



Board of Building Standards

CODE COMMITTEE MEETING AGENDA

DATE: AUGUST 10, 2023
TIME: 1:00 PM
LOCATION: TRAINING ROOM 3, 6606 TUSSING ROAD, REYNOLDSBURG, OHIO, 43068
[Click here to join the meeting](#)

Call to Order

Approval of Minutes

[MIN-1](#) June 13, 2023 Code Committee Meeting Minutes

Petitions

[P-1](#) Petition #23-06 - OPC Section 608.16.1 - beverage dispenser backflow prevention devices - Jim Chandler of Vista Water Group, LLC

Recommendations of the Residential Construction Advisory Committee

[R-1](#) Petition #23-04 - RCO 311.7.1 Two handrails - Robert Kramer

Old Business

OB-1 Industrialized Unit Rule Status

New Business

[NB-1](#) Elevator rules - 5 year rule review

[NB-2](#) Boiler and Pressure Vessel Rules - 5 year rule review

Adjourn

File Attachments for Item:

MIN-1 June 13, 2023 Code Committee Meeting Minutes

OHIO BOARD OF BUILDING STANDARDS
CODE COMMITTEE MINUTES
June 13, 2023

The Code Committee met on June 13, 2023 with the following members present: Ms. Cromwell, Mr. Denk, Mr. Johnson, Mr. Miller, Mr. Pavlis, Mr. Stanbery, and Mr. Tyler. Board Chairman, Tim Galvin, was also present.

The following staff members were present: Regina Hanshaw, Debbie Ohler, Jay Richards, and Laura Borso

Guests present: Corbin Johnson

Guests present via Teams: Duane Matlack, Kerry Sutton and Steve Szoke of ACI, Jay Pease of Owens Corning, and Carol Shield, Chair of the ACI 440.11 standard committee.

CALL TO ORDER

The meeting was called to order by Mr. Denk at 10:06 A.M.

APPROVAL OF MINUTES

Mr. Miller made the motion to approve the minutes of the Code Committee meeting held on May 11, 2023. Mr. Stanbery seconded the motion. The motion passed unanimously.

PETITIONS

Withdrawal of Petition #23-02 - OBC Section 429 Privacy Pods/Booths - Charles Moore of Framery Acoustics

Ms. Ohler explained that she contacted the petitioner and the petitioner agreed to withdraw the petition. Staff and the petitioner will work together in the coming months to craft language to present to the committee that addresses privacy pods and similar products. No further action was taken.

Reconsideration of Petition #23-03 - OBC Ch 19 & 35 - Add ACI 440.11 to address Glass Fiber Reinforced Polymer (GFRP) - Kerry Sutton of ACI

After the committee members discussed the pros and cons of adopting the OBC Chapters 19 and 35 rules as originally filed in the proposed 2024 OBC rule package, Ms. Cromwell made a motion to revise the OBC Chapters 19 and 35 rules to remove the language addressing GFRP and to remove the references to the ACI 440.11 and ASTM D7957 standards with the understanding that she will use the added time to contact other engineers to learn more about their experience using the product. She did not want Ohio to rush into adopting language until ongoing research on the product has been completed. Mr. Miller seconded the motion. The motion passed, with Mr. Stanbery voting no. The petitioner was encouraged to bring the petition back to the committee in early 2024.

RECOMMENDATIONS OF THE RESIDENTIAL CONSTRUCTION ADVISORY COMMITTEE

No items for consideration.

Ohio Board of Building Standards
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OLD BUSINESS

No items for consideration.

NEW BUSINESS

Proposed 2024 OBC – Comments received after original filing

Staff presented comments that were received since the 2024 rule packages were originally filed on May 19th. The committee reviewed and discussed the comments submitted by Kurt Beres (OBC 1008.2.3, exit discharge illumination), Diana Anderson (OBC 102.10, fence exemption), and Dave Collins (OBC 506.2.1, missing “SM” in equation 5-1 “A_i” variable), and decided to make no modifications to the rules as a result of the comments received.

Industrialized Unit rule package review

Mr. Richards presented the outline and the proposed IU rules to the committee and explained the need for the separation of the rules from the current OBC Section 113. The next step is to post the rules and solicit stakeholder comments.

ADJOURN

Mr. Miller made the motion to adjourn at 1:09 P.M. Mr. Stanbery seconded the motion. The motion passed unanimously.

File Attachments for Item:

P-1 Petition #23-06 - OPC Section 608.16.1 - beverage dispenser backflow prevention devices -
Jim Chandler of Vista Water Group, LLC

Application to Change the Building Code

Application For Rule Change

Submitter Information

Contact Name *

Jim Chandler

Organization/Company

Vista Water Group LLC

Phone Number *

(419) 282-2035

Email *

jim@vistawatergroup.com

Street Address *

1244 County Road 1475

City *

Ashland

State *

Ohio

Zip Code *

44805

Website

<https://vistawatergroup.com>

Code Section *

OPC 608.16.1

General Explanation of Proposed Change *

As stated in the Foreword of the American National Standard ASSE 1022-2021 document, the ASSE 1022 Standard was created due to the following: "Concerns have been raised that a dual check valve alone will not show any visible indication of failure." The Standard calls for two check valves and an atmospheric vent. "If there is failure of the downstream check and the backpressure exceeds the supply pressure, the vent will discharge, giving a visual indication of the check valve's failure."

The Standard also requires the following installation: "The atmospheric vent port shall have the provision for direct connection through a sight tube for the purpose of extending the vent to an approved air-gapped termination and giving a visible indication of any discharge from the device."

It is believed by the submitter, plumbing contractors and others in the plumbing and beverage industries that requiring an ASSE 1022 certified backflow preventer for beverage machine applications causes numerous issues including potential slip hazards, property damage and more costly installations due to the requirement of a waste receptacle. There are practical issues and product design issues of concern. They have also been shown to be unreliable. This problem has been addressed in the 2024 International Plumbing Code.

Potential Slip Hazards: The requirement for an atmospheric vent also requires a dedicated line to a drain or waste receptacle. Since the drain line must be situated above the waste receptacle to prevent a cross connection and allow for visible inspection, it can potentially be moved allowing water to flow onto the floor creating a slip hazard.

Property Damage: Water running from a drain line that is moved away from the indirect waste receptacle and go unnoticed causing substantial property damage to cabinetry, walls, etc. Further, installers and/or users often push the drain tubing down into the waste receptacle to eliminate flooding but such action defeats the purpose of a sight tube.

Costly Installations: The requirement to provide an atmospheric vent, sight tubing and a waste receiver substantially increases the cost of the installation for each installed ASSE 1022 device and such cost is passed on to the end user. Another thing that increases the cost where these devices are used is the additional labor when the installing contractor is called back to the job due to failures, water damage, etc.

Practical Issues: Beverage dispensers are found in many varied locations including full-service restaurants, fast food restaurants, convenience stores, sports complexes, offices and schools. Some locations have access to the beverage dispensers limited to employees (e.g. restaurants) where some allow access and self-dispensing by the general public (e.g. convenience stores). The requirement to place drains in a location with ready access where flow from the atmospheric vent can be monitored is impractical since they would often be in the way and allow unwanted access by the general public. Such open waste receptacles can then be damaged, tampered with and filled with things other than water.

Product Design Concerns: The ASSE 1022 standard calls for the atmospheric vent to be located between the two internal checks and

cause the vent to open and receive fluids when the pressure on the outlet side becomes greater than the pressure on the inlet side of the dual check device. To accomplish this feature most product designs require the use of diaphragms, seats, seals, baffles, discs, gaskets and/or springs that can be very sensitive to fouling and failure by even tiny amounts of sediment in the fluid stream. Some ASSE 1022 devices require the use of a prefilter screen down to the micron level to help reduce failures and flow that runs to the atmospheric vent not caused by a pressure differential, rather, sediment trapped in the device itself.

Explanation of Cost Impact of Proposed Code Change (Attach additional cost information as necessary to justify any statement of cost increase or cost decrease) *

The proposed rule change would reduce costs involved with the current rule due to the savings to the installer and end user being able to use a less expensive dual check backflow prevention device, eliminate the need for the addition of a waste receptor and reduce/eliminate call back and servicing costs.

Information on Submittal

Sponsor (Organization sponsoring or requesting the rule change (if any))

Vista Water Group, LLC

Rule Title (Title of rule change) *

Beverage Dispensers

Purpose/Objective(Technical justification for the proposed rule change) *

To allow other ASSE certified dual check devices to be allowed for backflow protection in addition to ASSE 1022 certified devices. Devices that conform to ASSE 1024 and ASSE 1032 have been in use for many years and have proven to be very reliable for backflow prevention. ASSE 1032 certified devices have been the gold standard for use with carbonated beverage machines.

Notes:

1. To encourage uniformity among states using model codes, it is recommended that the submitter first submit any code change directly to ICC and participate in the national model code development process.
2. Please provide a copy of application and documentation.
3. Use a separate form for each code change proposal.

Attachments

Attach Formatted Rule Language (Using Strike-out for Deleted Text and Underline for Added Text) *

File Name	Size
Formatted-Rule-Language.rtf	779.00 Bytes

Sponsor Full Name *

Jim Chandler

Date of Submission

06/27/2023



CRITERIA FOR SUBMITTING RULE CHANGES TO THE BOARD OF BUILDING STANDARDS

The Ohio Board of Building Standards processes all petitions for changes to the rules of the Board of Building Standards (Building, Mechanical, Plumbing, Boiler, Elevator, or Residential Codes) pursuant to ORC Chapter 119.

When anyone desires to petition the Board of Building Standards to adopt, amend, or annul a provision of rules of the Board, they must complete an application and provide supporting information submitted to the Secretary of the Board of Building Standards.

The application must include the following:

- (1) The date the application is prepared;
- (2) The rule number or section that is proposed for amendment, adoption, or annulment;
- (3) The rule numbers of all other rules that will be affected by the matter proposed;
- (4) The name, address, contact information, affiliation of the applicant, and of any representative;
- (5) The provisions that are proposed for adoption, amendment, or annulment;
- (6) The reason and technical justification for the proposed change;
- (7) All text to be eliminated shall be shown deleted by means of strikethrough, e.g., ~~matter to be eliminated~~;
- (8) All proposed new text to be inserted into a rule shall be shown as underlined, e.g., proposed new matter; and
- (9) One copy of the completed application and attachments.
- (10) An estimate of the increase or decrease in cost that would occur with the adoption of the proposed code change.

When the Secretary of the Board of Building Standards receives a completed application for an adoption, amendment, or annulment of rules of the Board, the Secretary will promptly deliver or mail a copy of the application to each member of the Board.

After receiving an application for the adoption, amendment, or annulment of rules of the Board, the Board of Building Standards shall proceed under sections 3781.101 and 3781.12 of the Revised Code.

APPLICATION

FOR
RULE CHANGE



BOARD OF BUILDING STANDARDS

6606 Tussing Road, P.O. Box 4009

Reynoldsburg, Ohio 43068-9009

(614) 644-2613

bbs@ohio.gov

www.com.state.oh.us/dico/bbs/default.aspx

Pursuant to section 3781.12 of the Revised Code and rules adopted by the Board of Building Standards, application is herewith submitted to adopt, amend, or annul a rule adopted by the Board pursuant to section 3718.10 of the Revised Code.

For BBS use:	
Petition #:	23-06
Date Recv'd:	June 27, 2023

Submitter: Jim Chandler Vista Water Group, LLC
(Contact Name) (Organization/Company)

Address: 1244 County Road 1475
(Include Room Number, Suite, etc.)

Ashland Ohio 44805
(City) (State) (Zip)

Telephone Number: (419) 282-2035 **Fax Number:** _____

Date: June 27, 2023 **E-mail Address:** jim@vistawatergroup.com

Code Section: Ohio Plumbing Code (OPC) 608.16.1

General Explanation of Proposed Change (attach additional sheets if necessary):

See PDF attachment - "applicationToChangeTheBuildingCode-649b36cb034432f6f2ef9168"

Explanation of Cost Impact of Proposed Code Change*: _____

*Attach additional cost information as necessary to justify any statement of cost increase or cost decrease.

Information on Submittal (attach additional sheets if necessary):	
1. Sponsor:	Vista Water Group, LLC, https://vistawatergroup.com Organization sponsoring or requesting the rule change (if any)
2. Rule Title:	Beverage Dispensers Title of rule change
3. Purpose/ Objective:	To allow other ASSE certified dual check devices to be allowed for backflow protection in addition to ASSE 1022 certified devices. Devices that conform to ASSE 1024 and ASSE 1032 have been in use for many years and have proven to be very reliable for backflow prevention. ASSE 1032 certified devices have been the gold standard for use with carbonated beverage machines. Technical justification for the proposed rule change
4. Formatted Rule Language (Using Strike-out for Deleted Text and Underline for Added Text)	608.16.1 Beverage dispensers. The water supply connection to beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022, ASSE 1024, ASSE 1032, or by an air gap. The portion of the backflow prevention device downstream from the second check valve and the piping downstream shall not be affected by carbon dioxide gas. Use strike-out for deleted text and underline for added text
5. Notes:	<ol style="list-style-type: none"> 1. To encourage uniformity among states using model codes, it is recommended that the submitter first submit any code change directly to ICC and participate in the national model code development process. 2. Please provide a copy of application and documentation. 3. Use a separate form for each code change proposal.

Comparison of Model Code and OPC Beverage Dispenser Water Supply Backflow Protection Requirements

Code	Coffee Machine	Non-Carbonated Beverage Dispenser	Water Supply Connection to Carbonated Beverage Dispenser
2000 IPC	Not addressed	Not addressed	ASSE 1012 or ASSE 1022 (Integral ASSE 1032 required on the equipment) [608.16.1]
2002 OPC Effective 1/1/02-11/1/11	Not addressed	Not addressed	ASSE 1022 (Ohio Exception: If an ASSE 1032 device is installed on the carbonator, the ASSE 1022 is not required to protect the water supply connection) [608.16.1]
2003 IPC	ASSE 1022 or Air gap The word "coffee machine" is not mentioned [608.16.1]	ASSE 1022 or Air gap The word "non-carbonated" is not mentioned [608.16.1]	ASSE 1022 or Air gap (assumes an ASSE 1032 is either installed integral to the equipment or no BFP installed integral to equipment) The word "carbonated" doesn't appear [608.16.1]
2006 IPC	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 CSA B64.3.1 or Air gap The word "carbonated" doesn't appear [608.16.1]

2009 IPC	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap The word "carbonated" doesn't appear [608.16.1]
2011 OPC	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap The word "carbonated" doesn't appear [608.16.1]
2012 IPC	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap The word "carbonated" doesn't appear [608.16.1]
2015 IPC	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap The word "carbonated" doesn't appear [608.16.1]
2017 OPC	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap [608.16.10]	ASSE 1022 or Air gap The word "carbonated" doesn't appear [608.16.1]

2018 IPC	ASSE 1022 ASSE 1024 or Air gap [608.17.1.1]	ASSE 1022 ASSE 1024 or Air gap [608.17.1]	ASSE 1022 or Air gap [608.17.1.1]
2021 IPC	ASSE 1022 ASSE 1024 or Air gap [608.17.1.2]	ASSE 1022 ASSE 1024 or Air gap [608.17.1.2]	ASSE 1022 or Air gap [608.17.1.1]
2024 OPC	ASSE 1022 ASSE 1024 or Air gap [608.17.1.2]	ASSE 1022 ASSE 1024 or Air gap [608.17.1.2]	ASSE 1022 or Air gap [608.17.1.1]
2024 IPC	ASSE 1022 ASSE 1024 ASSE 1032 or Air gap [608.17.1.2]	ASSE 1022 ASSE 1024 ASSE 1032 or Air gap [608.17.1.2]	ASSE 1022 or Air gap [608.17.1.1]

Ohler, Deborah

From: Cormack, Larry R. <LRCormack@columbus.gov>
Sent: Thursday, June 23, 2022 10:47 AM
To: Ohler, Deborah
Subject: Re: [EXTERNAL] Beverage dispenser backflow prevention requirements

Thank you for the information. This will help out greatly.

Sent from my iPhone

On Jun 23, 2022, at 10:40 AM, "debbie.ohler@com.ohio.gov" <debbie.ohler@com.ohio.gov> wrote:

<image001.gif>

Larry-

I'd like to first apologize for the delay in getting this information to you. This is a board meeting week for us and during those weeks, there is much to do, and often times other work takes a back seat.

As discussed on Monday, I have done BBS library research (see attached) on the history and evolution of the current language found in the current OPC Section 608.16.1 and 608.16.10. These two sections currently require either an ASSE 1022 backflow preventer or an air gap for beverage dispensers.

Many years ago, an ASSE 1032 backflow preventer was allowed in the model code and the Ohio code. However, in the 2003 edition, the ASSE 1032 was taken out the IPC and eventually (in the 2011 edition of the OPC), you'll notice that the OPC Advisory Committee and the BBS decided to remove it from the OPC because they wanted to stick with the model code language. As best as I can tell, in this application, the ASSE 1022 backflow preventer is the only device permitted in the IPC for carbonated beverage machines because it provides a visual indication of failure of the second check and, according to one of the reasoning statements in a model code change proposal, this is the only device that is recognized in the American Beverage Association standards. Starting with the 2018 IPC, an ASSE 1024 device is permitted for coffee machines and noncarbonated beverage machines.

The next OPC will be based upon the 2021 edition of the IPC. Therefore, the next edition of the OPC will allow an ASSE 1024 backflow preventer for coffee machines and noncarbonated beverage machines. The ASSE 1022 will still be required for carbonated beverages.

In the meantime, until we can get the new code adopted, as I see it, owners have 2 options to use the ASSE 1024 for coffee machines and noncarbonated beverage machines:

1. Request a variance from the BBA per OBC 110
2. Submit as an alternative engineered design per OBC 106.5

I hope this helps.
Debbie

<image002.jpg>

Deborah D. Ohler, P.E., Construction Codes Administrator

Ohio Board of Building Standards

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<https://com.ohio.gov/divisions-and-programs/industrial-compliance/boards/board-of-building-standards>

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the flood level rim of the fixture or device. Ball cocks shall be set in accordance with Section 425.4.1. Vacuum breakers shall not be installed under exhaust hoods or similar locations that will contain toxic fumes or vapors. Pipe-applied

vacuum breakers shall be installed not less than 6 inches (152 mm) above the flood level rim of the fixture, receptor or device served

TABLE 608.15.1
MINIMUM REQUIRED AIR GAPS

FIXTURE	MINIMUM AIR GAP	
	Away from a wall ^a (inches)	Close to a wall (inches)
Lavatories and other fixtures with effective opening not greater than 1/2 inch in diameter	1	1 1/2
Sink, laundry trays, gooseneck back faucets and other fixtures with effective openings not greater than 3/4 inch in diameter	1.5	2.5
Over-rim bath fillers and other fixtures with effective openings not greater than 1 inch in diameter	2	3
Drinking water fountains, single orifice not greater than 7/16 inch in diameter or multiple orifices with a total area of 0.150 square inch (area of circle 7/16 inch in diameter)	1	1 1/2
Effective openings greater than 1 inch	Two times the diameter of the effective opening	Three times the diameter of the effective opening

For SI: 1 inch = 25.4 mm.

a. Applicable where walls or obstructions are spaced from the nearest inside edge of the spout opening a distance greater than three times the diameter of the effective opening for a single wall, or a distance greater than four times the diameter of the effective opening for two intersecting walls.

608.15.4.1 Deck-mounted and integral vacuum breakers. Approved deck-mounted or equipment-mounted vacuum breakers and faucets with integral atmospheric or spill-proof vacuum breakers shall be installed in accordance with the manufacturer's instructions and the requirements for labeling with the critical level not less than 1 inch (25.4 mm) above the flood level rim.

608.15.4.2 Hose connections. Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type or pressure-type vacuum breaker or a permanently attached hose connection vacuum breaker.

Exceptions:

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

608.15.4.3 Fittings with hose-connected outlets. Plumbing fixture fittings with hose connected outlets shall have backflow protection in compliance with ASME A112.18.3.

608.16 Connections to the potable water system. Connections to the potable water system shall conform to Sections 608.16.1 through 608.16.9.

608.16.1 Beverage dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a double check valve with an intermediate atmospheric vent conforming to ASSE 1012 or ASSE

1022. The double check valve with an intermediate atmospheric vent device and the piping downstream therefrom shall not be affected by carbon dioxide gas. Secondary protection in the form of a dual check valve conforming to ASSE 1032 shall be installed on the beverage-dispensing equipment

608.16.2 Connections to boilers. The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012 or CSA CAN/CSA B64.3. Where conditioning chemicals are introduced into the system, the potable water connection shall be protected by an air gap or a reduced pressure principle backflow preventer, complying with ASSE 1013, CSA CAN/CSA B64.4 or AWWA C511.

608.16.3 Heat exchangers. Heat exchangers utilizing an essentially toxic transfer fluid shall be separated from the potable water by double-wall construction. An air gap open to the atmosphere shall be provided between the two walls. Heat exchangers utilizing an essentially nontoxic transfer fluid shall be permitted to be of single-wall construction.

608.16.4 Connections to automatic fire sprinkler systems and standpipe systems. The potable water supply to automatic fire sprinkler and standpipe systems shall be protected against backflow by a double check valve assembly or a reduced pressure principle backflow preventer.

Exceptions:

1. Where systems are installed as a portion of the water distribution system in accordance with the requirements of this code and are not provided with a fire department connection, isolation of the water supply system shall not be required.
2. Isolation of the water distribution system is not required for deluge, preaction or dry pipe systems.

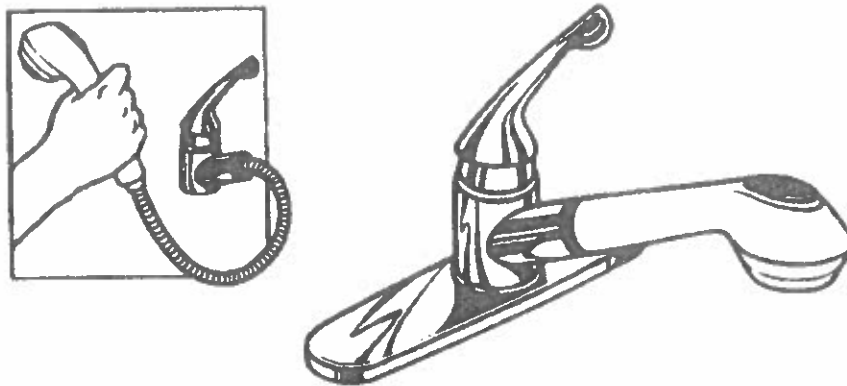


Figure 608.15.4.3
FLEXIBLE HOSE FAUCET

608.16 Connections to the potable water system. Connections to the potable water system shall conform to Sections 608.16.1 through 608.16.9.

- ❖ Sections 608.16.1 through 608.16.9 regulate backflow prevention for direct connections between a potable and nonpotable system. A cross connection exists where there is no atmospheric opening (air gap) between the potable water supply and the source of contamination.

This section addresses cross connections that result from the direct connection of the potable water supply to a closed system such as boilers, vessels, tanks, heat exchangers and nonpotable piping systems.

608.16.1 Beverage dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a double check valve with an intermediate atmospheric vent conforming to ASSE 1012 or ASSE 1022. The double check valve with an intermediate atmospheric vent device and the piping downstream therefrom shall not be affected by carbon dioxide gas. Secondary protection in the form of a dual check valve conforming to ASSE 1032 shall be installed on the beverage-dispensing equipment.

- ❖ The potable water supply to a carbonated beverage dispenser must be protected by a backflow preventer with intermediate atmospheric vent. A secondary device, called a "dual check valve," must be integral with the beverage equipment, installed between the pump and carbonate tank. Piping downstream of the backflow preventer with intermediate atmospheric vent must not be copper. These requirements are intended to prevent CO₂ backflow into copper water supply lines, which causes leaching of copper into the potable water supply (see Figure 608.16.1).

608.16.2 Connections to boilers. The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012 or CSA CAN/CSA B64.3. Where conditioning chemicals are intro-

duced into the system, the potable water connection shall be protected by an air gap or a reduced pressure principle backflow preventer, complying with ASSE 1013, CSA CAN/CSA B64.4 or AWWA C511.

- ❖ Because boilers are pressurized vessels, the potential for backflow caused by backpressure is quite high. Any time the potable water supply pressure drops below boiler pressure, backflow can occur.

If a boiler system contains only untreated, unconditioned water supplied from a potable source, a backflow preventer with an intermediate atmospheric vent can be installed (see Figure 608.16.2).

If any chemicals are added to the boiler system, the potable water supply connection must be protected with a reduced pressure principle backflow preventer (see Figure 608.13.2).

608.16.3 Heat exchangers. Heat exchangers utilizing an essentially toxic transfer fluid shall be separated from the potable water by double-wall construction. An air gap open to the atmosphere shall be provided between the two walls. Heat exchangers utilizing an essentially nontoxic transfer fluid shall be permitted to be of single-wall construction.

- ❖ The extent of isolation required for a heat exchanger depends on the type of fluid used on the exchanger's nonpotable side. From the definition of "Essentially nontoxic transfer fluids," the nonpotable fluid must be evaluated as to its Gosselin rating. If the fluid has a Gosselin rating of 1, a single-wall heat exchanger is permitted.

The Gosselin rating is a measure of the toxicity of a substance. The name originates from one of the prime developers of the rating system, Dr. Robert E. Gosselin, professor of Pharmacology at Dartmouth Medical School in New Hampshire.

Gosselin toxicity ratings are the values used by medical personnel to analyze poison victims. The ratings are based on the probable lethal dose for a human. The six levels of Gosselin ratings are outlined in Figure 608.16.3(1).

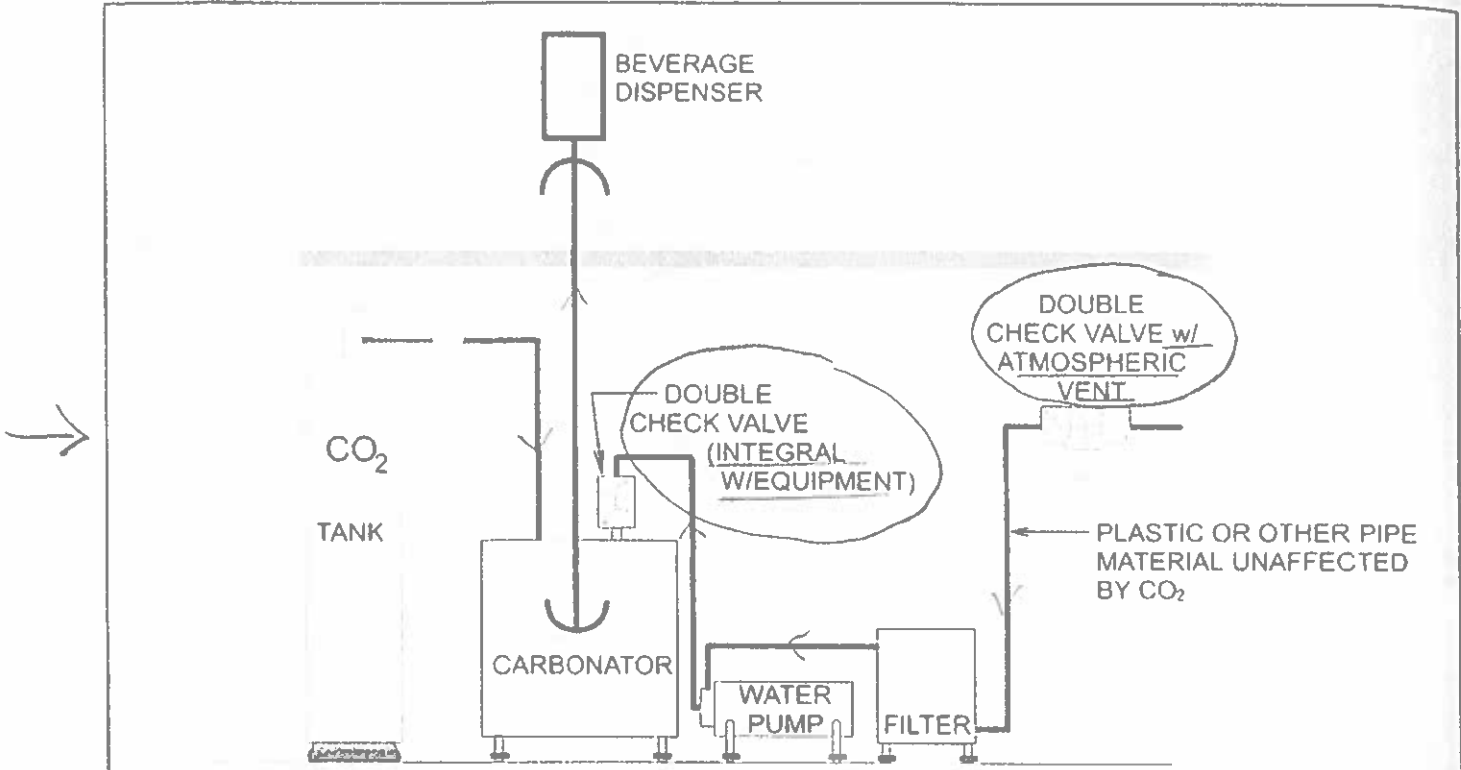


Figure 608.16.1
BEVERAGE DISPENSER

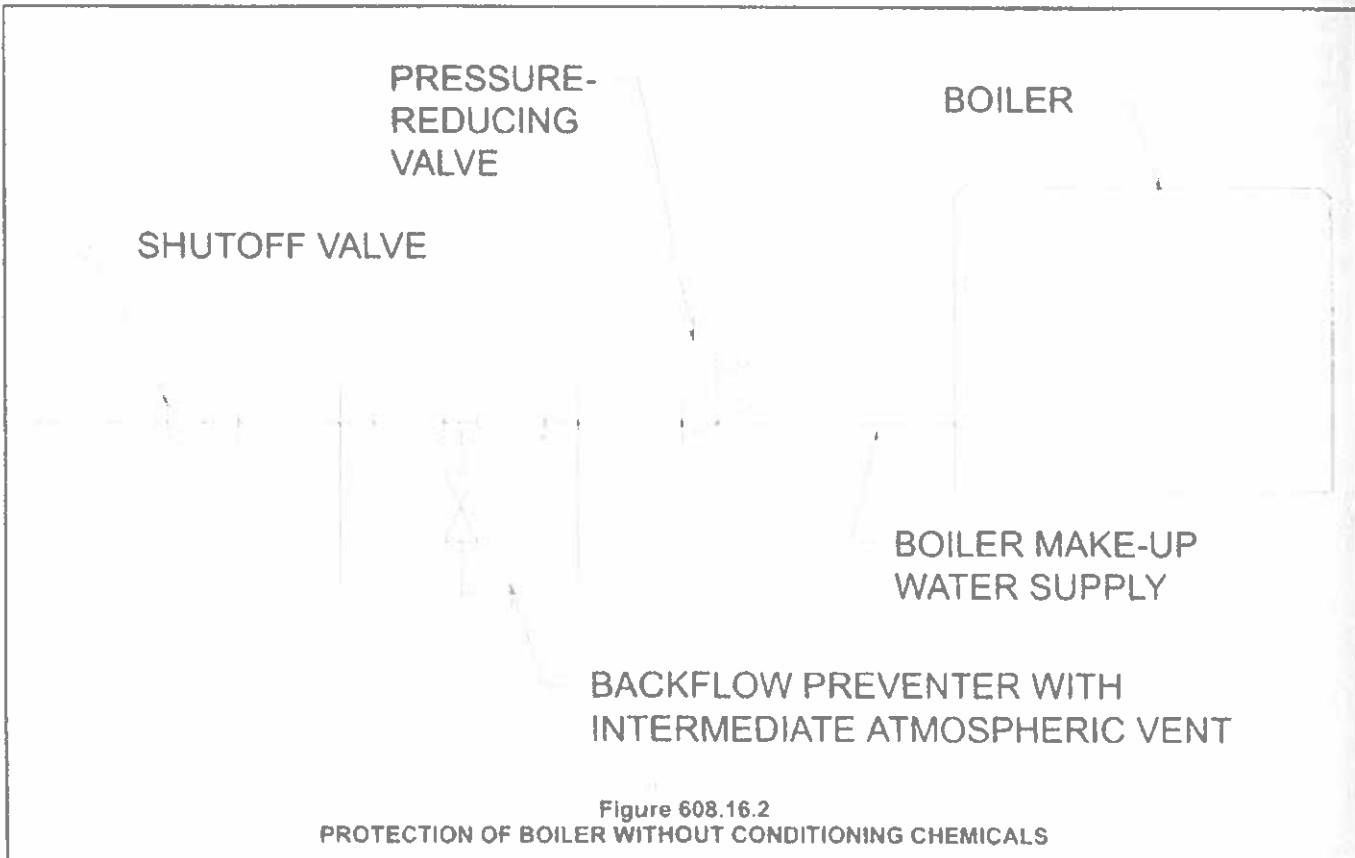


Figure 608.16.2
PROTECTION OF BOILER WITHOUT CONDITIONING CHEMICALS

1062.

IRC

CHAPTER 43
REFERENCED STANDARDS

ASSE

Standard reference number	Title	Referenced in code section number
1062-97	<u>Temperature Actuated, Flow Reduction Valves to Individual Fixture Fittings</u>	P2724.1

Reason: (Viola) Temperature actuated flow reduction (TAFR) valves are point-of use devices that are installed in-line with or are integrated into fixture fittings. These valves are designed to automatically reduce discharge flow to a trickle (0.25 gpm or less) if the water temperature exceeds a preset limit. These devices are commonly utilized on showerheads, bath and utility faucets, and sink and lavatory faucets. Although these devices are intended to limit exposure to high temperature water, they are not intended to be used as a substitute for balanced pressure, thermostatic, or combination shower valves required in Section 424.4. ASSE 1062 was developed under a consensus process, is accredited by ANSI, and complies with ICC procedures governing referenced standards.

(Higgins) This section is proposed to address the applicable standards for specialty devices which are typically installed on lavatory faucets, showerheads and bathtub spouts to prevent accidental burns. Although these devices are not mandated for specific applications, the use of a particular device should be accompanied by some form of compliance with an established standard. Please note the standards which are referenced.

Public Hearing: Committee: AS AM D
Assembly: ASF DF

P49-00
425.4.1

Proponent: David W. Viola, Plumbing Manufacturers Institute

Revise as follows:

425.4.1 Ball cocks. All flush tanks shall be equipped with an anti-siphon ~~ball-cock~~ fill valve conforming to ASSE 1002 or CSA B125. The ball cock backflow preventer shall be located at least 1 inch (25.4 mm) above the full opening of the overflow pipe.

Reason: This is an editorial update to be consistent with the title of ASSE 1002.

Public Hearing: Committee: AS AM D
Assembly: ASF DF

P50-00
426.2

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing National Soft Drink Association

Add new text as follows:

426.2 Carbonated beverage dispensers water supply. The water supply shall conform to one of the backflow requirements specified in Sections 426.2.1 through 426.2.3.

426.2.1 Air gap. The water supply to the carbonated beverage dispenser shall be protected against backflow by an integral air gap located within the dispenser.

426.2.2 Internal backflow preventer. The water supply to the carbonated beverage dispenser shall be protected against backflow by an integral backflow preventer conforming to ASSE 1022.

426.2.3 External backflow preventer. Carbonated beverage dispensers having an integral backflow preventer conforming to ASSE 1032 or having no backflow preventer shall have the water supply connection to the dispenser protected with a backflow preventer conforming to ASSE 1022.

Reason: All carbonated beverage dispensers are listed to NSF 18 to assure quality control of the dispenser. This new text will recognize that there is a difference between the standard and the water supply connection requirements for carbonated beverage dispensers.

Analysis: Section 608.16.1 covers the requirements for backflow protection for potable water supply connection to a carbonated beverage dispensing unit.

Public Hearing: Committee: AS AM **D**
Assembly: ASF DF

P51-00
427 (IRC P2701.1)

Proponent: Patrick J. Higgins, P.J. Higgins & Associates, Inc.

THIS PROPOSAL IS ON THE AGENDA OF THE IPC AND THE IRC PLUMBING CODE DEVELOPMENT COMMITTEES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Add new text as follows:

reason.

The modification cleared up the language in the first sentence and added the word "alone" to the second sentence to ensure that the ASSE 1062 valves were not used in place of the valves required in Section 424.4.

Assembly Action: No Motion

ITEM 2 (IRC)
Committee Action: Approval as Modified

Was added editorially and modified as follows:

P424.6 Temperature actuated, flow reduction valves for individual fixture fittings. ~~Where~~ Temperature actuated, flow reduction devices, ~~are where~~ installed for individual fixture fittings, they shall conform to ASSE 1062. Such valves shall not be used alone as a substitute for the balanced pressure, thermostatic or combination shower valves required for showers in Section 2708.3.

Committee Reason: Approved based on proponent's published reason. The modification cleared up the language in the first sentence and added the word "alone" to the second sentence to ensure that the ASSE 1062 valves were not used in place of the valves required in Section 2708.3

Assembly Action: No Motion

P49-00

Committee Action: Approval as Modified

Modify proposal as follows:

425.4.1 ~~Bell-cocks~~ Fill valves. All flush tanks shall be equipped with an anti-siphon fill valve conforming to ASSE 1002 or CSA B125. The ~~bell-cock fill valve~~ backflow preventer shall be located at least 1 inch (25.4 mm) above the full opening of the overflow pipe

Committee Reason: The change makes the language consistent with the title of ASSE 1002. The modification adds the term "fill valve" throughout for consistency

Assembly Action: No Motion

P50-00

Committee Action: Disapproval

Committee Reason: The proposed text is already covered by Section 608.16.1. The requirements should remain in Chapter 6 instead of Chapter 4.

Assembly Action: Motion Failed

P51-00 Withdrawn by Proponent

P52-00

ITEM 1 (IPC)
Committee Action: Approval as Modified

Modify proposal as follows:

501.2 Water heater as space heater. Where a combination potable water heating and space heating system requires water for space heating at temperatures higher than 140 F (60 C), a ~~tempering valve~~ master thermostatic mixing valve complying with ASSE 1017 shall be provided to limit the water supplied to the potable hot water distribution system to a temperature of 140 F (60 C) or less. The potability of the water shall be maintained throughout the system.

Committee Reason: The change provides maximum potable water temperature consistency between the IPC and the IMC. The text was modified to include the correct temperature control device.

Assembly Action: No Motion

ITEM 2 (IRC)
Committee Action: Approval as Modified

Modify proposal as follows:

P2802.2 ~~Scald-protection~~ Temperature control. Where a combination potable water heating and space heating system requires water for space heating at temperatures higher than 140 F (60 C) a ~~tempering valve~~ master thermostatic mixing valve complying with ASSE 1017, shall be provided to limit the water supplied to the potable hot water distribution system to a temperature of 140 F (60°C) or less. The potability of the water shall be maintained throughout the system.

Committee Reason: The change provides maximum potable water temperature consistency between the IRC, IPC and IMC. The text was modified to include the correct temperature control device.

Assembly Action: No Motion

P53-00

Committee Action: Disapproval

Committee Reason: Disapproved in favor of P52-00.

Assembly Action: No Motion

P54-00

Committee Action: Disapproval

Committee Reason: This requirement should be coordinated between all ICC Codes. Allowing fuel fired water heaters to be located in a space that communicates with a sleeping room creates a potential safety hazard if the enclosure seals are damaged.

Assembly Action: No Motion

P55-00

Committee Action: Disapproval

→ **P78-00**

Proposed Change as Submitted:

Proponent: Julius Ballanco, PE., JB Engineering and Code Consultants, P.C., representing National Soft Drink Association

Revise as follows:

608.16.1 Beverage dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by an ~~double check valve with an intermediate atmospheric vent integral backflow preventer conforming to ASSE 1012 or ASSE 1022 or by an air gap. The double check valve with an intermediate atmospheric vent device and the piping downstream therefrom shall not be affected by carbon dioxide gas. Secondary protection in the form of a dual check valve conforming to ASSE 1032 shall be installed on the beverage dispensing equipment. Carbonated beverage dispensers without integral backflow protection or with an integral backflow preventer conforming to ASSE 1032 shall have the water supply connection to the dispenser protected with a backflow preventer conforming to ASSE 1022.~~

⇒ **Proponent's Reason:** This is a companion change to Section 426. The backflow protection requirements have been modified to be consistent with the National Soft Drink Association's position on adequate backflow protection.

Committee Action:

Approval as Modified

Staff Note: The modification in the Report of Public Hearings was published incorrectly. The following modification has been corrected by staff.

Modify proposal as follows:

608.16.1 Beverage dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap. The backflow preventer device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

Committee Reason: The change clarifies that a second level of protection conforming to ASSE 1022 is required when a dispenser has no integral backflow preventer or one that conforms to ASSE 1032. The modification separates the water supply protection requirements from the beverage dispenser backflow protection requirements.

Assembly Action:

Approval as Submitted

Individual Consideration Agenda

This item is on the agenda for individual

consideration because an assembly action was successful and a public comment was submitted.

Public Comment 1:

Julius Ballanco, National Soft Drink Association, requests Approval as Modified.

Commenter's Reason: The National Soft Drink Association was concerned that the modified language by the committee was not in compliance with the intent of their change. Therefore, at the hearings I requested a floor vote for Approval as Submitted. The voting members agreed to the Approval as Submitted. However, after reviewing the change, the National Soft Drink Association is in agreement with the committee's modification. Therefore, we would request that the committee action be considered for this change. The modification meets the original intent of the proposed change. Furthermore, text is simplified and in appropriate code performance language.

Public Comment 2:

Roy N. McFarland, Jr., VPMIA, requests Disapproval.

Commenter's Reason: Item P78-00 was modified and Approved as Modified by the committee. The assembly action that followed, approved P78-00 as submitted.

With Approval as Submitted the requirement for the backflow preventer as well as the piping downstream, not to be affected by carbon dioxide gas, has been removed. The modification by the committee was to introduce this language back into the code, as it should be, in order to have total protection for the system.

In the first sentence of 608.16.1 the proponent specifies protection by means of an integral backflow preventer conforming to ASSE 1022 or an air gap. I have not encountered a beverage dispenser that utilizes an air gap for protection, it would seem that if an air gap were to be installed, there would be a risk of the potable water being contaminated at this point, by allowing bacteria to enter the open system.

In the second sentence the proponent goes on to state that a carbonated beverage dispenser either without integral backflow protection or with an integral backflow preventer that conforms to ASSE 1032, shall have the potable water protected with a backflow preventer conforming to ASSE 1022. I have read this many times and still do not know if the second sentence refers to the integral backflow protection of the first sentence or is something entirely different.

This section as submitted and as modified is very confusing and it is hard to comprehend its meaning. The second sentence seems to override the first by stating that the water supply connection to the dispenser requires a backflow preventer conforming to ASSE 1022 while the first sentence states that the ASSE 1022 is required but an air gap is also an option. If this code change is allowed to remain as stated there is sure to be some major confusion created for the installers as well as the inspectors.

P79-00

Proposed Change as Submitted:

Proponent: Rand Ackroyd, Rand Engineering, representing ANSUL

Ohio Plumbing Code language
Effective 1/1/02 - 11/1/11

4101:3-6-08.16.1 Beverage dispensers.

608.16.1 Beverage Dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a double check valve with an intermediate atmospheric vent conforming to ASSE 1022. *The backflow prevention device and all piping downstream of the backflow preventer must be compatible with carbon dioxide gas.*

Exception: *If a backflow preventer which conforms to ASSE 1032 is installed on a carbonator that conforms to NSF 18, then the double check valve with intermediate atmospheric vent conforming to ASSE 1022 is not required to protect the water supply connection.*

Replaces part of rule 4101:2-61-09

EFFECTIVE: January 1, 2002

R.C. 119.032 rule review date: 1/01/07



Gerald O. Holland, Chairman
Board of Building Standards
September 28, 2001

Date

Promulgated under R.C. Chapter 119.
Rule authorized by R.C. Section 3781.10
Rule amplifies R.C. Chapters 3781. & 3791.
Prior Eff. Dates: 3/1/98, 12/1/00

Steve,

I received an e-mail from Doug Young earlier this week. He had just received his December 2000 WestGroup code update and was questioning the adopted language in our current plumbing code relating to beverage dispenser backflow prevention. I remembered that this was one of the recent rule changes that Gary wanted to be effective prior to the new OPC work. In trying to answer his question, I was really confused by the language. I talked with Mike and still was confused. So yesterday, I went and talked with Ralph and Gary about it. After our discussion, I think we should revisit the language for proposed OPC section 608.16.1. Ralph and I worked on a suggested clarification of the proposed language to read as follows:

4101:3-6-08.16.1 BEVERAGE DISPENSERS. (Previously 4101:2-61-09)

608.16.1 Beverage Dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a double check valve with an intermediate atmospheric vent conforming to ASSE 1022. The backflow prevention device and all piping downstream of the backflow preventer must be compatible with carbon dioxide gas.

Exception: If an ASSE 1032 backflow preventer which conforms to NSF 18 is installed on the carbonator, then the double check valve with an intermediate atmospheric vent conforming to ASSE 1022 is not required.

notice rewording that was proposed to clarify (but not adopted)

Unfortunately, we also forgot to add ASSE 1022 to the referenced standard section of the code. Please make sure that it is added to the new OPC referenced standard section.

Thanks. Deb

**Table 608.1 Change to read as shown: (P71-00)
(P60-01)**

**TABLE 608.1
APPLICATION FOR BACKFLOW PREVENTERS**

DEVICE	DEGREE OF HAZARD*	APPLICATION*	APPLICABLE STANDARDS
Air gap Air gap fittings for use with plumbing fixtures, appliances and appurtenances	High or low hazard High or low hazard	Backsiphonage or backpressure Backsiphonage or backpressure	ASME A112.1.2 ASME A112.1.3
Antisiphon-type water closet flush tank ball cock	Low hazard	Backsiphonage only	ASSE 1002 CSA B125
Barometric loop	High or low hazard	Backsiphonage only	(See Section 608.13.4)
Reduced pressure principle backflow preventer and Reduced pressure principle fire protection backflow preventer	High or low hazard	Backpressure or Backsiphonage Sizes 3/8" - 16"	ASSE 1013 AWWA C511 CSA CAN/CSA B64.4
Reduced pressure detector fire protection backflow prevention assemblies	High or low hazard	Backpressure or backsiphonage (Fire sprinkler systems)	ASSE 1047
Double check backflow prevention assembly and double check fire protection backflow prevention assembly	Low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1015 AWWA C510
Double check detector fire protection backflow prevention assemblies	Low hazard	Backpressure or backsiphonage (Fire sprinkler systems) Sizes 1 1/2" - 16"	ASSE 1048

For SI: 1 inch = 25.4 mm.

Section 608.8 Change to read as shown: (P72-00)

608.8 Identification of potable and nonpotable water. In all buildings where two or more water distribution systems, one potable and the other nonpotable water, are installed, each system shall be identified either by color marking or metal tags in accordance with Sections 608.8.1 through 608.8.3.

Section 608.13.1 Change to read as shown: (P60-01)

608.13.1 Air gap. The minimum required air gap shall be measured vertically from the lowest end of a potable water outlet to the flood level rim of the fixture or receptacle into which such potable water outlet discharges. Air gaps shall comply with ASME A112.1.2 and air gap fittings shall comply with ASME A112.1.3.

Section 608.13.9 Change to read as shown: (P74-00)

608.13.9 Chemical dispenser backflow devices. Backflow devices for chemical dispensers shall comply with ASSE 1055 or shall be equipped with an air gap fitting.

Section 608.15.4.3 Delete without substitution. (P76-00)

Section 608.16.1 Change to read as shown: (P78-00)

608.16.1 Beverage dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap. The backflow preventer device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

Section 608.16.4.1 Change to read as shown: (P79-00)

608.16.4.1 Additives or nonpotable source. Where systems under continuous pressure contain chemical additives or antifreeze, or where systems are connected to a nonpotable secondary water supply, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer. Where chemical additives or antifreeze are added to only a portion of an automatic fire sprinkler or standpipe system, the reduced pressure principle

608.16.1 Beverage dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap. The backflow preventer device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

608.16.2 Connections to boilers. The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSF 1012 or CAN CSA B64.3. Where conditioning chemicals are introduced into the system, the potable water connection shall be protected by an air gap or a reduced pressure principle backflow preventer, complying with ASSE 1013, CAN CSA B64.4 or AWWA C511.

608.16.3 Heat exchangers. Heat exchangers utilizing an essentially toxic transfer fluid shall be separated from the potable water by double-wall construction. An air gap open to the atmosphere shall be provided between the two walls. Heat exchangers utilizing an essentially nontoxic transfer fluid shall be permitted to be of single-wall construction.

608.16.4 Connections to automatic fire sprinkler systems and standpipe systems. The potable water supply to automatic fire sprinkler and standpipe systems shall be protected against backflow by a double check-valve assembly or a reduced pressure principle backflow preventer.

Exceptions:

1. Where systems are installed as a portion of the water distribution system in accordance with the requirements of this code and are not provided with a fire department connection, isolation of the water supply system shall not be required.
2. Isolation of the water distribution system is not required for deluge, preaction or dry pipe systems.

608.16.4.1 Additives or nonpotable source. Where systems under continuous pressure contain chemical additives or antifreeze, or where systems are connected to a nonpotable secondary water supply, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer. Where chemical additives or antifreeze are added to only a portion of an automatic fire sprinkler or standpipe system, the reduced pressure principle backflow preventer shall be permitted to be located so as to isolate that portion of the system. Where systems are not under continuous pressure, the potable water supply shall be protected against backflow by an air gap or a pipe applied atmospheric vacuum breaker conforming to ASSE 1001 or CAN/CSA B64.1.1.

608.16.5 Connections to lawn irrigation systems. The potable water supply to lawn irrigation systems shall be protected against backflow by an atmospheric-type vacuum breaker, a pressure-type vacuum breaker or a reduced pressure principle backflow preventer. A valve shall not be installed downstream from an atmospheric vacuum breaker. Where chemicals are introduced into the system, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer.

608.16.6 Connections subject to backpressure. Where a potable water connection is made to a nonpotable line, fixture, tank, vat, pump or other equipment subject to back-pressure, the potable water connection shall be protected by a reduced pressure principle backflow preventer.

608.16.7 Chemical dispensers. Where chemical dispensers connect to the potable water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, 608.13.2, 608.13.5, 608.13.6, 608.13.8 or 608.13.9.

608.16.8 Portable cleaning equipment. Where the portable cleaning equipment connects to the water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, 608.13.2, 608.13.3, 608.13.7 or 608.13.8.

608.16.9 Dental pump equipment. Where dental pumping equipment connects to the water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, 608.13.2, 608.13.5, 608.13.6 or 608.13.8.

608.17 Protection of individual water supplies. An individual water supply shall be located and constructed so as to be safeguarded against contamination in accordance with Sections 608.17.1 through 608.17.8.

608.17.1 Well locations. A potable ground water source or pump suction line shall not be located closer to potential sources of contamination than the distances shown in Table 608.17.1. In the event the underlying rock structure is limestone or fragmented shale, the local or state health department shall be consulted on well site location. The distances in Table 608.17.1 constitute minimum separation and shall be increased in areas of creviced rock or limestone, or where the direction of movement of the ground water is from sources of contamination toward the well.

608.17.2 Elevation. Well sites shall be positively drained and shall be at higher elevations than potential sources of contamination.

608.17.3 Depth. Private potable well supplies shall not be developed from a water table less than 10 feet (3048 mm) below the ground surface.

608.17.4 Water-tight casings. Each well shall be provided with a water-tight casing to a minimum distance of 10 feet (3048 mm) below the ground surface. All casings shall extend at least 6 inches (152 mm) above the well platform. The casing shall be large enough to permit installation of a separate drop pipe. Casings shall be sealed at the bottom in an impermeable stratum or extend several feet into the water-bearing stratum.

608.17.5 Drilled or driven well casings. Drilled or driven well casings shall be of steel or other approved material. Where drilled wells extend into a rock formation, the well casing shall extend to and set firmly in the formation. The annular space between the earth and the outside of the casing shall be filled with cement grout to a minimum distance of 10 feet (3048 mm) below the ground surface. In an instance of casing to rock installation, the grout shall extend to the rock surface.

608.16 Connections to the potable water system. Connections to the potable water system shall conform to Sections 608.16.1 through 608.16.9.

❖ Sections 608.16.1 through 608.16.9 regulate backflow prevention for direct connections between a potable and nonpotable system. A cross connection exists where there is no atmospheric opening (air gap) between the potable water supply and the source of contamination.

This section addresses cross connections that result from the direct connection of the potable water supply to a closed system such as boilers, vessels, tanks, heat exchangers and nonpotable piping systems.

608.16.1 Beverage dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap. The backflow preventer device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

❖ The potable water supply to a carbonated beverage dispenser must be protected by a backflow preventer with an intermediate atmospheric vent conforming to ASSE 1022 or by an air gap. Concerns have been raised that a dual check valve alone will not show any visible indication of failure. The backflow preventer for beverage dispensing equipment includes two check valves and an atmospheric vent. If there is failure of the downstream check and the backpressure exceeds the supply pressure, the vent will discharge, giving a visual indication of the check valve's failure. Piping downstream of the backflow preventer with intermediate atmospheric vent must not be copper. These requirements are intended to prevent CO₂ backflow into copper water supply lines, which causes leaching of copper into the potable water supply (see Figure 608.16.1)

608.16.2 Connections to boilers. The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012 or CAN/CSA B64.3. Where conditioning chemicals are introduced into the system, the potable water connection shall be protected by an air gap or a reduced pressure principle backflow preventer, complying with ASSE 1013, CAN/CSA B64.4 or AWWA C511.

❖ Because boilers are pressurized vessels, the potential for backflow caused by backpressure is quite high. Any time the potable water supply pressure drops below boiler pressure, backflow can occur.

If a boiler system contains only untreated, unconditioned water supplied from a potable source, a backflow preventer with an intermediate atmospheric vent can be installed (see Figure 608.16.2).

If any chemicals are added to the boiler system, the potable water supply connection must be protected with a reduced pressure principle backflow preventer (see Figure 608.13.2).

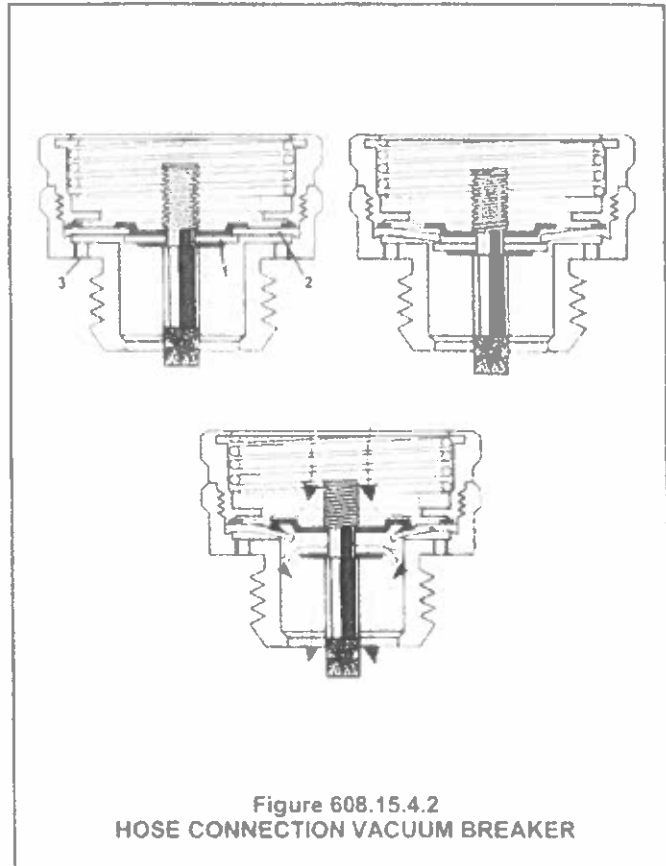


Figure 608.15.4.2
HOSE CONNECTION VACUUM BREAKER

608.16.3 Heat exchangers. Heat exchangers utilizing an essentially toxic transfer fluid shall be separated from the potable water by double wall construction. An air gap open to the atmosphere shall be provided between the two walls. Heat exchangers utilizing an essentially nontoxic transfer fluid shall be permitted to be of single-wall construction.

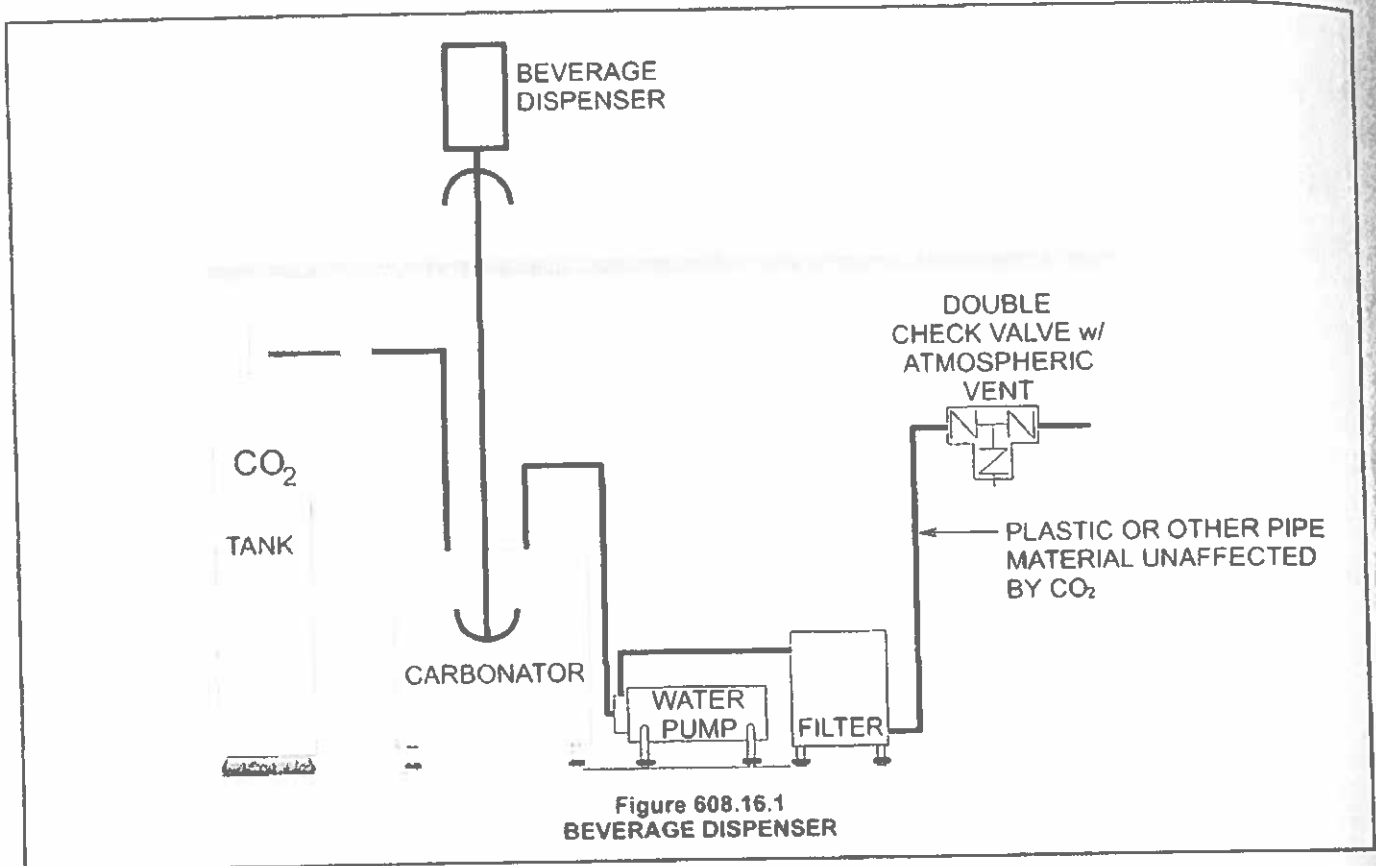
❖ The extent of isolation required for a heat exchanger depends on the type of fluid used on the exchanger's nonpotable side. From the definition of "Essentially nontoxic transfer fluids," the nonpotable fluid must be evaluated as to its Gosselin rating. If the fluid has a Gosselin rating of 1, a single-wall heat exchanger is permitted.

The Gosselin rating is a measure of the toxicity of a substance. The name originates from one of the prime developers of the rating system, Dr. Robert E. Gosselin, professor of Pharmacology at Dartmouth Medical School in New Hampshire.

Gosselin toxicity ratings are the values used by medical personnel to analyze poison victims. The ratings are based on the probable lethal dose for a human. The six levels of Gosselin ratings are outlined in Figure 608.16.3(1)

Some of the commercially available transfer fluids with a Gosselin rating of 1 are identified in Figure 608.16.3(2).

If the heat transfer fluid has a Gosselin rating of 2 or more, a double wall heat exchanger is required. The



double-wall heat exchanger must have an intermediate space between the walls that is open to the atmosphere. This type of construction would allow any leakage of fluid through the walls of the heat exchanger to discharge externally to the heat exchanger where it would be observable [see Figure 608.16.3(3)].

608.16.4 Connections to automatic fire sprinkler systems and standpipe systems. The potable water supply to automatic fire sprinkler and standpipe systems shall be protected against backflow by a double check-valve assembly or a reduced pressure principle backflow preventer.

Exceptions:

1. Where systems are installed as a portion of the water distribution system in accordance with the requirements of this code and are not provided with a fire department connection, isolation of the water supply system shall not be required.
 2. Isolation of the water distribution system is not required for deluge, preaction or dry pipe systems.
- ❖ A double check-valve assembly is the minimum form of backflow prevention required between the potable water supply and an automatic fire sprinkler system or standpipe system. Protection by a double check-valve assembly is permitted only where the sprinkler or standpipe system is filled from a potable source. A double check-valve assembly is tested and rated for low-hazard backpressure applications typically as-

sociated with automatic sprinkler systems.

If antifreeze or other chemicals are added to a sprinkler or standpipe system or if a nonpotable hazardous secondary supply system is involved, such as water of unknown quality entering from the fire department connection during fire fighting, the potable water supply must be protected with a reduced pressure principle backflow preventer (see commentary, Section 609.16.4.1).

Exception 1 addresses the installation of dual-purpose (combination) water distribution and fire sprinkler piping systems. Where only spot protection is provided with limited-area sprinkler systems and in residential applications, it is not uncommon for fire sprinklers to be supplied from the domestic water service and water distribution system. In such systems, there is no fire department connection through which water can be pumped into the system, and the entire piping system, including sprinkler piping, is constructed of materials that are approved for potable water distribution. Because there is no potential source of backflow contamination in such systems, a backflow preventer is not required [see Figure 608.16.4(1)].

Exception 1 is not intended to apply to separate (independent) water distribution systems and fire sprinkler systems that share only a common water service. Where the fire sprinklers and water distribution system share no piping in common other than the main supply (water service) and both systems are constructed of

P96-06/07
608.16.1

AS

Proposed Change as Submitted:

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C.

Revise as follows:

608.16.1 Beverage dispensers. The water supply connection to beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022, CSA B64.3.1 or by an air gap. The portion of the backflow preventer device downstream from the second check valve and the piping downstream therefrom shall not be affected by carbon dioxide gas.

Reason: I submitted this change originally. I have found that the section is not always being properly interpreted regarding the backflow preventer. Some ASSE 1022 devices have brass components in the area of the first check valve and the intermediate opening to the outside. The use of brass in these areas has no impact of the quality of the water supplying the carbonated beverage dispenser. The important components required to have non-copper or copper alloy material are from the second check valve and downstream from that check. This is the part of the system that can come in contact with carbonated water that may still be used in a carbonated beverage.

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action:

Approved as Submitted

Committee Reason: The proposed revision is consistent with the requirements of ASSE 1022 and provides a needed clarification regarding what parts must be unaffected by carbon dioxide gas.

Assembly Action:

None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rand Ackroyd, Rand Engineering, representing himself, requests Disapproval.

Commenter's Reason: It is not appropriate to add a design requirement for a backflow preventer to the Code. The specific requirement for materials of construction for the backflow preventer is already in ASSE 1022 Standard referenced in the Code.

Final Action: AS AM AMPC ____ D

P97-06/07
608.16.1

AS

Proposed Change as Submitted:

Proponent: Paul Bladdick and Barry Pines, Code Study Development Group of Southeast Michigan

Revise as follows:

608.16.1 Beverage dispensers. The water supply connection to beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022, ~~CSA B64.3.1~~ or by an air gap. The backflow preventer device and the piping downstream there from shall not be affected by carbon dioxide gas.

Reason: The CSA B64 Standards were included in the IPC under the premise that they are same as the ASSE Standards. Upon in depth analysis they are significantly different from the ASSE Standards. Some of the differences include different names of the devices and different abbreviations, different performance requirements, different material requirements, and different test requirements. The CSA standards are not promulgated under the ANSI process and procedures. The CSA B64 standards use metric measurements vs. English measurements. The CSA standards do not specify the order the tests should be conducted.

CSA B64.3.1-01's check valve sealing test is a resistance to opening test, whereas ASSE 1022-2003 is a resealing test. The CSA test does not verify the resealing of the check valve. CSA B64.3.01 does not have a vent port leakage test at various flows; ASSE 1022-2003 does. CSA B64.3.1-01's endurance test uses a carbonator. ASSE 1022-2003 does not. It specifies the backpressure on the device instead. The CSA B64.3.1-01 endurance test produces only half of the backpressure required in ASSE 1022-2003. CSA B64.3.1-01's backpressure tests on the upstream and the downstream checks are conducted at half the pressure required by ASSE 1022-2003.

water system shall conform to Sections 608.16.1 through 608.16.10.

608.16.1 Beverage dispensers. The water supply connection to beverage dispensers shall be protected against backflow by a ~~backflow preventer~~ double check valve with an intermediate atmospheric vent conforming to ASSE 1022, CSA B64.3.1 or by an air gap. The backflow ~~preventer~~ prevention device and the all piping downstream ~~therefrom~~ of the backflow preventer ~~shall not be affected by~~ must be compatible with carbon dioxide gas.

Exception: If a backflow preventer which conforms to ASSE 1032 is installed on a carbonator that conforms to NSF 18, then the double check valve with intermediate atmospheric vent conforming to ASSE 1022 is not required to protect the water supply connection.

Note: The previous language changed the first "preventer" to prevention, but not the second one. Why not the fix the second and third ones? Also, would the exception apply to anything similar in the CSA B64.3.1? [Is the air gap still not acceptable? -Deb]

[**Kaminski comment:** The new word "prevention" cleans up the language. Air gap is not practicable with this installation. Domestic water is under continuous pressure and directly piped.]

[**Dexter comment:** The "Model Code" text should remain unchanged, no justification provided. If staff believes that a change should be made, submit it through the "Model Code" process. The proposed edits should not be made.]

608.16.2 Connections to boilers. The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012 or CSA B64.3. Where conditioning chemicals are introduced into the system, the potable water connection shall be protected by an air gap or a reduced pressure principle backflow preventer, complying with ASSE 1013, CSA B64.4 or AWWA C511.

608.16.3 Heat exchangers. Heat exchangers utilizing an essentially toxic transfer fluid shall be separated from the potable water by double wall construction. An air gap open to the atmosphere shall be provided between the two walls. Heat exchangers utilizing an essentially nontoxic transfer fluid shall be permitted to be of single-wall construction.

608.16.4 Connections to automatic fire sprinkler systems and standpipe systems. The potable water supply to automatic fire sprinkler and standpipe systems shall be protected against backflow by a double check-valve assembly or a reduced pressure principle backflow preventer.

Exceptions:

608.15.4 Protection by a vacuum breaker. Openings and outlets shall be protected by atmospheric-type or pressure-type vacuum breakers. The critical level of the vacuum breaker shall be set a minimum of 6 inches (152 mm) above the flood level rim of the fixture or device. Fill valves shall be set in accordance with Section 425.3.1. Vacuum breakers shall not be installed under exhaust hoods or similar locations that will contain toxic fumes or vapors. Pipe-applied vacuum breakers shall be installed not less than 6 inches (152 mm) above the flood level rim of the fixture, receptor or device served.

608.15.4.1 Deck-mounted and integral vacuum breakers. Approved deck-mounted or equipment-mounted vacuum breakers and faucets with integral atmospheric or spillproof vacuum breakers shall be installed in accordance with the manufacturer's instructions and the requirements for labeling with the critical level not less than 1 inch (25 mm) above the flood level rim.

608.15.4.2 Hose connections. Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type or pressure-type vacuum breaker or a permanently attached hose connection vacuum breaker.

Exceptions:

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

608.16 Connections to the potable water system. Connections to the potable water system shall conform to Sections 608.16.1 through 608.16.10.

608.16.1 Beverage dispensers. The water supply connection to beverage dispensers shall be protected against backflow by a ~~backflow preventer~~ double check valve with an intermediate atmospheric vent conforming to ASSE 1022 or by an air gap. The portion of the backflow preventer ~~device~~ downstream from the second check valve and the all piping downstream ~~therefrom shall not be affected by~~ of the backflow preventer device must be compatible with carbon dioxide gas. [Staff comment - this language is carried forward from previous versions of the code]

[David D. - Model Code language, accept as written. I see no practical reason to carry the old language forward.]

[PAHAC-keep model code language]

608.16.2 Connections to boilers. The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent

P 159-15

608.16.1 (New), 608.16.1, 608.16.1.2 (New)

Proponent: Roger Harper, representing Virginia Plumbing and Mechanical Inspectors Association | skip.harper@dncd.virginia.gov |

2015 International Plumbing Code

Add new text as follows:

608.16.1 Beverage dispensers. The water supply connection to beverage dispensers shall be protected against backflow in accordance with Sections 608.16.1.1 and 608.16.1.2.

Revise as follows:

~~608.16.1.1 Beverage~~ Carbonated beverage dispensers.

The water supply connection to carbonated beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap. The portion of the backflow preventer device downstream from the second check valve of the device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

Add new text as follows:

608.16.1.2 Coffee machines and non carbonated drink dispensers. The water supply connection to coffee machines and noncarbonated beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022, ASSE 1024 or by an air gap.

Reason: This section needs to be sub-divided into two categories one for carbonated beverage dispensers and one for non carbonated dispensers

Cost Impact: Will not increase the cost of construction

There is no cost increase but actually less cost in many cases because of the price difference between the backflow devices

P 159-15 608.16.1-HARPER3519

AS

P 160-15

608.16.1, 608.16.9, 608.16.10

Proponent: Janine Snyder, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2015 International Plumbing Code

Revise as follows:

608.16.1 Beverage dispensers. The water supply connection to ~~each beverage dispenser~~dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an *air gap*. The portion of the backflow preventer device downstream from the second check valve and the piping downstream therefrom shall not be affected by carbon dioxide gas.

608.16.9 Dental pumping equipment. ~~Where the water supply connection to each dental pumping equipment connects to the water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, 608.13.2, 608.13.5, 608.13.6 or 608.13.8.~~

608.16.10 Coffee machines and noncarbonated beverage dispensers. The water supply connection to ~~each coffee machine~~machine and ~~each noncarbonated beverage dispenser~~dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an *air gap*.

Reason: The reason for these revisions should be obvious. Each "unit" needs to be protected from backflow from the other "unit". For example, installing one backflow preventer device to serve multiple "units" leaves open the possibility that contamination in one "unit" could contaminate an adjacent "unit". In other words, cross contamination could occur. Although the backflow protection section of the code is primarily concerned with protecting the potable water supply from the "units", the code needs to also be specific about protection between units. These changes make this clear. Hopefully, many jurisdictions have already been aware of this potential problem and have already required separate backflow prevention devices for these units.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes. This is PMGCAC Item 128.

Cost Impact: Will increase the cost of construction.

This proposal will increase the cost of construction because additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code. For those jurisdictions that were not enforcing the code in this manner, yes, there might need to be extra backflow prevention devices installed. In those situations there will be an increased cost of material and labor.

P 160-15 : 608.16.1-SNYDER4014

AS

P 161-15

608.16.1, 608.16.1.1 (New), 608.16.1.2 (New), 608.16.10

Proponent: Janine Snyder, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2015 International Plumbing Code

Revise as follows:

~~608.16.1 Beverage dispensers. The water supply connection to beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap. The portion of the backflow preventer device downstream from the second check valve in accordance with Section 608.16.1.1 and the piping downstream therefrom shall not be affected by carbon dioxide gas.~~

Add new text as follows:

608.16.1.1 Carbonated beverage dispensers. The water supply connection to carbonated beverage dispensers shall be protected against backflow by a backflow prevention device conforming to ASSE 1022 or by an air gap. The portion of the backflow preventer device downstream from the second check valve of the device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

608.16.1.2 Coffee machines and noncarbonated beverage dispensers. The water supply connection to coffee machines and noncarbonated beverage dispensers shall be protected against backflow by a backflow prevention device conforming to ASSE 1024 or by an air gap.

Delete without substitution:

~~608.16.10 Coffee machines and noncarbonated beverage dispensers. The water supply connection to coffee machines and noncarbonated beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap.~~

Reason: There is not a need to protect the potable water supply to coffee machines and noncarbonated beverage dispensers with a backflow prevention device that is suitable for a potable water supply connection to a carbonated beverage dispenser. The ASSE 1022 device is constructed especially for exposure to carbon dioxide gas and carbonated water. An ASSE 1024 device is a dual check valve device just like the ASSE 1022 device but it does not have an intermediate atmospheric vent and thus does not require a drain. There isn't any justification for needing to use the ASSE 1022 device (and having to provide a drain for the vent) where there will not be exposure to carbon dioxide gas or carbonated water. What comes from a coffee machine or a non-carbonated beverage dispenser is supposedly safe enough to ingest so why have so great of concern that the potable water supply might become "polluted" with something that will not make people sick if an ASSE 1024 device fails. (See the definition of POLLUTED in Chapter 2)

Also consider that in general ASSE 1022 devices apparently don't have a long life according to many field reports. On the other hand ASSE 1024 devices are frequently used with great success in many other similar low hazard applications.

This proposal is submitted by the ICC Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes. This is PMGCAC Item 95.

Cost Impact: Will not increase the cost of construction.

This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code.

P 161-15 : 608.16.1 SNYDER4015

AS

CHANGE TYPE: Modification


CHANGE SUMMARY: Only carbonated beverage dispensers require a backflow preventer that is designed for exposure to carbon dioxide gas. Also, because of the potential for cross-contamination between noncarbonated drink dispensers and or coffee machines, each dispenser or machine supplied with potable water must have a backflow preventer (or air gap) at the connection to the potable water supply.

2018 CODE: ~~608.16.1~~ **608.17.1.1 Beverage** Carbonated beverage dispensers. The water supply connection to carbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an *air gap*. The portion of the backflow preventer device downstream from the second check valve of the device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

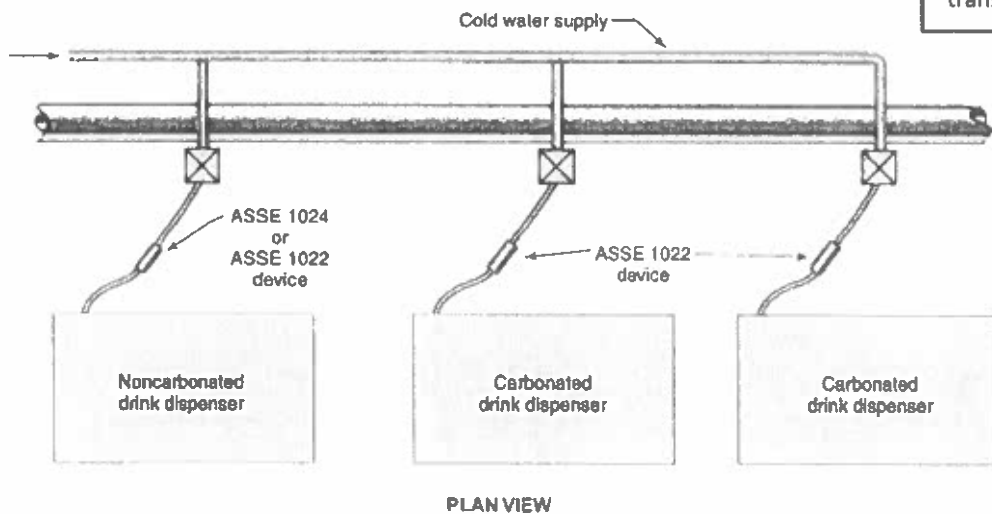
608.17.1.2 Coffee machines and noncarbonated drink dispensers. The water supply connection to each coffee machine and each noncarbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or ASSE 1024, or protected by an *air gap*.

CHANGE SIGNIFICANCE: An ASSE 1022 backflow preventer, specially designed for carbon dioxide exposure, is only required for a carbonated drink dispenser, not for noncarbonated drink dispensers or coffee machines. Coffee machines and noncarbonated beverage dispensers can now be connected to the potable water supply using ASSE 1024 backflow preventers. The ASSE 1022 device has a vent opening that leaks water when the downstream check valve of the device fails. The leaking water requires a safe point of discharge (a drain) which sometimes necessitates a complex air gap drainage arrangement. The ASSE 1024 device (which does not have a vent opening) does not need a drain, thus simplifying many installations. Also, in order to protect against cross-contamination among individual coffee machines and noncarbonated beverage dispensers, each machine and each dispenser requires its own ASSE 1024 device.

608.17.1.1, 608.17.1.2 Independent Backflow Protection for Drink Dispensers



This excerpt is taken from *Significant Changes to the International Plumbing Code®, International Mechanical Code®, International Fuel Gas Code®, 2018 Edition*. Significant Changes publications take you directly to the most important changes that impact projects. Key changes are identified then followed by in-depth discussion of how the change affects real-world application. Photos, tables and illustrations are included to further clarify application. Available for the IBC, IRC, IFC and IPC/IMC/IFGC, the Significant Changes publications are very useful training and review tools for transitioning to a new code edition.



Independent backflow protection

P99-21

IPC: 608.17.1.2, ASSE Chapter 15 (New)

Proponents: Chris Haldiman, Watts Water Technologies, representing Watts Water Technologies (chris.haldiman@wattswater.com); Cameron Rapoport, Watts, representing Watts (cameron.raoport@wattswater.com)

2021 International Plumbing Code

Revise as follows:

608.17.1.2 Coffee machines and noncarbonated drink dispensers. The water supply connection to each coffee machine and each noncarbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022, or ASSE 1024, ASSE 1032 or protected by an *air gap*.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena IL 60448

1032- 2004(R2021): Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers – Post Mix Type

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASSE 1032-2004(R2021) with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

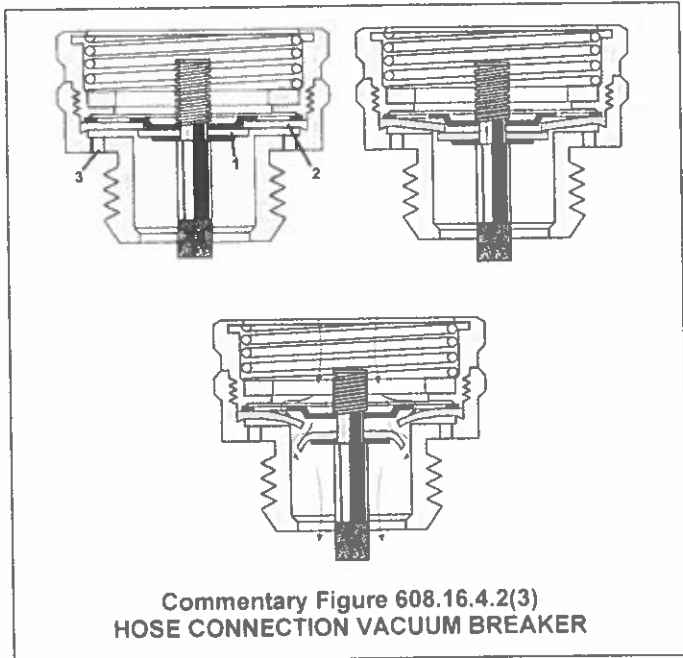
Reason Statement: Post-mix type carbonated beverage dispensers present a higher hazard than non-carbonated beverage dispensers, and therefore the added protection of an atmospheric vent in an ASSE 1022 compliant device is appropriate. However, non-carbonated beverage dispensers present less of a hazard as they do not produce carbonic acid, and therefore a dual check would be an appropriate device. There are two ASSE standards for dual checks, 1032 and 1024.

Though ASSE 1032 states it is specifically for carbonated beverage, examination of the standard leaves no reason it would not be appropriate for non-carbonated beverage. Additionally, ASSE 1032 are more commonly available in appropriate sizes (1/4", 3/8") than ASSE 1024 devices, and with more appropriate end connections given that their intended application is for beverage dispensing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. There is no cost impact, it just offers increased device choices.

P99-21

form of backflow prevention. In Exception 1, water heater and boiler drain valves (with or without hose threads) must be provided with an air gap, and in Exception 2, the clothes washing machine has integral backflow prevention (typically an air gap between the fill pipe and the overflow rim of the washing machine tub).



608.17 Connections to the potable water system. Connections to the potable water system shall conform to Sections 608.17.1 through 608.17.10.

❖ Sections 608.17.1 through 608.17.10 regulate backflow prevention for direct connections between a potable system and nonpotable system. A cross connection exists where there is no atmospheric opening (air gap) between the potable water supply and the source of contamination.

This section addresses cross connections that result from the direct connection of the potable water supply to a closed system such as boilers, vessels, tanks, heat exchangers and nonpotable piping systems.

608.17.1 Beverage dispensers. The water supply connection to beverage dispensers shall be protected against backflow in accordance with Sections 608.17.1.1 and 608.17.1.2.

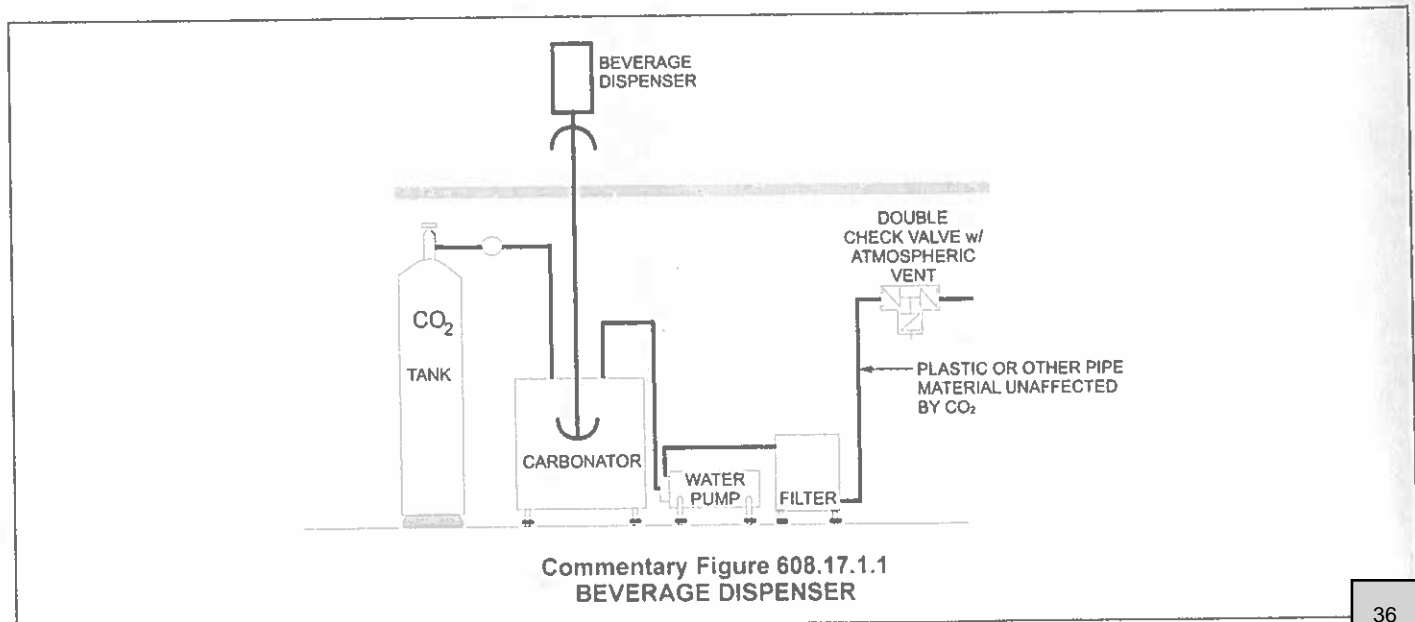
❖ See the commentary to Sections 608.17.1.1 and 608.17.1.2.

608.17.1.1 Carbonated beverage dispensers. The water supply connection to each carbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an *air gap*. The portion of the backflow preventer device downstream from the second check valve of the device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

❖ The potable water supply to a carbonated beverage dispenser must be protected by a backflow preventer with an intermediate atmospheric vent conforming to ASSE 1022 or by an air gap. Concerns have been raised that a dual check valve alone will not show any visible indication of failure. The backflow preventer for beverage dispensing equipment includes two check valves and an atmospheric vent. If there is failure of the downstream check and the backpressure exceeds the supply pressure, the vent will discharge, giving a visual indication of the check valve's failure. Piping downstream of the backflow preventer with intermediate atmospheric vent must not be copper. These requirements are intended to prevent carbon dioxide (CO₂) gas backflow into copper water supply lines, which causes leaching of copper into the potable water supply (see Commentary Figure 608.17.1.1).

Note that this section requires that each carbonated beverage water connection be provided with a backflow preventer. For example, where there are two carbonated beverage dispensers at a location served by one potable water supply connection, each dispenser must be provided with its own backflow preventer. This prevents a possible cross contamination issue between machines.

Prior to the 2009 edition of the code, a carbonated beverage dispenser backflow preventer that met the CSA B64.3.1 standard was acceptable. An in-depth analysis comparing the test protocols between the



ASSE and CSA standards suggested that the CSA standard was not equal to the requirements of ASSE. Because the use of ASSE 1022 devices has a long history of providing safe conditions, and the majority of beverage dispenser manufacturers only specify the ASSE 1022 device for use with their equipment, the CSA standard was removed from this section.

608.17.1.2 Coffee machines and noncarbonated drink dispensers. The water supply connection to each coffee machine and each noncarbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or ASSE 1024, or protected by an *air gap*.

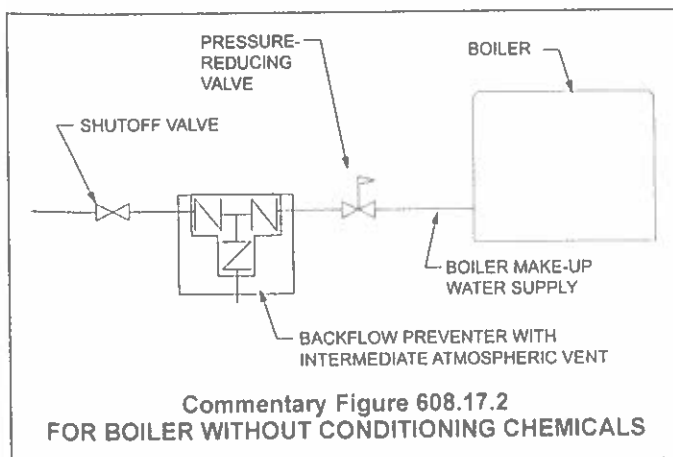
❖ The potable water supply to a coffee machine or a noncarbonated beverage dispenser must be protected by a backflow preventer with an ASSE 1022 device, an ASSE 1024 device or by an *air gap*. All these devices will provide the needed level of protection. Note that this section requires that each coffee machine and each noncarbonated beverage water connection is to be provided with a backflow preventer. For example, where there are two noncarbonated beverage dispensers at a location served by one potable water supply connection, each dispenser must be provided with its own backflow preventer. This prevents a possible cross contamination issue between machines.

608.17.2 Connections to boilers. The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012, ASSE 1081 or CSA B64.3. Where conditioning chemicals are introduced into the system, the potable water connection shall be protected by an *air gap* or a reduced pressure principle backflow preventer, complying with ASSE 1013, AWWA C511 or CSA B64.4.

❖ Because boilers are pressurized vessels, the potential for backflow caused by backpressure is quite high. Any time the potable water supply pressure drops below boiler pressure, backflow can occur.

Where a boiler system contains only untreated, unconditioned water supplied from a potable source, a backflow preventer with an intermediate atmospheric vent can be installed (see Commentary Figure 608.17.2).

Where any chemicals are added to the boiler system, the potable water supply connection must be protected with a reduced pressure principle backflow preventer.



608.17.3 Heat exchangers. Heat exchangers utilizing an *essentially toxic transfer fluid* shall be separated from the potable water by double-wall construction. An *air gap* open to the atmosphere shall be provided between the two walls. Heat exchangers utilizing an *essentially nontoxic transfer fluid* shall be permitted to be of single-wall construction.

❖ The extent of isolation required for a heat exchanger depends on the type of fluid used on the exchanger's nonpotable side. From the definition of "Essentially nontoxic transfer fluid," the Gosselin rating of nonpotable fluid must be evaluated. If the fluid has a Gosselin rating of 1, a single-wall heat exchanger is permitted.

The Gosselin rating is a measure of the toxicity of a substance. The name originates from one of the prime developers of the rating system, Dr. Robert E. Gosselin, professor of Pharmacology at Dartmouth Medical School in New Hampshire.

Gosselin toxicity ratings are the values used by medical personnel to analyze poison victims. The ratings are based on the probable lethal dose for a human. The six levels of Gosselin ratings are outlined in Commentary Figure 608.17.3(1).

Some of the commercially available transfer fluids with a Gosselin rating of 1 are identified in Commentary Figure 608.17.3(2).

Where the heat transfer fluid has a Gosselin rating of 2 or more, a double-wall heat exchanger is required. The double-wall heat exchanger must have an intermediate space between the walls that is open to the atmosphere. This type of construction would allow any leakage of fluid through the walls of the heat exchanger to discharge externally to the heat exchanger where it would be observable [see Commentary Figure 608.17.3(3)].

TOXICITY RATING OR CLASS	PROBABLE ORAL LETHAL DOSE (HUMAN)	
	Dose	For 70 kg person (150 pounds)
6 Super toxic	Less than 5 mg/kg	A taste (less than 7 drops)
5 Extremely toxic	5-50 mg/kg	Between 7 drops and 1 teaspoon
4 Very toxic	50-500 mg/kg	Between 1 teaspoon and 1 ounce
3 Moderately toxic	0.5-5 g/kg	Between 1 ounce and 1 pint (pound)
2 Slightly toxic	5-15 g/kg	Between 1 pint and 1 quart
1 Practically nontoxic	Above 15 g/kg	More than 1 quart (2.2 pounds)

**Commentary Figure 608.17.3(1)
GOSSELIN RATINGS**

608.17.4 Connections to automatic sprinkler systems and standpipe systems. The potable water supply to automatic sprinkler systems and standpipe systems shall be protected against backflow by a double check backflow prevention

File Attachments for Item:

R-1 Petition #23-04 - RCO 311.7.1 Two handrails - Robert Kramer

BOARD OF BUILDING STANDARDS

6606 Tussing Road, P.O. Box 4009

Reynoldsburg, Ohio 43068-9009

(614) 644-2613

bbs@ohio.gov

www.com.state.oh.us/dico/bbs/default.aspx

APPLICATION

FOR RULE CHANGE



Pursuant to section 3781.12 of the Revised Code and rules adopted by the Board of Building Standards, application is herewith submitted to adopt, amend, or annul a rule adopted by the Board pursuant to section 3718.10 of the Revised Code.

For BBS use:	
Petition #:	23-04
Date Recv'd:	03/27/2023

Submitter: ROBERT KRAMER CITIZEN
(Contact Name) (Organization/Company)

Address: 5690 GENEVIEVE PLACE
(Include Room Number, Suite, etc.)

FAIRFIELD OHIO 45014
(City) (State) (Zip)

Telephone Number: 513-885-4600 Fax Number: _____

Date: MARCH 26, 2023 E-mail Address: KEYNOTEMAN@HOTMAIL.COM

Code Section: 101

General Explanation of Proposed Change (attach additional sheets if necessary):

311.7.1 Stairways shall not be less than 36 inches (914 mm) in clear width at all points above the permitted handrail height and below the required headroom height. Handrails must be installed on both sides of all stairways and shall not project more than 4.5 inches (114 mm) on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 31½ inches (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are provided on both sides

1. Around 24,760,843 patients were admitted to emergency departments due to staircase-related injury during a 23 year-long study by NEISS.
2. In an average year, 1,076,558 people in the US suffer from a staircase-related injury.
3. More than 12,000 people meet death from falling down stairs every year. This itself tells how fatal a fall could be. Simple tripping down stairs or falling off the stairs can rewrite one's destiny. Since the fall will be very fast, the speed of impacting your head or back will occur in a fraction of a second.

The cost should be no more than \$200.00 per home.

Explanation of Cost Impact of Proposed Code Change*: _____

* Attach additional cost information as necessary to justify any statement of cost increase or cost decrease.

SECTION 311 MEANS OF EGRESS

311.1 Means of egress. Dwellings shall be provided with a means of egress in accordance with this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the dwelling to the required egress door without requiring travel through a garage. The required egress door shall open directly into a public way or to a yard or court that opens to a public way.

311.2 Egress door. Not less than one egress door shall be provided for each dwelling unit. The egress door shall be side-hinged, and shall provide a clear width of not less than 32 inches (813 mm) where measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The clear height of the door opening shall be not less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the dwelling without the use of a key or special knowledge or effort.

311.2.1 Garage access doors. Garages shall be served by at least one side hinged door not less than 2 feet 6 inches (760 mm) in width and 6 feet 8 inches (2032 mm) in height. Such door located between a dwelling and an attached garage shall be acceptable for meeting this requirement.

311.3 Floors and landings at exterior doors. There shall be a landing or floor on each side of each exterior door. The width of each landing shall be not less than the door served. Landings shall have a dimension of not less than 36 inches (914 mm) measured in the direction of travel. The slope at exterior landings shall not exceed 1/4 unit vertical in 12 units horizontal (2 percent). Exception: Exterior balconies less than 60 square feet (5.6 m²) and only accessed from a door are permitted to have a landing that is less than 36 inches (914 mm) measured in the direction of travel.

311.3.1 Floor elevations at the required egress doors. Landings or finished floors at the required egress door shall be not more than 1 1/2 inches (38 mm) lower than the top of the threshold. Exception: The landing or floor on the exterior side shall be not more than 8 1/4 -inches (209 mm) below the top of the threshold provided that the door does not swing over the landing or floor. Where exterior landings or floors serving the required egress door are not at grade, they shall be provided with access to grade by means of a ramp in accordance with Section 311.8 or a stairway in accordance with Section 311.7.

311.3.2 Floor elevations at other exterior doors. Doors other than the required egress door shall be provided with landings or floors not more than 8 1/4 -inches (209 mm) below the top of the threshold.

Exception: A top landing is not required for the stairway located on the exterior side of the door, provided that the threshold of the door is not more than 30" above the adjacent grade and the door does not swing over the stairway.

311.3.3 Storm and screen doors. Storm and screen doors shall be permitted to swing over exterior stairs and landings.

311.4 Vertical egress. Egress from habitable levels including habitable attics and basements that are not provided with an egress door in accordance with Section 311.2 shall be by a ramp in accordance with Section 311.8 or a stairway in accordance with Section 311.7.

311.5 Landing, deck, balcony and stair construction and attachment. Exterior landings, decks, balconies, stairs and similar facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting. Attachment shall not be accomplished by use of toenails or nails subject to withdrawal.

311.6 Hallways. The width of a hallway shall be not less than 3 feet (914 mm).

311.7 Stairways.

311.7.1 Width. Stairways shall be not less than 36 inches (914 mm) in clear width at all points above the permitted handrail height and below the required headroom height. The clear width of stairways at and below the handrail height, including treads and landings, shall be not less than 31 1/2 inches (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are installed on both sides *in accordance with 311.7.8*. Exception: The width of spiral stairways shall be in accordance with Section 311.7.10.1.

311.7.2 Headroom. The headroom in stairways shall be not less than 6 feet 8 inches (2032 mm) measured vertically from the sloped line adjoining the tread nosing or from the floor surface of the landing or platform on that portion of the stairway.

Exceptions:

1. Where the nosings of treads at the side of a flight extend under the edge of a floor opening through which the stair passes, the floor opening shall not project horizontally into the required headroom more than 4 3/4 inches (121 mm).

2. The headroom for spiral stairways shall be in accordance with Section 311.7.10.1.

311.7.3 Vertical rise. A flight of stairs shall not have a vertical rise larger than 148 1/2 -inches (3772 mm) between floor levels or landings.

311.7.4 Walkline. The walkline across winder treads and landings shall be concentric to the turn and parallel to the direction of travel entering and exiting the turn. The walkline shall be located 12 inches (305 mm) from the inside of the turn. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear stair width at the walking surface. Where winders are adjacent within a flight, the point of the widest clear stair width of the adjacent winders shall be used.

311.7.5 Stair treads and risers. Stair treads and risers shall meet the requirements of this section. For the purposes of this section, dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners.

311.7.5.1 Risers. The riser height shall be not more than 8 1/4 -inches (209 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of

the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. At open risers, openings located more than 30 inches (762 mm), as measured vertically, to the floor or grade below shall not permit the passage of a 4-inch-diameter (102 mm) sphere. Exceptions: 1. The opening between adjacent treads is not limited on spiral stairways. 2. The riser height of spiral stairways shall be in accordance with Section 311.7.10.1.

311.7.5.2 Treads. The tread depth shall be not less than 9 -inches (229 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

311.7.5.2.1 Winder treads. Winder treads shall have a tread depth of not less than 9 -inches (229 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a tread depth of not less than 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm). Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and shall not be required to be within 3/8 inch (9.5 mm) of the rectangular tread depth. Exception: The tread depth at spiral stairways shall be in accordance with Section 311.7.10.1.

311.7.5.3 Nosings. Nosings at treads, landings and floors of stairways shall have a radius of curvature at the nosing not greater than 9/16 inch (14 mm) or a bevel not greater than 1/2 inch (12.7 mm). A nosing projection not less than 3/4 inch (19 mm) and not more than 1 1/4 inches (32 mm) shall be provided on stairways. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 -inch (9.5 mm) within a stairway. Exception: A nosing projection is not required where the tread depth is not less than 11 inches (279 mm).

311.7.5.4 Exterior plastic composite stair treads. Plastic composite exterior stair treads shall comply with the provisions of this section and Section 507.2.2.

311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway. The width perpendicular to the direction of travel shall be not less than the width of the flight served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the stairway has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm). Exception: A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided that a door does not swing over the stairs.

311.7.7 Stairway walking surface. The walking surface of treads and landings of stairways shall be sloped not steeper than one unit vertical in 48 inches horizontal (2-percent slope).

311.7.8 Handrails. Handrails shall be provided on not less than one side of each flight of stairs with four or more risers. Where the stairway width exceeds (36, 54, 60) inches, a handrail is to be provided on both sides of the flight of stairs.

311.7.8.1 Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) Exceptions: 1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread. 2. Where handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to guard, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed 38 inches (956 mm).

311.7.8.2 Handrail projection. Handrails shall not project more than 4 1/2 inches (114 mm) on either side of the stairway. Exception: Where nosings of landings, floors or passing flights project into the stairway reducing the clearance at passing handrails, handrails shall project not more than 6 1/2 inches (165 mm) into the stairway, provided that the stair width and handrail clearance are not reduced to less than that required.

311.7.8.3 Handrail clearance. Handrails adjacent to a wall shall have a space of not less than 1 1/2 inches (38 mm) between the wall and the handrails.

311.7.8.4 Continuity. Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned or shall terminate in newel posts or safety terminals. Exceptions: 1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread. 2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread. 3. Two or more separate rails shall be considered continuous if the termination of the rails occurs over a single tread and positioned within 4 inches of each other. If the transition occurs between a wall mounted handrail and handrail/guardrail combination, the wall mounted handrail shall return into the wall.

311.7.8.5 Grip size. Required handrails shall be of one of the following types or provide equivalent graspability. 1. Type I. Handrails with a circular cross section shall have an outside diameter of not less than 1 1/4 inches (32 mm) and not greater than 2 inches (51 mm). If the handrail is not circular, it shall have a perimeter of not less than 4 inches (102 mm) and not greater than 6 1/4 inches (160 mm) and a cross section of not more than 2 1/4 inches (57 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm). 2. Type II. Handrails with a perimeter greater than 6 1/4 inches (160 mm) shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within 3/4 inch (19 mm) measured vertically from the tallest portion of the profile and have a depth of not less than 5/16 inch (8 mm) within 7/8 inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than 3/8 inch (10 mm) to a level that is not less than 1 3/4 inches (45 mm) below the tallest portion of the profile. The width of the handrail above the recess shall be not less than 1 1/4 inches (32 mm) and not more than 2 3/4 inches (70 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).

311.7.8.6 Exterior plastic composite handrails. Plastic composite exterior handrails shall comply with the requirements of Section 507.2.2.

311.7.9 Illumination. Stairways shall be provided with illumination in accordance with Sections 303.7 and 303.8.

311.7.10 Special stairways. Spiral stairways and bulkhead enclosure stairways shall comply with the requirements of Section 311.7 except as specified in Sections 311.7.10.1 and 311.7.10.2.

311.7.10.1 Spiral stairways. The clear width at and below the handrails at spiral stairways shall be not less than 26 inches (660 mm) and the walkline radius shall be not greater than 241/2 inches (622 mm). Each tread shall have a depth of no less than 63/4 inches (171 mm) at the walkline. Treads shall be identical, and the rise shall be not more than 91/2 inches (241 mm). Headroom shall be not less than 6 feet 6 inches (1982 mm).

311.7.10.2 Bulkhead enclosure stairways. Stairways serving bulkhead enclosures, not part of the required building egress, providing access from the outside grade level to the basement shall be exempt from the requirements of Sections 311.3 and 311.7 where the height from the basement finished floor level to grade adjacent to the stairway is not more than 8 feet (2438 mm) and the grade level opening to the stairway is covered by a bulkhead enclosure with hinged doors or other approved means.

311.7.11 Alternating tread devices. Alternating tread devices shall not be used as an element of a means of egress. Alternating tread devices shall be permitted provided that a required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches (508 mm). Exception: Alternating tread devices are allowed to be used as an element of a means of egress for lofts, mezzanines and similar areas of 200 gross square feet (18.6m²) or less where such devices do not provide exclusive access to a kitchen or bathroom.

311.7.11.1 Treads of alternating tread devices. Alternating tread devices shall have a tread depth of not less than 5 inches (127 mm), a projected tread depth of not less than 81/2 inches (216 mm), a tread width of not less than 7 inches (178 mm) and a riser height of not more than 91/2 inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing or floor surface.

311.7.11.2 Handrails of alternating tread devices. Handrails shall be provided on both sides of alternating tread devices and shall comply with Sections 311.7.8.2 to 311.7.8.6. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

311.7.12 Ships ladders. Ships ladders shall not be used as an element of a means of egress. Ships ladders shall be permitted provided that a required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at

and below the handrails shall be not less than 20 inches (508 mm). Exception: Ships ladders are allowed to be used as an element of a means of egress for lofts, mezzanines and similar areas of 200 gross square feet (18.6 m²) or less that do not provide exclusive access to a kitchen or bathroom.

311.7.12.1 Treads of ships ladders. Treads shall have a depth of not less than 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the nosing projection is not less than 8 1/2 inches (216 mm). The riser height shall be not more than 9 1/2 inches (241 mm).

311.7.12.2 Handrails of ships ladders. Handrails shall be provided on both sides of ships ladders and shall comply with Sections 311.7.8.2 to 311.7.8.6. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

311.8 Ramps.

311.8.1 Maximum slope. Ramps serving the egress door required by Section 311.2 shall have a slope of not more than 1 unit vertical in 8 units horizontal (12.5 -percent slope).

311.8.2 Landings required. There shall be a floor or landing at the top and bottom of each ramp, where doors open onto ramps, and where ramps change directions. The width of the landing perpendicular to the ramp slope shall be not less than 36 inches (914 mm).

311.8.3 Handrails required. Handrails shall be provided on not less than one side of ramps exceeding a slope of one unit vertical in 12 units horizontal (8.33percent slope). *Where the ramp width exceeds (36, 54, 60) inches, a handrail is to be provided on both sides of the ramp.*

311.8.3.1 Height. Handrail height, measured above the finished surface of the ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

311.8.3.2 Grip size. Handrails on ramps shall comply with Section 311.7.8.5.

311.8.3.3 Continuity. Handrails where required on ramps shall be continuous for the full length of ramp. Handrail ends shall return or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1 1/2 -inches (38 mm) between the wall and the handrails.

File Attachments for Item:

NB-1 Elevator rules - 5 year rule review

2022 (extended to 2023) Five-Year Rule-Review Proposed Changes

BBS Elevator Rules (July 2023)

4101:5-1-01 Scope – Amend

4101:5-1-02 Definitions – Amend

4101:5-1-03 Enforcement – Amend

4101:5-1-04 Application for permit - Amend

4101:5-1-05 Adjudication order - Amend

4101:5-1-06 Examination for certificate of competency - Amend

4101:5-1-07 Assessment fee - Amend

4101:5-3-01 Accepted engineering practice and approved standards - Amend

4101:5-3-02 Resolution of conflicts - Amend

4101:5-1-01 Scope.

This ~~code covers~~ division of the Administrative Code applies to the design, construction, repair, alteration, and maintenance of:

- (A) Passenger elevators;
- (B) Freight elevators;
- (C) Stage lifts;
- (D) Dumbwaiters;
- (E) Escalators;
- (F) Moving walks;
- (G) Belt Manlifts;

~~(H) Mine elevators;~~

~~(H)~~ (H) Wind Elevators in wind turbine tower elevators towers connected to building services equipment;

~~(I)~~ (I) Special service elevators and other lifting and lowering equipment as provided for by section 4105.01 of the Revised Code, but ~~shall~~ does not include the following:

- (1) Conveyors and related equipment within the scope of "ANSI B20.1";

- (2) Tiering or piling machines used to move material to and from storage and located and operating entirely within one story;
- (3) Equipment for feeding or positioning materials at machine tools, printing presses, etc.;
- (4) Hoists for raising or lowering materials and which are provided with unguided hooks, slings, and similar means for attachment to the materials;
- (5) Skip or furnace hoists;
- (6) Wharf ramps;
- (7) Amusement devices, but does include elevators in observation towers, etc.;
- (8) Lift bridges;
- (9) Railroad car lifts or dumpers;
- (10) Material hoists and material lifts; and
- (11) Workmen's hoists in place for the duration of the construction renovation or demolition of the project; and
- (12) Elevators within individual dwelling units.

4101:5-1-02 Definitions.

~~Note: For definitions~~ This rule defines terms used in rules 4101:5-1-01 to 4101:5-3-02 of the Administrative Code.

(For-definitions of terms not contained herein, refer to the "ASME" standards listed in rule 4101:5-3-01 of the Administrative Code.)

"ASME" means the "American Society of Mechanical Engineers." Referenced standards, codes, and related technical information developed by this organization can be purchased by logging on to <http://www.asme.org> or by calling 1-800-the-asme.

"Board" means the board of building standards as established by section 3781.07 of the Revised Code and authorized by division (A) of section 4105.011 of the Revised Code to formulate rules and regulations governing the design, construction, repair, alteration, and maintenance of elevators.

"Board of building appeals" means the board of building appeals as established by section 3781.19 of the Revised Code.

"Division" means the division of industrial compliance in the department of commerce.

"Elevator" means, a hoisting and lowering apparatus equipped with a car, cage, or platform which moves on or between permanent rails or guides and serves two or more fixed landings in a building or structure to which section 3781.06 of the Revised Code applies. "Elevator" includes

dumb-waiters other than hand-powered dumb-waiters, escalators, manlifts of the endless belt type, moving walks, other lifting or lowering apparatus permanently installed on or between rails or guides, and all equipment, machinery, and construction related to any elevator; but does not include construction hoists and other similar temporary lifting or lowering apparatuses, ski lifts, traveling, portable amusement rides or devices that are not affixed to a permanent foundation, or nonportable amusement rides or devices that are affixed to a permanent foundation.

"Freight elevator" means an elevator normally used for carrying freight and on which only the operator and employees in the pursuit of their duties, by the permission of the employer, are allowed to ride.

"General inspector" means a state inspector examined and hired to inspect elevators and lifting apparatus for that state.

"Inspector" means either a general or special inspector.

"Moving walks" means a type of passenger-carrying device on which passengers stand or walk, and in which the passenger-carrying surface remains parallel to its direction of motion and is uninterrupted.

"Owner or user" means any person, firm or corporation owning or operating any elevator.

"Special inspector" means an inspector examined and commissioned by the superintendent to inspect elevators and lifting apparatus in the state.

"Superintendent" means the superintendent of the division of industrial compliance created in the department of commerce under section 121.04 of the Revised Code, or the person designated by the superintendent as responsible for the enforcement of rules 4101:5-1-01 to 4101:5-3-02 and 1301:3-6-01 to 1301:3-6-06 of the Administrative Code.

4101:5-1-03 Enforcement.

- (A) The superintendent of the division of industrial compliance ~~shall enforce all~~ enforces the provisions of rules 4101:5-1-01 to 4101:5-3-02 and rules 1301:3-6-01 to 1301:3-6-06 of the Administrative Code relating to the design, construction, repair, alteration, and maintenance of elevators and elevator controls as defined in rule 4101:5-1-02 of the Administrative Code.

Exception: Municipal corporations, such as the city of Cleveland and the city of Cincinnati, which are authorized to adopt regulations for the regular inspection of elevators pursuant to section 4105.19 of the Revised Code.

- (B) All requirements within the standards referenced in "Table 4101:5-3-01" of rule 4101:5-3-01 of the Administrative Code that relate to the construction of the building and the building service equipment located within an elevator hoistway enclosure, hoistway, machine room, and control room such as, but not limited to, requirements for wall materials, wall fire resistance ratings, fire and/or smoke dampers, means of egress doors and hardware, ladders, air conditioning systems, ventilation systems, fire protection systems, lighting systems, electrical power supply to the elevator controls, lighting switches, electrical disconnects and selective coordination of

overcurrent protective devices (OCPD), plumbing, sanitary piping, and sump pits ~~shall~~ are to be enforced by the building official having jurisdiction as determined in division (A)(1) of section 3791.04 of the Revised Code.

4101:5-1-04 Application for permit.

In accordance with section 4105.16 of the Revised Code-, every owner or contractor ~~shall~~ is required to apply for and obtain a permit from the division of industrial compliance prior to the installation of, alteration of, or repair of any elevator regulated by the division. The application ~~shall~~ is to be made on forms prescribed by the superintendent and in accordance with rule 1301:3-6-03 of the Administrative Code.

4101:5-1-05 Adjudication order.

Before attempting to enforce, by any remedy, civil or criminal, the provisions with which the proposed or inspected elevator does not comply, the superintendent ~~shall~~ will issue an adjudication order in accordance with section 4105.11 of the Revised Code. The owner of the elevator specified therein may appeal to the board of building appeals under section 3781.19 of the Revised Code.

4101:5-1-06 Examination for certificate of competency.

- (A) No person may act, either as a general inspector or as a special inspector of elevators, unless ~~he~~ that person holds a certificate of competency issued by the superintendent in accordance with rule 1301:3-6-02 of the Administrative Code.
- (B) The written examination administered by the superintendent, prior to issuance of a certificate of competency, ~~shall be~~ is the "Quality Elevator Inspectors (QEI) Examination."

4101:5-1-07 Assessment fee.

- (A) In accordance with division (I) of section 4105.17 of the Revised Code, in addition to any fees assessed and collected directly from the owner or user for the inspection and issuance of a certificate of operation, the superintendent will collect, directly from the owner or user, a board assessed fee of three dollars and twenty-five cents for each certificate of operation or renewal thereof and for each inspection conducted.
- (B) The three dollars and twenty-five cent assessment fee collected directly from the owner or user on behalf of the board ~~shall~~ is to be remitted to the board when deposited by the division of industrial compliance pursuant to section 121.084 of the Revised Code. The superintendent ~~shall~~ is to report to the board the amounts remitted not later than one month following the first full month's collection and then monthly thereafter.

4101:5-3-01 Accepted engineering practice and approved standards.

Unless otherwise specifically provided for in rules 4101:1-30-01 or 4101:5-1-01 to 4101:5-3-02 of the Administrative Code, compliance with the applicable technical provisions and requirements of the standards listed in "Table 4101:5-3-01" of the Administrative Code ~~this rule~~ is prima facie evidence of conformity with accepted engineering practice or with an approved standard governing the design, construction, repair, alteration and maintenance of elevators.

Compliance with a more recently published edition of a standard listed in "Table 4101:5-3-01" of this rule is acceptable as meeting the minimum standard identified provided that compliance is demonstrated to the entire standard and the specific edition of that standard is identified on the approval record issued by the superintendent. Additionally, the specific edition of that standard is to be identified on the certificate of plan approval and the certificate of occupancy issued by the building official having jurisdiction pursuant to rule 4101:1-1-01 of the Administrative Code. Addenda subsequently issued by the promulgating agency in between published editions is not enforceable unless specifically adopted herein.

Table 4101:5-3-01

Promulgating Agency (Note a)	Standard Identification	Edition	Title
ASME	A 17.1 (Note b)	2016 2019	Safety Code for Elevators and Escalators
ASME	A17.3 (Note c)	2015 2020	Safety Code for Existing Elevators and Escalators.
ASME	A17.6	2010 2017	Standard for Elevator Suspension, Compensation, and Governor Systems
ASME	A17.7	2007	Performance-based Safety Code for Elevators and Escalators
ASME	A17.8	2016	Standard for Wind Turbine Tower Elevators
ASME	A18.1	2014 2020	Safety Standard for Platform Lifts and Stairway Chairlifts

Table 4101:5-3-01

ASME	A 90.1	2015	Safety Standard for Belt Manlifts
ESTA	E1.42	2016 2018	Design, Installation, and Use of Orchestra Pit Lifts
Note a	ASME means the "American Society of Mechanical Engineers" and ESTA means the "Entertainment Services and Technology Association"		
Note b	<p>Section 2.2.2.5-delete the last sentence;</p> <p>Section 8.6.11.10 – delete the entire section.</p> <p>Section 8.11.1.1.2(a)- change to read as follows: Periodic tests, as required in 8.6, are not required to be witnessed by a general or special inspector.;</p> <p>Section 8.11.1.1.2(b)- change to read as follows: Periodic test reports shall <u>are to be</u> submitted to the division within five business days of the completion of the periodic test. The test reports shall <u>are to be</u> on forms prescribed by the superintendent and shall <u>are to</u> include the date and type of test(s) performed, detailed results of the test(s), and a statement as to any corrective action taken.</p>		
Note c	The rules of the board shall <u>are not to be</u> retroactively applied to existing elevators that are not otherwise being altered or repaired. Portions of an elevator not altered and not affected by an alteration are not required to comply with the code requirements for a new elevator.		

4101:5-3-02 Resolution of conflicts.

- (A) In the event of conflict, the rules of the board of building standards adopted pursuant to section 3781.10 of the Revised Code and known as the "Ohio Building Code", the "Ohio Mechanical Code", and the "Ohio Plumbing Code" ~~shall~~ govern any rule or standards adopted by the board pursuant to division (A) of section 4105.011 of the Revised Code.
- (B) The rules of the board ~~shall~~ are not to be retroactively applied to existing elevators that are not otherwise being altered or repaired. Portions of an elevator not altered and not affected by an alteration are not required to comply with the code requirements for a new elevator.

Traditional five-year testing with weights and proposed alternative testing without weights

Overview:

In accordance with standards recommended by the American Society of Mechanical Engineers (ASME) and set forth in the Ohio Revised Code, all suspension-based elevators must have a safety test performed every five years to retain a valid certificate of operation. Depending on the type of elevator being tested and the portion of the test being performed, elevators are weighted to capacity, or 125% of capacity, and then observed as they are raised, lowered, and held. The results of these tests are measurable and directly linked to the minimum requirements adopted in Ohio.

Since 2013, ASME has permitted some alternative testing methods, including the five-year test without weights, with a couple of notable caveats. First, those alternative tests are subject to approval by the Authority Having Jurisdiction, and second, those tests must meet the same safety and public protection standards established by the test that they are seeking to replace.

While the technology now exists to check most of the safety boxes that pertain to a five-year test without weights, Ohio is not ready to endorse such a switch. In the recent past there have been several accidents, including a few fatalities, which involved elevator brakes not being properly adjusted, maintained, and tested.

The requirement of testing elevators with weights provides a more accurate evaluation of the strength and robustness of the system. The real-life simulation measures the reliability of the brakes, safeties, machines, limit switches, and integrity of the overall system. Performing a 125% capacity brake test consists of loading a car in real time with actual weight and sending the car down. The purpose of the test is to determine whether an elevator can handle the weight, and most importantly, safely lower and hold the weight. Performing the actual weight test provides the most reliable and accurate results which promote a better evaluation of the elevator and its systems.

Specifically, the proposed alternative test methods do not adequately demonstrate the “safely lower and hold” portion of this requirement via simulation (no weight). Elevator owners and service providers are encouraged to exceed the minimum ASME testing requirements by complementing the current approved testing methods with alternative testing, but at this time this method will not be considered as an equivalent replacement to traditional five-year safety tests with weights.

File Attachments for Item:

NB-2 Boiler and Pressure Vessel Rules - 5 year rule review

2023 Five-Year Rule-Review Proposed Changes

BBS Boiler Rules (July 2023)

- 4101:4-1-01 Definitions and abbreviations - Amend
- 4101:4-2-01 Scope, administration, and enforcement - Amend
- 4101:4-2-02 Types and qualifications of inspectors - Amend
- 4101:4-3-01 Accepted engineering practice and approved standards - Amend
- 4101:4-4-01 Design of boilers and pressure vessels - Amend
- 4101:4-4-02 Maximum allowable working pressure of new boilers and pressure vessels - Amend
- 4101:4-4-03 Safety devices and controls - Amend
- 4101:4-4-04 Steam boiler blowoff systems - Amend
- 4101:4-4-05 Clearances - Amend
- 4101:4-5-01 Boilers and pressure vessels of special design - Amend
- 4101:4-6-01 Construction and stamping of boilers and pressure vessels - Amend
- 4101:4-7-01 Contractor registration and boiler permits - Amend
- 4101:4-8-01 Inspection of boilers - Amend
- 4101:4-9-01 Existing boilers and pressure vessels - Amend
- 4101:4-10-01 Licensure and attendance requirements of operators - Amend

4101:4-1-01 Definitions and abbreviations.

As used in Chapters 4101:4-1 to 4101:4-10 of the Administrative Code,

- (A) "Alteration" means any change in the item described on the original manufacturer's data report which affects the pressure containing capability of the boiler or pressure vessel. Non physical changes such as an increase in the maximum allowable working pressure (internal or external) or design temperature of a boiler or pressure vessel ~~shall be~~ are considered ~~an alteration~~ alterations. A reduction in minimum temperature such that additional mechanical tests are required ~~shall is~~ also be considered an alteration.
- (B) "ASME" means the "American Society of Mechanical Engineers". Referenced standards, codes, and related technical information developed by this organization can be purchased by logging on to <http://www.asme.org> or by calling 1-800-the-asme.
- (C) "Authorized Inspection Agency" means an entity, accepted by the "National Board," that provides third party inspection services in which boilers and pressure vessels are inspected during

construction, repairs, and alterations to verify their conformity with the code of construction adopted by the board of building standards. Authorized inspection agencies employ authorized inspectors.

- (D) "Authorized Inspector" means an individual holding a "National Board" commission with the appropriate endorsement and designated as such by an "Authorized Inspection Agency".
- (E) "Board" means the board of building standards established by section 3781.07 of the Revised Code and authorized by section 4104.02 of the Revised Code to formulate rules and regulations for the construction, installation, repair, conservation of energy, and operation of boilers and for the construction and repair of pressure vessels.
- (F) "Boiler" means a closed vessel in which water is heated, steam is generated, steam is superheated, or any combination thereof, under pressure or vacuum for use externally to itself by the direct application of heat from the combustion of fuels, or from electricity or nuclear energy. The term boiler ~~shall include~~includes fired units for heating or vaporizing liquids other than water where these units are separate from processing systems and are complete within themselves.
- (G) "Boiler, high pressure, high temperature water" means a water heating boiler operating at pressures exceeding one hundred sixty psig or temperatures exceeding two hundred fifty degrees Fahrenheit.
- (H) "Boiler, low pressure" means a steam boiler operating at pressures not exceeding fifteen psig, or a hot water heating boiler operating at pressures not exceeding one hundred sixty psig or temperatures not exceeding two hundred fifty degrees Fahrenheit.
- (I) "Boiler, portable" means a boiler which is primarily intended for temporary use and the construction and usage of which is obviously portable.
- (J) "Boiler, potable water heater" means a boiler used for supplying potable hot water for commercial purposes at pressures not exceeding one hundred sixty psig and temperatures not exceeding two hundred ten degrees Fahrenheit, except that water heaters are exempted when none of the following limitations are exceeded:
 - (1) Heat input of two hundred thousand Btu per hour;
 - (2) Water temperature of two hundred ten degrees Fahrenheit;
 - (3) Nominal water-containing capacity of one hundred twenty gallons.
- (K) "Boiler, power" means a boiler in which steam or other vapor, to be used externally to itself, is generated at a pressure of more than fifteen psig.
- (L) "Boiler, process" means a boiler to which all of the following apply:
 - (1) The steam in the boiler is either generated or superheated, or both, under pressure or vacuum for use external to itself.
 - (2) The source of heat for the boiler is, in part or in whole, from a process other than the boiler itself.
 - (3) The boiler is part of a continuous processing unit, such as used in chemical manufacture or petroleum refining, other than a steam-generated process unit.

- (M) "Btu" means "British Thermal Unit".
- (N) "Certificate of competency" means the document issued by the superintendent to a person who has passed the examination prescribed by the board of building standards.
- (O) "Certificate of inspection" means a report of the inspection of a boiler as required by sections 4104.11, 4104.12, and 4104.13 of the Revised Code and the rules of the board of building standards. The written report, completed by a general or special inspector, when filed in the office of the superintendent, ~~shall be~~ becomes the basis on which a certificate of operation may be granted or denied. The certificate of inspection would then be replaced with a certificate of operation, if granted.
- (P) "Certificate of operation" means the certificate issued by the superintendent to the owner or user following the general or special inspector's inspection of a boiler in accordance with section 4104.12 of the Revised Code.
- (Q) "Code stamp" means the permanent "ASME" identifying stamping applied to boilers and pressure vessels which indicates that the vessel has been constructed in accordance with the rules of the board and the applicable section of the "ASME Boiler and Pressure Vessel Code" and has been approved by an authorized inspector.
- (R) "Commission, National Board" means a certificate and renewable commission card issued by the "National Board" to an individual who has satisfied the requirements and the rules of the "National Board."
- (S) "Commission, Ohio" means a document issued by the superintendent pursuant to section 4104.08 of the Revised Code, which authorizes a general or special inspector to inspect boilers and pressure vessels for use in the state of Ohio.
- (T) "Contractor" means any person, firm, partnership, company, or corporation that engages in the practice of installing or making major repairs or modifications to any boiler that is subject to the provisions of Chapters 4101:4-1 to 4101:4-10 and 1301:3-5 of the Administrative Code.
- (U) "Inspection, external" means the inspection of the exterior parts of a boiler and the fittings, appurtenances, controls, and safety appliances attached thereto while the boiler is under operating conditions.
- (V) "Inspection, internal" means a complete visual and physical inspection of the interior of a boiler.
- (W) "Inspector, general" means a state of Ohio employee holding a certificate of competency and a valid Ohio commission to inspect boilers and pressure vessels to be used in the state of Ohio.
- (X) "Inspector, special" means an individual who holds a valid "National Board" commission and a valid Ohio commission to inspect boilers and pressure vessels to be used in the state of Ohio. Special inspectors are typically employed by an insurance company authorized to write boiler and pressure vessel insurance in the state of Ohio but can also be employed as an inspector by the owner-user of the boiler or pressure vessel which is proposed for use or is operating within the state of Ohio. The owner-user ~~must~~ is obligated to maintain an established inspection program meeting the requirements of the "National Board" publication "NB-371, Accreditation

of Owner-User Inspection Organizations (OUIO)" referenced in rule 4101:4-3-01 of the Administrative Code. In their capacity as a special inspector, they are a representative of the state boiler inspection department, acting independently of their relationship with their employer.

- (Y) "Installation, existing" means any boiler or pressure vessel within the scope of these rules that has been previously approved and issued a certificate of operation.
- (Z) "Installation, new" means any boiler or pressure vessel that has not yet been placed in service or issued a certificate of operation.
- (AA) "National Board" or "NB" means the "National Board of Boiler and Pressure Vessel Inspectors." Referenced standards, codes, publications, and other technical information developed by this organization can be purchased and obtained by logging on to <http://www.nationalboard.org> or by calling (614)888-8320.
- (BB) "NBIC" means the "National Board Inspection Code" as published by the "National Board of Boiler and Pressure Vessel Inspectors" and referenced in rule 4101:4-3-01 of the Administrative Code.
- (CC) "NFPA" means the "National Fire Protection Association." Referenced standards published by this organization can be purchased by logging on to <http://www.nfpa.org> or by calling (800)344-3555.
- (DD) "Non-standard" means an existing power boiler or pressure vessel which was installed prior to July 1, 1913 and was not constructed and stamped in accordance with the rules adopted by the industrial commission of Ohio or the Ohio board of building standards.
- (EE) "Ohio special" means a boiler or pressure vessel which does not fully comply with "ASME" code requirements, but has been approved for use in Ohio by special action of the board of building standards under section 4104.02 of the Revised Code or permitted for use by the board of building appeals under section 3781.19 of the Revised Code.
- (FF) "Ohio-standard" means an existing boiler or pressure vessel constructed to meet the rules of the Ohio industrial commission code requirements but not stamped with the applicable "ASME" symbol.
- (GG) "Owner or user" means any person, firm or corporation owning or operating any boiler or pressure vessel.
- (HH) "Pressure vessel" means a container for the containment of pressure, either internal or external. This pressure may be obtained from an external source or by the application of heat from a direct or indirect source or any combination thereof.
- (II) "psi" means pounds per square inch.
- (JJ) "psig" means pounds per square inch gage.
- (KK) "Qualified individual" means a service technician trained and thoroughly knowledgeable about the installation, operation, maintenance and service of the specific boiler fuel-burning system, controls, and safety devices.
- (LL) "Reinstallation" means a boiler or pressure vessel removed from its original setting and re-erected at the same location or a new location without a change of ownership.

- (MM) "Repair, major" means the process of restoring a boiler, pressure vessel, or component of a boiler or pressure vessel to a safe and satisfactory condition such that the existing design requirements are met.
- (NN) "Repair, routine" means repairs meeting the conditions prescribed in ["Part 3"](#) of the "NBIC ~~Part 3~~" and determined acceptable to the superintendent as a routine repair.
- (OO) "Revised Code" means the general statutes of the state of Ohio as revised and consolidated into titles, chapters, and sections.
- (PP) "Secondhand" means a used boiler or used pressure vessel which has had a change of ownership and location.
- (QQ) "Stationary Steam Engine" means an engine or turbine in which the mechanical force arising from the elasticity and expansion action of steam or from its property of rapid condensation or from a combination of the two is made available as a motive power.
- (RR) "Superintendent" means the superintendent of the division of industrial compliance created in the department of commerce under section 121.04 of the Revised Code, or the person designated by the superintendent as responsible for the enforcement of rules 4101:4-1-01 to 4101:4-10-01 and 1301:3-5-01 to 1301:3-5-10 of the Administrative Code.

4101:4-2-01 Scope, administration, and enforcement.

- (A) All boilers and pressure vessels proposed for use in the state of Ohio ~~shall~~[are to](#) be designed, constructed, installed, altered, repaired, maintained, and operated in accordance with the rules adopted by the board as prescribed in Chapters 4101:4-1 to 4101:4-10 of the Administrative Code, except as follows:
- (1) Boilers, pressure vessels, and stationary steam engines under federal control or subject to inspection under federal laws;
 - (2) Air tanks located on vehicles operating under the rules of other state authorities and used for carrying passengers, or freight;
 - (3) Air tanks installed on the right of way of railroads and used directly in the operation of trains;
 - (4) Pressure vessels that are under the regulation and control of the state fire marshal under Chapter 3737. of the Revised Code;
 - (5) Boilers and pressure vessels outside the scope of the applicable section of the "ASME Code for Boilers and Pressure Vessels" as referenced in rule 4101:4-3-01 of the Administrative Code;
 - (6) Historical steam boilers of riveted construction, preserved, restored, or maintained for hobby or demonstration use. In accordance with section 4104.33 of the Revised Code, these boilers ~~shall~~[are to](#) be repaired, altered, inspected and operated in compliance with Chapter 1301:3-4 of the Administrative Code, the rules adopted by the historical boilers licensing board.

- (B) All boilers and pressure vessels proposed for use in the state of Ohio, except those exempt in paragraph (A) of this rule ~~shall~~are to be inspected by an authorized inspector during fabrication and construction and upon completion for compliance with the rules of the board. The inservice inspections ~~shall~~are to be conducted by general and special inspectors in accordance with rules adopted by the superintendent in Chapter 1301:3-5 of the Administrative Code. The following boilers and pressure vessels ~~shall~~are to comply with the rules of the board for construction but ~~shall~~are not to be subjected to the superintendent's inspection requirements or contractor registration requirements prescribed in Chapter 1301:3-5 or 4101:4-7, respectively, of the Administrative Code:
- (1) Portable boilers or pressure vessels when located on farms and used solely for agricultural purposes;
 - (2) Low pressure boilers which are located in private residences or in apartment houses of less than or equal to five family units (these boilers are regulated by Chapters 4101:8-1 to 4101:8-44 of the Administrative Code known as the "Residential Code of Ohio" or Chapters 4101:2-1 to 4101:2-15 of the Administrative Code known as the "Ohio Mechanical Code");
 - (3) Pressure vessels containing only water under pressure for domestic supply purposes, including those containing air, the compression of which serves only as a cushion or airlift pumping system, when located in private residences or in apartment houses of less than or equal to five family units (these pressure vessels, hot water expansion tanks, and pressure tanks are regulated by the Chapters 4101:2-1 to 4101:2-15 of the Administrative Code known as the "Ohio Mechanical Code" and Chapters 4101: 3-1 to ~~4101:3-13~~4101:3-15 of the Administrative Code known as the "Ohio Plumbing Code");
 - (4) Portable boilers used in pumping, heating, steaming, and drilling, in the open field, for water, gas, and oil;
 - (5) Portable boilers used in the construction of and repair to public roads, railroads, and bridges.
- (C) If the owner or user of any boiler disagrees with the inspector as to the necessity for shutting down a boiler or for making repairs or alterations to it, or taking any other measures for safety, the owner or user may appeal the decision of the inspector to the board of building appeals.
- (D) In the event of a conflict, the rules of the board adopted pursuant to section 3781.10 of the Revised Code and known as the "Ohio Building Code," the "Ohio Mechanical Code," and the "Ohio Plumbing Code" ~~shall~~ govern any ~~rule~~rules or standards adopted by the board pursuant to section 4104.02 of the Revised Code.
- (E) In any condition not covered by these rules, the applicable section of the "ASME Code for Boilers and Pressure Vessels" as referenced in rule 4101:4-3-01 of the Administrative Code for new installations ~~shall~~ apply when not inconsistent with the provisions of Chapter 4104. of the Revised Code. Should any paragraph, subparagraph, sentence, clause, phrase, provision, or exemption of these rules be declared unconstitutional or invalid for any reason, the invalidity ~~shall~~does not affect the remaining portions or paragraphs.

4101:4-2-02 Types and qualifications of inspectors.

- (A) Only an "Authorized Inspector" employed by an "Authorized Inspection Agency" ~~shall~~is permitted to conduct inspections of boilers and pressure vessels during construction and fabrication to determine compliance with the rules of the board.
- (B) Only a general or special inspector ~~shall~~ is permitted to conduct inservice periodic inspections for boilers and repair and alteration inspections of boilers and pressure vessels to determine compliance with the rules of the board.
- (C) An applicant for examination as an inspector of boilers and pressure vessels ~~shall~~is to be qualified as prescribed in the "National Board" publication "NB-263, Rules for National Board Inservice and New Construction Commissioned Inspectors" as referenced in rule 4101:4-3-01 of the Administrative Code.
- (D) The written examination administered by the superintendent ~~shall~~is to be the "National Board Commission Examination." The examination ~~shall be~~ is given four times each year, on the first Wednesday of March, June, September, and December.
- (E) The superintendent may allow an applicant to sit for the examination at an "On-Demand" location accepted by the "National Board" in accordance with "Part 2" of the "National Board" publication "NB-263, Rules for National Board Inservice and New Construction Commissioned Inspectors" as referenced in rule 4101:4-3-01 of the Administrative Code.

4101:4-3-01 Accepted engineering practice and approved standards.

- (A) Where references are made in Chapters 4101:4-1 to 4101:4-10 of the Administrative Code to the applicable section of the "ASME Boiler and Pressure Vessel Code" or to other standards or publications, this rule identifies the specific edition of the code, standard, or publication that is adopted. Conformity to the applicable technical provisions, requirements, recommendations, and determinations in the codes, standards or other referenced publications adopted in "Table 4-3-01" of this rule, is prima-facie evidence of conformity with accepted engineering practice or with an approved standard.
- (B) The board of building standards adopts existing published standards by year of issue as shown in "Table 4-3-01" of the Administrative Code as well as amendments, supplements, and addenda subsequently published prior to issuance of the next edition by the same authority in accordance with section 4104.02 of the Revised Code.

Table 4-3-01

Authority	Edition Date	Designation	Title
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Table 4-3-01

ASME	2017 2023	BPVC -Section I (see footnote a)	Rules for Construction of Power Boilers.
ASME	2017 2023	BPVC -Section II	Material Specifications Materials. Part A-Ferrous. Part B-Non-Ferrous. Part C-Welding Rods, Electrodes and Filler Metals. Part D-Properties.
ASME	2017 2023	BPVC -Section III	Rules for Construction of Nuclear Facility Components.
ASME	2017 2023	BPVC -Section IV	Rules for Construction of Heating Boilers.
ASME	2017 2023	BPVC -Section V	Nondestructive Examination.
ASME	2017 2023	BPVC -Section VI	Recommended Rules for Care and Operation of Heating Boilers.
ASME	2017 2023	BPVC -Section VII	Recommended Guidelines for the Care of Power Boilers.
ASME	2017 2023	BPVC -Section VIII	Rules for Construction of Pressure Vessels-Division 1.
ASME	2017 2023	BPVC -Section VIII	Rules for Construction of Pressure Vessels-Division 2-Alternative Rules
ASME	2017 2023	BPVC -Section VIII	Pressure Vessels-Division 3- Alternative Rules for Construction of High Pressure Vessels
ASME	2017 2023	BPVC -Section IX	Welding, Brazing, and Fusing Qualifications.

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ASME	2017 2023	BPVC -Section X	Fiber-Reinforced Plastic Pressure Vessels.
ASME	2017 2023	BPVC -Section XI	Rules for Inservice Inspection of Nuclear Power Plant Reactor Facility Components.
ASME	2017 2023	BPVC	Code Cases: Boilers and Pressure Vessels.
ASME	2016 2022	B 31.1	Power Piping.
ASME	2015 2021	CSD-1	"Controls and Safety Devices for Automatically Fired Boilers."
NFPA	2015 2023	NFPA 85	"Boiler and Combustion Systems Hazards Code"
National Board	2017 2023	NBIC - Part 3, Repairs and Alterations	National Board Inspection Code.
National Board	Jul. 2012, Rev. 1	NB-27	A Guide for Blowoff Vessels.
National Board	Jul. 2017 2023	NB-263	Rules for Commissioned Inspectors (RCI-1).
National Board	Oct. 2016 Jul. 2020 , Rev. 8.1.1.010	NB-371	Accreditation of Owner-User Inspection Organizations (OUIO).

Footnote a: For riveted construction, see "ASME, BPVC-Section I, Power Boilers, Part PR (1971 edition)."

4101:4-4-01 Design of boilers and pressure vessels.

- (A) All new boilers and pressure vessels proposed for use in the state of Ohio, except those exempt by division (A) of section 4104.04 of the Revised Code, ~~shall~~[are to](#) be designed in accordance with the applicable approved referenced standard(s) adopted in "Table 4101:4-3-01" of rule 4101:4-3-01 of the Administrative Code and other requirements as prescribed in rules 4101:4-4-01 to 4101:4-4-04 of the Administrative Code.

- (B) A boiler having the standard stamping of another state that has adopted rules of construction equivalent to those of Ohio may be accepted by the superintendent provided that the person desiring to install the boiler ~~shall make~~makes application to the superintendent for the installation and ~~shall include~~includes the manufacturers' data report covering the construction of the boiler.
- (C) All electric boilers ~~shall are to~~ be wired and the shell grounded, in accordance with "NFPA 70, the National ~~Electric~~Electrical Code" referenced in rule 4101:1-35-01 of the Administrative Code.

4101:4-4-02 Maximum allowable working pressure of new boilers and pressure vessels.

- (A) The maximum allowable working pressure for boilers and pressure vessels built in accordance with the applicable section of the "ASME Boiler and Pressure Vessel Code" as referenced in rule 4101:4-3-01 of the Administrative Code ~~shall is to~~ be as determined in the applicable approved referenced standard to which it is constructed and stamped. In no case ~~shall is~~ the maximum allowable pressure permitted to exceed the pressure indicated by the manufacturer's identification stamped or cast upon the boiler or pressure vessel. Upon inspection of a boiler, if conditions are found which justify a reduction of the maximum allowable working pressure, the factor of safety shall be appropriately increased.
- (B) The maximum allowable steam working pressure for cast iron boilers, except for hot water boilers, ~~shall be is~~ fifteen psig.

4101:4-4-03 Safety devices and controls.

- (A) All boilers and pressure vessels ~~shall are to~~ be provided with the necessary safety appliances and controls that will prevent pressure and temperature from rising above the design limits. The required safety devices and controls ~~shall are to~~ be as required in the applicable section of the "ASME Boiler and Pressure Vessel Code" as referenced in rule 4101:4-3-01 of the Administrative Code.
- (B) The operation of a boiler or pressure vessel without the required safety devices or controls is prohibited, except where alternate device(s) are provided for use on a temporary basis.
- (C) Any owner or operator who in any manner loads the safety valve or valves to a greater pressure than that allowed by the certificate of operation ~~shall be is~~ subject to the penalty provided in section 4104.99 of the Revised Code.
- (D) The minimum safety or relief valve relieving capacity for electric boilers ~~shall be is~~ 3.5 pounds of steam per hour for each kilowatt input.
- (E) The discharge of safety valves and other outlets ~~shall be installed~~is to be directed and terminated in

[such a manner](#) so as not to endanger any person.

- (F) Replacement of existing safety devices and controls [shallis to](#) comply with the requirements for new safety devices and controls as prescribed in the applicable section of the "ASME Boiler and Pressure Vessel Code" as referenced in rule 4101:4-3-01 of the Administrative Code.
- (G) When an owner wishes to install safety devices and controls which will enable a new or an existing boiler to be operated without continuous, manned attendance by a licensed operator, the requirements of paragraph (B)(4) or (B)(5) of rule 4101:4-10-01 of the Administrative Code [shallare to](#) be met.

4101:4-4-04 Steam boiler blowoff systems.

- (A) The blowoff from boilers may be discharged directly to any place such as a lake, swamp, stream, sump, or open pit provided there is no hazard to life or property. Where a safe place of discharge is not available, a blowoff tank [shallis to](#) be used. The tank [shallis to](#) be designed to separate the flash steam from the water and [shallis to](#) be flashed to a lower pressure system or vented to the atmosphere. The vent [shallis to](#) be large enough to prevent a steam pressure greater than five psig in the blowoff tank. The water from the blowoff tank may be discharged into a building drain or building sewer provided the water temperature does not exceed one hundred forty degrees Fahrenheit.
- (B) When a blowoff tank is elevated above the lowest point of a boiler, provisions [shallare to](#) be made for draining water from the boiler.
- (C) The shell thickness of a blowoff tank [shallis to](#) be not less than one-fourth inch and [shallis to](#) be constructed for a pressure of not less than twenty-five per cent of the allowed pressure of the boilers connected to it for boilers up to and including four hundred psig. For boiler pressure greater than four hundred psig, use "Table 4-4-04(C)" for the blowoff tank allowable pressure. Construction of the blowoff tank [shallis to](#) comply with section VIII, division 1, of the "ASME Boiler and Pressure Vessel Code" as referenced in rule 4101:4-3-01 of the Administrative Code and as modified in this rule.

Table 4-4-04(C)

Maximum allowable working pressure of boiler (psig)	Blowoff tank allowable pressure (psig)
3000	400
2250	325
1500	275
1000	200
750	165

Table 4-4-04(C)

500	125
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(D) Blowoff piping between the boiler blowoff valve and the blowoff tank or other safe place of discharge, where the pressure is approximately atmospheric and when there are no intervening valves, shall ~~is to~~ be constructed in accordance with "Table 4-4-04(D)". All boiler blowoff pipe fittings shall ~~are to~~ be fabricated of steel.

Table 4-4-04(D)

Boiler pressure (psig)	Piping pressure (psig)
1501 to 2000	900
901 to 1500	600
601 to 900	400
250 to 600	250
Below 250	150

(E) In lieu of the design requirements of paragraphs (C) and (D) of this rule, the "National Board" publication entitled "NB-27, A Guide for Blowoff Vessels" as referenced in rule 4101:4-3-01 of the Administrative Code may be used for the design, construction, and arrangement of boiler blowoff equipment.

4101:4-4-05 Clearances.

When boilers are replaced or when new boilers are installed in either existing or new buildings, a minimum clear space of three feet shall ~~is to~~ be provided on the control and service sides of the boiler. All other sides shall ~~are to~~ comply with the boiler manufacturer's installation instructions for clearances to combustible materials. All boilers shall ~~are to~~ be so located that adequate space will be provided for the proper operation of the boiler and its appurtenances, for the inspection of all surfaces, tubes, water walls, economizer piping, valves, and other equipment, and for their necessary maintenance and repair.

4101:4-5-01 Boilers and pressure vessels of special design.

(A) When a boiler or pressure vessel proposed for use in Ohio does not conform to all the provisions of the applicable section of the "ASME Boiler and Pressure Vessel Code" referenced in rule 4101:4-3-01 of the Administrative Code, application can be made to the board for legal use in Ohio by submitting, prior to fabrication, the following documents, sealed by a registered professional engineer holding a certificate issued under section 4733.14 of the Revised Code:

- (1) A written analysis detailing how the proposed boiler or pressure vessel does not conform to the requirements of the "ASME Boiler and Pressure Vessel Code";
- (2) Detailed construction drawings;

- (3) Materials specifications;
- (4) Design calculations;
- (5) Welding details and procedures, and procedure qualification tests (when applicable); and
- (6) Detailed quality control procedures used in all phases of construction.

(Note: All documents submitted [shall are to](#) be in the English language, and all dimensions, pressures, temperatures, and material properties [shall are to](#) be in the same units as used in the applicable section of the "ASME Boiler and Pressure Vessel Code" referenced in rule 4101:4-3-01 of the Administrative Code.

- (B) After receipt by the board, the documents listed above [shall will](#) be reviewed by a registered professional engineer assigned or approved by the board. After review, the professional engineer [shall will](#) make a recommendation to the board.
- (C) If the application is approved by the board, the boiler or pressure vessel [shall is to](#) be inspected during construction by an authorized inspector, tested as required by the applicable section of the "ASME Boiler and Pressure Vessel Code" as referenced in rule 4101:4-3-01 of the Administrative Code and in accordance with the conditions of the resolution issued by the board. If approved, the boiler or pressure vessel of special design [shall is to](#) be tagged with an "OHIO SPECIAL" serial number by a general inspector.
- (D) When an existing "Ohio Special" boiler or pressure vessel that has been approved by the board is proposed to be repaired, reinstalled, or relocated, the work [shall is to](#) be performed in accordance with rule 4101:4-9-01 of the Administrative Code.
- (E) When an existing "Ohio Special" boiler or pressure vessel that has been approved by the board is proposed to be altered, the proposed alterations [shall are to](#) be documented by a registered design professional and evaluated and approved by the board, prior to the alteration, in the same manner as described in paragraphs (A) and (B) of this rule. If the alterations are approved by the board, the boiler or pressure vessel may be altered in accordance with the conditions of the resolution and, consistent with ["Part 3" of the "NBIC"](#), the original code of construction or the currently adopted "ASME Boiler and Pressure Vessel Code" referenced in rule 4101:4-3-01 of the Administrative Code. The boiler or pressure vessel [shall is to](#) be tested and inspected as required by the conditions of the resolution issued by the board.

4101:4-6-01 Construction and stamping of boilers and pressure vessels.

Unless exempt by rule 4101:4-2-01 of the Administrative Code,

- (A) All boilers and pressure vessels [shall are to](#) be constructed and tested in accordance with the applicable section(s) of the "ASME Boiler and Pressure Vessel Code" as referenced in rule

4101:4-3-01 of the Administrative Code.

- (B) All boilers and pressure vessels ~~shall~~are to be inspected during construction and after completion by an authorized inspector to determine compliance with the applicable section of the "ASME Boiler and Pressure Vessel Code."
- (C) Unless exempt from stamping requirements by the "ASME Boiler and Pressure Vessel Code," after certification of the manufacturer's data report and acceptance by an authorized inspector, the manufacturer ~~shall~~is to apply the appropriate "ASME" code stamp symbol to the boiler or pressure vessel indicating that the boiler or pressure vessel complies with all of the "ASME" code requirements that are prescribed in the applicable code section referenced in rule 4101:4-3-01 of the Administrative Code.
- (D) All boilers and pressure vessels ~~shall~~are to be registered with the "National Board." In accordance with the "National Board" registration requirements, the original manufacturer's data report, properly executed and signed by both the manufacturer and an authorized inspector, ~~shall~~is to be filed with the "National Board" for permanent retention.
- (E) The manufacturer, in accordance with the "National Board" registration requirements, ~~shall~~is also to apply the "National Board" registration number to the boiler or pressure vessel.

4101:4-7-01 Contractor registration and boiler permits.

Unless exempt by paragraph (B) of rule 4101:4-2-01 of the Administrative Code,

- (A) Every contractor or owner ~~shall~~ is to be registered with the division of industrial compliance before installing or making major repairs or alterations to any boiler. Applications for registration will be obtained from the division of industrial compliance on forms prescribed by the superintendent.
- (B) All contractors or owners performing boiler installations, repairs, or alterations ~~shall~~ are to register annually with the superintendent. The annual registration processing fee ~~shall be~~ is fifty dollars.
- (C) Every contractor or owner ~~shall~~ is to apply for and obtain a permit from the division of industrial compliance prior to making the installation of any boiler. The application ~~shall~~ is to be made on forms prescribed by the superintendent. A permit fee of one-hundred dollars per boiler ~~shall~~ is to be submitted with each permit application form.
- (D) Unless the contractor or owner obtains a "National Board "R" Certificate of Authorization" as prescribed in "Part 3" of the "NBIC" referenced in rule 4101:4-3-01 of the Administrative Code, every contractor or owner ~~shall~~ is to apply for and obtain a permit from the division of industrial compliance prior to making a routine repair that involves welding or a major repair to an existing

boiler. The application ~~shall~~ is to be made on forms prescribed by the superintendent. A permit fee of one-hundred dollars per boiler ~~shall~~ is to be submitted with each permit application form.

- (E) Every contractor or owner performing boiler alterations ~~shall~~ is to obtain a "National Board "R" Certificate of Authorization" as prescribed in "Part 3" of the "NBIC" referenced in rule 4101:4-3-01 of the Administrative Code. The contractor or owner is not required to apply for or obtain a permit from the division of industrial compliance. However, in accordance with "Part 3" of the "NBIC" and rule 4101:4-9-01 of the Administrative Code, authorization from an authorized inspector ~~shall~~ is to be obtained prior to making the proposed alteration.

4101:4-8-01 Inspection of boilers.

- (A) Unless exempt by paragraph (B) of rule 4101:4-2-01 of the Administrative Code, upon completion of an installation and in accordance with rules 1301:3-5-01 to 1301:3-5-09 of the Administrative Code, all boilers ~~shall~~ are to be inspected by a general or special inspector who holds an Ohio commission issued by the superintendent. Each boiler ~~shall~~ will be assigned a state of Ohio serial number obtained from the superintendent and affixed by the inspector. Unless otherwise authorized by the superintendent, the boilers ~~shall~~ are not to be operated until a certificate of operation has been issued by the superintendent.
- (B) In accordance with division (~~F~~G) of section 4104.18 of the Revised Code, in addition to any fee assessed and collected directly from the owner or user for the inspection and issuance of a certificate of operation, the superintendent will collect, directly from the owner or user, a board assessed fee of three dollars and twenty-five cents for each certificate of operation or renewal thereof and for each inspection conducted.
- (C) The three dollar and twenty-five cent assessment fee collected directly from the owner or user on behalf of the board ~~shall~~ is to be remitted to the board when deposited by the division of industrial compliance pursuant to section 121.084 of the Revised Code. The superintendent ~~shall~~ will report to the board the amounts remitted not later than one month following the first full month's collection and then monthly thereafter.
- (D) Before inspection or any other work is started on an electric boiler, ~~it shall~~ the boiler is to be isolated electrically. An appropriate warning tag ~~shall~~ is to be posted on the disconnect.
- (E) If, in the judgment of the inspector, it is advisable to apply a hydrostatic test to a boiler or pressure vessel, the owner or user ~~shall~~ is to prepare for and apply the test, which ~~shall~~ will be witnessed by the inspector.

4101:4-9-01 Existing boilers and pressure vessels.

- (A) All existing boilers and pressure vessels and the associated equipment, controls, devices, and safeguards ~~shall~~ are to be maintained in a safe and sanitary condition, in good working order,

and free of leaks and defects. The owner or the owner's designated agent ~~shall be~~ is responsible for the maintenance of such boilers and pressure vessels and associated equipment, controls, devices, and safeguards.

- (B) The rules of the board ~~shall are not to~~ be retroactively applied to existing boilers or pressure vessels that are not otherwise being altered, repaired, reinstalled, or relocated. Portions of a boiler or pressure vessel not altered or repaired and not affected by an alteration or repair are not required to comply with the code requirements for a new boiler or pressure vessel.
- (C) Routine boiler repairs such as piping or tube replacement or repairs considered general maintenance may be made without permit or inspection. However, routine repairs that involve welding do require a permit and approval must be obtained from a general or special inspector prior to performing the repair. In the case where the contractor or owner making the routine repair has obtained a "National Board "R" Certificate of Authorization", the authorized inspector ~~shall is to~~ authorize the routine repair prior to the work being performed. If the repair requires welding, ~~it shall~~ the welding is to be performed in accordance with the provisions of section IX of the "ASME Boiler and Pressure Vessel Code" as referenced in rule 4101:4-3-01 of the Administrative Code.
- (D) Where a major repair or alteration (including a re-rating) is necessary or desired on an existing boiler which bears the stamp of the appropriate "ASME" symbol or which is stamped with a state of Ohio boiler number, the repair or alteration ~~shall is to~~ comply with the requirements of "Part 3" of the "NBIC" as referenced in rule 4101:4-3-01 of the Administrative Code. The repair or alteration ~~shall is to~~ meet the requirements for the conditions under which it will be operated.
- (1) In accordance with rule 4101:4-7-01 of the Administrative Code, unless the contractor or owner has obtained a "National Board "R" Certificate of Authorization", all contractors or owners ~~shall are to~~ apply for a permit from the division of industrial compliance to make proposed repairs and the repairs ~~shall are to~~ be approved by a special or general inspector. A repair report, executed and signed by the special or general inspector, ~~shall is to~~ be filed with the superintendent on forms provided.
- (2) In accordance with "Part 3" of the "NBIC," contractors or owners performing boiler alterations ~~shall are to~~ obtain a "National Board "R" Certificate of Authorization" prior to making any alterations. All alterations ~~shall are to~~ be authorized and approved by an authorized inspector.
- (E) Where a major repair or alteration (including a re-rating) is necessary or desired on an existing boiler or pressure vessel which does not bear the appropriate "ASME" symbol stamp or which is not stamped with a state of Ohio boiler number, the boiler or pressure vessel ~~shall is to~~ be evaluated by the superintendent and required to meet the applicable requirements of the "ASME Boiler and Pressure Vessel Code" referenced in rule 4101:4-3-01 of the Administrative Code. Otherwise, the boiler or pressure vessel ~~shall is to~~ be retired from use.
- (F) Repairs made to an existing "Ohio Special" boiler or pressure vessel ~~shall are to~~ be done in accordance with paragraph (C), (D)(1), or (H)(1) of this rule, as applicable.

- (G) Alterations, including re-ratings, made to an existing "Ohio Special" boiler or pressure vessel ~~shall~~ are to be approved, prior to the alteration, by the board of building standards in accordance with the special procedure outlined in rule 4101:4-5-01 of the Administrative Code for boilers and pressure vessels of special design.
- (H) Where a major repair or alteration (including a re-rating) is necessary or desired on an existing pressure vessel which bears the stamp of the appropriate "ASME" symbol, the repair or alteration ~~shall~~ is to comply with the requirements of "Part 3" of the "NBIC" as referenced in rule 4101:4-3-01 of the Administrative Code. The repair or alteration ~~shall~~ is to meet the requirements for the conditions under which it will be operated.
- (1) Unless the contractor or owner has obtained a "National Board "R" Certificate of Authorization", all contractors or owners ~~shall~~ are to notify the division of industrial compliance prior to making repairs to an existing pressure vessel and the repairs ~~shall~~ are to be approved by a special or general inspector. A repair report, executed and signed by the special or general inspector, ~~shall~~ is to be filed with the superintendent on forms provided.
- (2) In accordance with "Part 3" of the "NBIC", contractors or owners performing pressure vessel alterations ~~shall~~ are to obtain a "National Board "R" Certificate of Authorization" prior to making any alterations. All alterations ~~shall~~ are to be authorized and approved by an authorized inspector.
- (I) Whenever repairs are made to fittings, safety devices, appliances, or controls or it becomes necessary or desirable to replace them, the work ~~shall~~ is to comply with the requirements for new installations as prescribed in the applicable section of the "ASME Boiler and Pressure Vessel Code" as referenced in rule 4101:4-3-01 of the Administrative Code. When an owner wishes to install safety devices and controls which will enable an existing boiler to be operated without continuous, manned attendance by a licensed operator, the requirements of paragraph (B)(4) or (B)(5) of rule 4101:4-10-01 of the Administrative Code ~~shall~~ are to be met.
- (J) An existing stationary boiler or pressure vessel which bears the appropriate "ASME" symbol or which is stamped with a state of Ohio boiler number may be reinstalled or relocated within Ohio, provided that the installation complies with the applicable section of the "ASME Boiler and Pressure Vessel Code" as referenced in rule 4101:4-3-01 of the Administrative Code and an inspection is made by a special or general inspector prior to operation. The fittings and appliances ~~shall~~ are to comply with the requirements for a new installation.
- (K) A secondhand boiler or pressure vessel stamped with the appropriate "ASME" symbol or having the standard stamping of another state that has adopted rules of construction equivalent to those of Ohio may be installed for use in the state of Ohio provided that application is made for the installation, the manufacturer's data report, indicating that the boiler or pressure vessel was inspected during construction by an authorized inspector, is filed in the office of the superintendent, and an inspection is made by a special or general inspector prior to operation. The inspector ~~shall~~ is to submit a report to the superintendent which contains a facsimile of the code stamping, a statement concerning any corrosion or other deteriorating conditions and the extent and location of any welded or riveted repairs. Upon approval of a secondhand boiler by the superintendent, a certificate of operation ~~shall~~ is to be issued.

- (L) Except as permitted in paragraph (K) of this rule, an existing boiler or pressure vessel that does not bear the appropriate "ASME" symbol, was not registered with the "National Board," does not have a state of Ohio boiler number stamped upon it, or does not have an "Ohio Special" serial number tagged upon it is prohibited from reinstallation or relocation within the state of Ohio.
- (M) The maximum allowable steam working pressure for cast iron boilers, except for hot water boilers, shall is to be fifteen psig.
- (N) The maximum allowable working pressure on the shell or drum of an existing nonstandard boiler shall is to be determined by the strength of the weakest section of the structure, computed from the thickness of the plate, the tensile strength of the plate, the efficiency of the longitudinal joint or the tube ligaments, the inside diameter of the weakest course and the factor of safety allowed by these rules.

(S)(t)(E)/(R)(F) = Maximum allowable working pressure, psig.

Where:

S = ultimate tensile strength of shell plates, psi.

When the ultimate tensile strength, "S", of steel or wrought-iron shell plates is not known, it shall is to be taken as fifty-five thousand psi for steel and forty-five thousand psi for wrought-iron.

t = minimum thickness of shell plate, in weakest course, inch.

E = efficiency of longitudinal joint.

For riveted construction, "E" shall is to be determined by rules given in paragraph "PR-15" of the 1971 edition of the "ASME Boiler and Pressure Vessel Code, section I."

For tube ligaments, "E" shall is to be determined by rules "PG-52" or, "PG-53" of the "ASME Boiler and Pressure Vessel Code, section I" and "PR-25", of the 1971 edition of the "ASME Boiler and Pressure Vessel Code, section I."

R = inside radius of the weakest course of the shell or drum in inches.

F = factor of safety permitted.

- (1) When computing the ultimate strength of rivets in shear, the following values in pounds per square inch of the cross-sectional area of the rivet shank (after driving) shall is to be used:

Strength of existing rivets in shear

Type of rivet	Strength
Iron rivet in single shear	38,000
Iron rivet in double shear	76,000

Strength of existing rivets in shear

Steel rivets in single shear	44,000
Steel rivets in double shear	88,000

(2) When the diameter of the rivet holes in the longitudinal joints of a boiler is not known, the diameter and cross-sectional area of rivets, after driving, may be ascertained from the following table or by cutting out one rivet in the body of the joint:

Sizes of rivets in inches based on plate thickness

Thickness of plate, inches.	1/4	9/32	5/16	11/32	3/8	13/32
Diameter of rivet after driving, inches.	11/16	11/16	3/4	3/4	13/16	13/16
Thickness of plate, inches.	7/16	15/32	1/2	9/16	5/8	-
Diameter of rivet after driving, inches.	15/16	15/16	15/16	17/16	17/16	-

(3) The resistance of steel to crushing ~~shall~~ is to be taken as ninety-five thousand psi.

(4) The lowest factor of safety permissible on existing installations ~~shall~~ is to be 4.5 excepting for horizontal return tubular boilers having continuous longitudinal lap seams more than twelve feet in length where the factor of safety ~~shall~~ is to be 8, and when this latter type of boiler is removed from its existing setting, it ~~shall~~ is not to be reinstalled for pressure in excess of fifteen psig. Reinstalled or secondhand nonstandard boilers ~~shall~~ are to have a minimum factor of safety of 6 when the longitudinal seams are of lap riveted construction, and a minimum factor of 5 when the longitudinal seams are of butt and double strap construction. A boiler constructed of wrought iron ~~shall~~ is to have a factor of safety of 7. Upon inspection of the boiler, if conditions are found which justify a reduction of the safe working pressure, the factor of safety as stated above ~~shall~~ is to be appropriately increased.

(O) The maximum allowable working pressure of a nonstandard low pressure steam boiler ~~shall~~ is not to exceed fifteen psig.

(P) The maximum allowable working pressure of a nonstandard boiler constructed principally of cast iron or constructed of a cast iron shell or heads and steel tubes ~~shall~~ is not to exceed thirty psig for hot water service.

- (Q) The maximum allowable working pressure of a nonstandard water tube boiler, the tubes of which are secured to cast iron or malleable iron headers, or which have cast iron mud drums, ~~shall~~ is not to exceed one hundred sixty psig for steam service.
- (R) If, in the judgment of the inspector, a low pressure boiler is unsafe for operation at the pressure previously approved, the pressure ~~shall~~ is to be reduced, proper repair made, or the boiler retired from service.
- (S) Nonstandard pressure vessels, except those exempt in section 4104.04 of the Revised Code and paragraph "U-1" of the "ASME Boiler and Pressure Vessel Code, section VIII", are prohibited for use in excess of fifteen psi internal or external pressure.
- (T) Any owner or operator who in any manner loads the safety valve or valves to a greater pressure than that allowed by the certificate of operation ~~shall be~~ is subject to the penalty provided in section 4104.99 of the Revised Code.

4101:4-10-01 Licensure and attendance requirements of operators.

- (A) In accordance with section 4104.05 of the Revised Code, no person ~~shall~~ is to operate a low pressure steam boiler that has more than three hundred sixty square feet of heating surface, a power steam boiler that has more than three hundred sixty square feet of heating surface, or a stationary steam engine operating at more than thirty horsepower, unless one of the following applies to that person:
 - (1) The person holds the required license as specified in section 4104.05 of the Revised Code, or
 - (2) The person is working under the direct supervision of a person holding the required license as specified in section 4104.05 of the Revised Code.
- (B) The operator described in paragraph (A) of this rule ~~shall~~ is to maintain continuous, manned attendance during all times of operation of a steam boiler that has more than three hundred sixty square feet of heating surface or a stationary steam engine operating at more than thirty horsepower, except as follows:
 - (1) The continuous, manned attendance by the operator during all times of operation of such steam boiler or stationary steam engine may occur from a central control room on the premises when the steam boiler or stationary steam engine can be monitored, controlled, and shut down from that central control room by the operator and is equipped with manual operational resets.
 - (2) The steam boiler may be operated without continuous, manned attendance for a maximum length of time equal to the time it takes for the boiler to go into a low water condition when subjected to an annual evaporation test conducted in accordance with the "ASME Boiler and Pressure Vessel Code, Section VI, 7.05 (H)" referenced in rule 4101:4-3-01 of the Administrative Code.
 - (3) The continuous, manned attendance by the operator during all times of operation of a non-solid-fuel-fired steam boiler or stationary steam engine is not required when the

superintendent of the division of industrial compliance has approved a site-specific, detailed written plan to provide for automated electronic monitoring of the steam boiler or stationary steam engine which utilizes controls that contain all operational functions, are equipped with manual operational resets, and are labeled for the intended operation, provided that all of the following apply:

- (a) The control equipment ~~must be~~ is located within the same complex or production facility premises;
 - (b) A person licensed under section 4104.19 of the Revised Code is present at all times within the same complex or production facility premises and is available to respond to an emergency condition when summoned by the automated electronic monitoring system;
 - (c) A secondary means of alerting such licensed person is within the same complex or production facility premises in the event of failure of the primary electronic monitoring system;
 - (d) A qualified individual as defined in rule 4101:4-1-01 of the Administrative Code performs annual operational tests on the automated electronic monitoring system to verify that the system is maintained in accordance with that original manufacturer specification; and
 - (e) A copy of such dated and signed service report or checklist, listing each control and safety device tested with the manufacturer's name, model number, set point, and actual operational test point is provided to the superintendent of the division of industrial compliance upon request. Failure to produce such service report may result in the issuance of an adjudication order within the meaning of Chapter 119. of the Revised Code.
- (4) The continuous, manned attendance by the operator during all times of operation of a non-solid-fuel-fired steam boiler having a fuel input rating of less than 12,500,000 BTU/hr is not required when an automated electronic control system meeting the requirements of "ASME CSD-1" referenced in rule 4101:4-3-01 of the Administrative Code is utilized, provided that all of the following requirements have also been met:
- (a) The boiler manufacturer and the installing contractor ~~shall complete~~ completes and ~~sign~~ signs a certification report (similar to the report shown in Appendix C of ASME CSD-1) for each boiler. The certification report ~~shall~~ is to meet the requirements of Section CG-510 of the ASME CSD-1 and ~~shall~~ is to identify the manufacturer, model number, and operational test date for each specific boiler control and safety device and certify that each control and safety device was installed and tested in accordance with the manufacturer's installation instructions and the ASME CSD-1.
 - (b) The installing contractor, who ~~shall~~ is to be registered in accordance with rule 4101:4-7-01 of the Administrative Code, ~~shall~~ is to obtain and provide to the owner or user the operating, testing, servicing, and cleaning instructions for the controls and safety devices. Additionally, the installing contractor ~~shall~~ is to provide to the owner or user the complete wiring and piping diagrams and a written precaution that the annual

operating, testing, and servicing of the controls and safety devices is to be performed only by a qualified individual. The contractor ~~shall~~ is to obtain a receipt from the owner or user for the delivery of these instructions.

- (c) The certification report and the receipt described in paragraphs (B)(4)(a) and (B)(4)(b) of this rule ~~shall~~ are to be submitted to the superintendent prior to the required inspection and issuance of the certificate of operation prescribed in rule 4101:4-8-01 of the Administrative Code. Failure to submit this documentation may result in the issuance of an adjudication order within the meaning of Chapter 119. of the Revised Code.
 - (d) The owner or user ~~shall~~ is to develop, coordinate, and implement a preventative maintenance program and ensure that the employee responsible for maintaining the boiler is trained, knowledgeable, and competent to operate and maintain such boiler, controls, and safety devices. The maintenance program ~~shall~~ is to be consistent with the manufacturer's recommendations and ~~shall~~ is to include regular inspections and operational testing for the boiler controls and safety devices. Annual inspection and operational testing ~~shall~~ is to be performed and documented by a qualified individual as defined in rule 4101:4-1-01 of the Administrative Code. Daily, weekly, monthly, and semi-annual inspections and operational testing, as outlined by the manufacturer and as recommended in Appendix D of the ASME CSD-1, ~~shall~~ is to be performed and documented by an employee who has been trained, is knowledgeable, and is competent to operate and maintain such boiler, controls, and safety devices. The maintenance records ~~shall~~ are to identify the manufacturer, model number, set point, the operational tests performed, the operational test date, the inspection results, and who performed the tests or inspection for each specific boiler control and safety device. The maintenance records ~~shall~~ are to be made available to the inspector for review during the certificate inspection. Failure to provide the required maintenance records may result in the issuance of an adjudication order within the meaning of Chapter 119. of the Revised Code.
- (5) The continuous, manned attendance by the operator during all times of operation of a non-solid-fuel-fired steam boiler having a fuel input rating of greater than or equal to 12,500,000 BTU/hr and meeting the requirements of "NFPA 85" referenced in rule 4101:4-3-01 is not required when an automated electronic control system is utilized meeting the requirements of the ASME CSD-1 referenced in rule 4101:4-3-01 of the Administrative Code, provided that all of the following requirements have also been met:
- (a) The certification report, wiring diagrams, instructions, maintenance, and testing requirements for the control system outlined in paragraphs (B)(4)(a) to (B)(4)(d) of this rule ~~shall~~ apply.
 - (b) Prior to installation of the boiler(s), the owner ~~shall~~ is to submit a detailed, written, process hazard analysis (PHA) to the superintendent of industrial compliance that identifies and evaluates the hazards associated with the unattended operation of the boiler and justifies the method(s) proposed to address the hazards. The analysis ~~shall~~ is to be prepared and sealed by a registered professional engineer holding a certificate issued under section 4733.14 of the Revised Code and ~~shall~~ is to identify possible

incident scenarios, the proposed protection/solution for each scenario, and any such additional information as determined necessary by the superintendent. The PHA ~~shall~~ is to be reviewed by the owner, updated at least every five years, and submitted to the superintendent for review and filing. Failure to provide the required PHA may result in the issuance of an adjudication order within the meaning of Chapter 119. of the Revised Code.