and a hose connection vacuum breaker may not be employed in backpressure situations of more than 10 feet of water column.

(d) A backflow preventer with intermediate atmospheric vent:

1. May not be employed in backpressure situations of more than 150 psig; and

2. May not serve boilers having a maximum steam pressure setting greater than 15 psig or a maximum water pressure setting greater than 30 psig.

(e) 1. A reduced pressure principle backflow preventer and a reduced pressure detector backflow preventer may not be subjected to a backpressure greater than twice the rated working pressure of the device.

2. A reduced pressure principle backflow preventer and a reduced pressure detector backflow preventer which serve a water–based fire protection system may have a test outlet located between the number 2 check valve and the number 2 listed indicating control valve.

3. A reduced pressure principle backflow preventer and a reduced pressure detector backflow preventer which are 2" or smaller in size and which serve a water–based fire protection system are not required to have a test cock on the number one listed indicating control valve.

(f) A hand–held shower may not be employed in backpressure situations of more than 5 feet of water column.

(g) 1. A double check backflow prevention assembly and a double check detector assembly backflow preventer may not be subjected to a backpressure greater than twice the rated working pressure of the device.

3. A double check backflow prevention assembly and a double check detector assembly backflow preventer which are 2" or smaller in size and which serve a water–based fire protection system are not required to have a test cock on the number one listed indicating control valve.

(h) A water supply fed trap seal primer valve shall be installed such that the bottom of the device or the critical level as marked on the device is at least 12" above:

1. The connection to the trap; and

2. The highest point downstream from the device where backpressure would be created.

6. The vent port of the tee is:

a. Positioned away from areas where toxic gases and fumes may accumulate; and

b. Constructed to protect the port from falling debris.

(k) A chemical dispensing system shall be connected to the water distribution system in either of the following manners:

1. The fixture supply shall be individually connected to the water distribution system.

2. The fixture supply shall be installed with a pressure bleeding device. The pressure bleeding device shall create a visually free flow of water through the atmosphere from the faucet connection into the fixture drain.

History: 1–2–56; r. (2) through (7), Register, October, 1971, No. 190, eff. 11–1–71; r. and recr. Register, November, 1972, No. 203, eff. 12–1–72; renum. from H 62.14, Register, July, 1983, No. 331, eff. 8–1–83; renum. from ILHR 82.14 and am. (1) (h) 17., r. (2), Register, February, 1985, No. 350, eff. 3–1–85; r. and recr. Register, February, 1994, No. 458, eff. 3–1–94; am. (2) (a), Tables 82.41–1, 2, (4) (c), (e) to (i), (k) to (m), (5) (e) 3. a., (i), cr. (4) (n), r. and recr. (5) (b), (f), r. (5) (h), Register, February, 1997, No. 494, eff. 3–1–97; correction in (4) (n) made under s. 13.93 (2m) (b) 1., Stats., Register, February, 2000, No. 530; am. (3) (a) 2., (4) (k) 1. and (5) (a), r. and recr. (4) (b) and (n), and Tables 82.41–1 and 82.41–2, cr. (4) (k) 1. c. and (5) (L), Register, December, 2000, No. 540, eff. 1–1–01; CR 02–002: am. (3) (intro.), (5) (a), Tables 82.41–1 and 2, renum. (5) (i) to (L) to be (5) (h) to (k) Register April 2003 No. 568, eff. 5–1–03; CR 04–035: cr. (3) (b) 4. d., am. Tables 82.41–1 and –2, 82.41 (2), (3) (a) 1. and (b) 7. Register November 2004 No. 587, eff. 12–1–04; CR 08–055: cr. (3) (b) 4. e., am. (4) (c) 1. a., (f), (i), (n), (5) (a), (e) 2., (f) (intro.), Tables 82.41–1 and 82.41–2 Register February 2009 No. 638, eff. 3–1–09; corrections in (6) made under s. 13.92 (4) (b) 1. and 7., Stats., Register February 2009 No. 638; CR 09–050: r. (6) Register December 2009 No. 648, eff. 1–1–10; CR 10–064: am. (1), (5) (e) 2., Table 82.41–2 Register December 2010 No. 660, eff. 1–1–11; correction in (2) (a), (b), (3) (a) 1., (b) 7., (4) (m), (5) (e) 2., (j) 4., Table 382.41–1, Table 382.41–2 made under s. 13.92 (4) (b) 7., Stats., Register December 2011 No. 672; **CR 23–006: am. (2) (a), (3) (b) 4. e., 5. (intro.), a., r. (3) (b) 5. b., cr. (3) (b) 5. bm., am. (3) (b) 5. c., r. and recr. (3) (b) 6. b., renum. (3) (d) to (3) (d) 1. and am., cr. (3) (d) 2., r. and recr. Table 382.41–1, r. Table 382.41–2, am. (4) (b) 1. (intro.), 2. (intro.), r. (4) (g) 2., (k) 2., cr. (4) (o), am. (5) (d) 1., cr. (5) (d) 1m., am. (5) (e) 3. a., (f) (intro.), (h) Register September 2023 No. 813, eff. 10–1–23; renum. (4) (k) 1. to (4) (k) under s. 13.92 (4) (b) 1., Stats., Register September 2023 No. 813; correction in (4) (b) 1. made under s. 35.17, Stats., Register September 2023 No. 813.**

Subchapter V — Special Plumbing Installations

SPS 382.50 Health care and related facilities.

(1) GENERAL. The provisions of this section shall set forth the requirements for the design, installation and maintenance of devices, fixtures and equipment which are installed in health care and related facilities.

(2) FIXTURES AND EQUIPMENT. (a) *Special fixtures and equipment.* 1. 'Requirements for ice manufacture and storage.' Machines for manufacturing ice or any device for handling or storage of ice shall be located in an area not subject to contamination.

2. 'Sterilizers and washer sanitizers.' a. Sterilizers and washer sanitizers shall discharge by means of indirect waste.

b. The indirect waste piping shall discharge by means of air–gap.

3. 'Aspirators.' Aspirators which require the use of water shall be provided with approved cross connection control.

(b) *Spouts and actions.* Except in psychiatric–care facilities in areas where patient safety is at risk with standard gooseneck spouts and actions, the selection of spouts and actions on plumbing fixtures shall comply with this section and Table 382.50–1.

1. 'Spouts'. a. Lavatories and sinks accessible to patients shall have a fixed water supply spout mounted so that its discharge point is a minimum distance of 5 inches above the flood level rim of the fixture.

b. Spouts shall have laminar flow in facilities listed in par. (3) (b).

2. 'Actions.' All fixtures used by medical and nursing staff, patients, residents, and food handlers shall be equipped with valves that can be operated without the use of hands and shall comply with all of the following:

a. Where wrist blade handles are used for this purpose, the handles may not exceed 4 1/2 inches in length, except handles on scrub sinks and clinical sinks shall be no less than 6 inches long.

b. Single lever faucet handles may be used in lieu of wrist blades.

c. In lavatories with self–closing faucets accessible to patients, the flow of the hot water shall be calculated to evacuate the water distribution piping from the faucet to the recirculated hot water supply.

(c) *Floor drain prohibition.* 1. Except as provided in subd. 2., floor drains may not be installed in operating or delivery rooms.

2. Floor drains may be installed in cystoscopic rooms. The drain shall contain a non–splash, horizontal–flow flushing bowl beneath the drain plate.

(3) WATER SUPPLY SYSTEMS. (a) *Hospital water supply systems.* Water supply systems serving hospitals shall comply with all of the following:

1. All hospitals shall be provided with at least 2 water services. Whenever more than one water main is available, the connections shall be made to different water mains.

2. Each water service connection shall adequately serve the total building water supply demand as specified in s. SPS 382.40 (7), except for additional services supplying water to additions deemed non–essential as defined in a hospital water management plan.

Note: The installation of two water services or a private water main may require the installation of a check valve. Refer to ch. NR 811 for more information.

(ag) *Health care facilities.* Hot and cold water shall be provided to all sinks accessible to patients and comply with all of the following:

1. Hot water shall be initiated and stored at a minimum of 140°F.

2. The maximum temperature to fixture fitting outlets accessible to patients may not exceed 115°F.

(b) *Hospital, community–based residential facility, inpatient hospice and nursing home water supply systems.* 1. Water supply systems serving a hospital, community–based residential facility, inpatient hospice or nursing home shall comply with all of the following:

a. Except as provided in subd. 1. b., a single control valve may serve an area where 4 or fewer patient care units exist and where each unit contains not more than 2 persons.

b. A water supply serving an intensive care patient care unit shall be individually valved.

2. All water distribution piping shall be insulated in accordance with chs. SPS 361 to 366.

3. Cold water shall be supplied to lavatories or sinks located in patient rooms.

4. A hot water distribution system shall be under constant recirculation to provide continuous hot water at each hot water outlet, except that when using thermal disinfection, under subd. 6. a. uncirculated hot water distribution piping may not exceed 3 feet in developed length.

4m. Control valves shall automatically regulate the temperature of the water supply of the distribution system that exceeds 140°F to each fixture accessible to patients.

5. Water provided to patient showers, therapeutic equipment and all types of baths shall be installed with pressure balanced and thermostatically controlled control valves which automatically regulate the temperature of the water supply to the fixture fitting outlet within a temperature range of 110°F to 115°F. Such control valves shall automatically reduce flow to 0.5 gpm or less when the water supply to the fitting outlet exceeds 115°F or when loss of cold water pressure occurs.

Note: See ch. SPS 382 Appendix A–382.50 (3) (b) 5. for sketches showing various design options.

6. Hot water distribution systems may not include a heat recovery system, and shall be installed and maintained to provide disinfection by one of the following methods:

a. Water stored and circulation initiated at a minimum of 140°F and with a return of a minimum of 124°F.