



THE NATIONAL BOARD  
OF BOILER AND PRESSURE VESSEL INSPECTORS

# NATIONAL BOARD INSPECTION CODE SUBCOMMITTEE INSTALLATION

## MINUTES

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Meeting of July 12, 2023  
St. Louis, MO

*These minutes are subject to approval and are for committee use only. They are not to be duplicated or quoted for other than committee use.*

The National Board of Boiler & Pressure Vessel Inspectors  
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## 1. Call to Order

Mr. Patten called the meeting to order at 8:00 a.m. Central Time.

## 2. Introduction of Members and Visitors

Mr. Patten held roll call with the members and visitors. Each member and visitor (in person and remote) introduced themselves with their name and company. All attendees are listed on **Attachment Page 1**.

## 3. Check for a Quorum

With 9 out of 11 members present, in person and remote, a quorum was reached.

## 4. Awards/Special Recognition

There were no awards or special recognitions for this meeting.

## 5. Announcements

Mr. Patten gave the announcements:

- The National Board will be hosting a reception on Wednesday evening from 5:30 p.m. to 7:30 p.m. at Sports & Social St. Louis Ballpark Village next to the hotel.
- The National Board will be hosting breakfast and lunch on Thursday for those attending the Main Committee meeting. Breakfast will be served from 7:00 a.m. to 8:00 a.m. in Cardinal C, and lunch will be served from 11:30 a.m. to 12:30 p.m. in Cardinal C.
- Meeting schedules, meeting room layouts, and other helpful information can be found on the National Board website under the **Inspection Code** tab → NBIC Meeting Information.
- Remember to add any attachments that you'd like to show during the meeting (proposals, reference documents, power points, etc.) to the NBIC file share site (nbfileshare.org) **prior to the meeting**.
  - Note that access to the NBIC file share site is limited to committee members only.
  - ALL power point attachments/presentations must be sent to the NBIC Secretary prior to the meeting for approval.
  - Contact Jonathan Ellis ([nbicsecretary@nbbi.org](mailto:nbicsecretary@nbbi.org)) for any questions regarding NBIC file share access.
- When possible, please submit proposals in word format showing "strike through/underline".
- If you'd like to request a new Interpretation or Action item, this should be done on the National Board Business Center.
  - Anyone, member or not, can request a new item.
- As a reminder, anyone who would like to become a member of a group or committee:
  - Should attend at least two meetings prior to being put on the agenda for membership consideration. The nominee will be on the agenda for voting during their third meeting.
  - The nominee must submit the formal request along with their resume to the NBIC Secretary **PRIOR TO** the meeting. [nbicsecretary@nbbi.org](mailto:nbicsecretary@nbbi.org)
  - If needed, we can also create a ballot for voting on a new member between meetings.
- Thank you to everyone who registered online for this meeting. The online registration is very helpful for planning our reception, meals, room set up, etc. Please continue to use the online registration for each meeting. If you are here in person, and did not register, please visit the National Board website to register now. Registering will ensure we have an accurate count for the reception, breakfast, and lunch. It is also a good way to ensure we have the most up-to-date contact information.

## 6. Adoption of the Agenda

A motion to adopt the agenda as presented was made, seconded, and unanimously approved.

## 7. Approval of the Minutes of the January 11, 2023, Meeting

A motion to approve the minutes from the January 11, 2023, meeting was made, seconded, and unanimously approved.

## 8. Review of Rosters

### a. Membership Nominations

Mr. Marvin Byrum (AIA) is interested in becoming a member of Subcommittee Installation.

Mr. Byrum left the room so the members could discuss and vote. After the group discussed the interest categories of the subcommittee, a motion to approve Mr. Byrum's membership to the subcommittee was made, seconded, and unanimously approved.

### b. Membership Reappointments

The following **Subcommittee Installation** memberships are set to expire prior to the January 2024 meeting: Mr. Eddie Wiggins and Mr. Joe Brockman.

Mr. Patten shared that both gentlemen wish to continue their membership on the subcommittee. A motion to approve both Mr. Wiggins' and Mr. Brockman's memberships on the subcommittee was made, seconded, and unanimously approved.

### c. Officer Appointments

Mr. Wiggins' term as Vice Chair of Subcommittee Installation is set to end after the July 2023 meeting.

According to the NB-240, 4.2.3 e), a term of office shall not exceed two consecutive three-year terms. Also, Mr. Wiggins told Mr. Patten that he did not wish to continue into another term as Vice Chair. Ms. Wadkinson nominated Mr. Konopacki. A motion to approve Mr. Konopacki as Vice Chair of the subcommittee was made, seconded, and unanimously approved.

## 9. Open PRD Items Related to Installation

- NB15-0305 – Create Guidelines for Installation of Overpressure Protection by System Design – D. Marek (PM)
  - This will be balloted to the subcommittee.
- NB15-0315 – Review isolation valve requirements in Part 1, 4.5.6 and 5.3.6 – D. DeMichael (PM)
  - Progress Report
- 19-83 – Address Alternate Pressure Relief Valve Mounting Permitted by ASME CC2887-1 – D. Marek (PM).
  - Progress Report
- 22-08 – Review and improve guidance for T&P valve installation relating to probe.
  - Progress Report
- 22-15 – What is the meaning of "service limitations" as used in Part 4, 2.4.5?
  - This was balloted to both subgroups and passed.
- 22-16 – Allow the use of pressure relief valves on potable water heaters.
  - PRD reviewed Part 1's proposal and decided to revise it and send it as a letter ballot to both parts.

## 10. Interpretations

There were no Part 1 interpretation requests to address.

## 11. Action Items

<b>Item Number: 20-62</b>	<b>NBIC Location: Part 1, 1.4.5.1</b>	<b>No Attachment</b>
<b>General Description:</b> Update the National Board Boiler Installation Report		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> T. Clark (PM), E. Wiggins, R. Spiker, T. Creacy, P. Jennings, and D. Patten		
<b>Explanation of Need:</b> The form has not been updated in years. The form will be part of the National Board's Jurisdictional Reporting System (JRS) which is currently under development.		
<b>July 2023 Meeting Action: Progress Report</b>		
Mr. Clark updated the group on this item. He fine-tuned some of the fields based on suggestions from the subgroup. Mark Mooney of JRS plans to have a mockup in JRS ready to review before the next meeting.		

<b>Item Number: 20-86</b>	<b>NBIC Location: Part 1, 2.10.1 a)</b>	<b>No Attachment</b>
<b>General Description:</b> Testing and Acceptance: Boil-out Procedure		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> E. Wiggins (PM), D. Patten, S. Konopacki, and R. Spiker		
<b>Explanation of Need:</b> This was brought to my (Mr. Eddie Wiggins) attention by Ernest Brantley. Mr. Brantley indicated during an acceptance inspection, he found boiler with excessive oil on the tubes and tube sheet after boiler was delivered and installed. He could not find any reference to boil-out to remove this extraneous material.		
<b>July 2023 Meeting Action: Progress Report</b>		
Mr. Patten added an updated proposal to the Cloud for the task group to review.		

<b>Item Number: 22-28</b>	<b>NBIC Location: Part 1</b>	<b>No Attachment</b>
<b>General Description:</b> Pool Heater definition		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> J. Kleiss (PM), R. Spiker, T. Creacy, and M. Byrum		
<b>Explanation of Need:</b> The NBIC Installation and Inspection Codes do not have a definition for pool heaters. There is potential for confusion regarding which NBIC requirements, if any, should apply to pool heaters.		
<b>July 2023 Meeting Action: Progress Report</b>		
Mr. Kleiss reviewed the subgroup's discussion on adding this as a new supplement. The group briefly discussed the general parameters of NBIC supplements and different kinds of pool heaters.		

<b>Item Number: 22-30</b>	<b>NBIC Location: Part 1, 3.6.3</b>	<b>Attachment Pages 2-4</b>
<b>General Description:</b> Drains in equipment rooms with heating boilers containing glycol		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> P. Jennings (PM), R. Adams, D. Zalusky, D. Patten, and R. Smith		
<b>Explanation of Need:</b> Glycol should be disposed of in accordance with regulations. The intent of this addition to the text is to identify that drains may not be the proper way to dispose of glycol.		
<b>July 2023 Meeting Action: Proposal</b>		
<p>Mr. Jennings reviewed the discussion from the subgroup’s meeting including the reasoning behind adding “such as ethylene glycol” to the proposal (to emphasize glycol as hazardous but not limit hazardous fluids to glycol). There was further discussion on if the word “floor” should be added back with “drains” (in paragraph 3.6.3). Since the verbiage already makes it clear that floor drains will promote proper cleanliness of the equipment room and since adding “floor” back would limit equipment rooms to floor drains (when an effective drainage system may already be in place), they decided to leave the proposal as is. A motion to accept the proposal as presented was made, seconded, and unanimously approved.</p>		

<b>Item Number: 22-32</b>	<b>NBIC Location: Part 1, 3.8.1.4 b)</b>	<b>No Attachment</b>
<b>General Description:</b> High pressure limit control requirements for fired jacketed steam kettles		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> R. Adams (PM), D. Patten, T. Clark, and T. Creacy		
<b>Explanation of Need:</b> As a safeguard to over pressurizing the fired jacketed steam kettle, the pressure range of the actuated high pressure limit control should not exceed the MAWP of the vessel.		
<b>July 2023 Meeting Action: Progress Report</b>		
<p>Mr. Clark reviewed the discussion from the subgroup meeting. They decided to add this as a new supplement and will try to add fire jacketed steam kettles as a definition in the Glossary.</p>		

## 12. New Items:

<b>Item Number: 23-50</b>	<b>NBIC Location: Part 1, 2.8.5 and 3.8.1.5</b>	<b>Attachment Pages 5-6</b>
<b>General Description:</b> Require separate waterside piping connections for multiple LWCO devices		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> T. Clark (PM), T. Creacy, M. Byrum, John Choitz, and R. Spiker		
<b>Explanation of Need:</b> CSD-1 CW-120 (a) and CW-140 (a) address piping connection requirements for low-water fuel cutoff devices for low-pressure and high-pressure steam boilers. Specifically, both sections require each LWCO device to have a separate piping connection on the waterside. However, NFPA 85 does not address any installation requirements for LWCO devices, potentially allowing them to be installed in an unsafe manner.		
<b>July 2023 Meeting Action: Proposal</b>		
Mr. Clark reviewed the discussion from the subgroup meeting. A motion to accept the proposal as presented was made, seconded, and unanimously approved.		
Mr. Creacy suggested that we open another item to either add a definition for fuel cutoff or create consistency in the usage of “low-water fuel cutoff” vs. just “fuel cutoff.” The subcommittee discussed opening a new item to address the verbiage inconsistencies in how “fuel cutoff” is used throughout Part 1. Mr. Creacy is going to open a new item to address such inconsistencies. Once an item is opened, we can discuss if this is something Part 1 needs to handle or if NBIC staff should address it.		

<b>Item Number: 23-52</b>	<b>NBIC Location: Part 1, 2.5.3.2 and 3.5.3</b>	<b>No Attachment</b>
<b>General Description:</b> Harmonize electrical requirements for all types of boilers/water heaters		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> T. Clark (PM), S. Konopacki, J. Kleiss, R. Spiker, and John Choitz		
<b>Explanation of Need:</b> Electrical requirements for power boilers, heating boilers, and water heaters are inconsistent, particularly regarding remote emergency shutdown switches. In some cases the requirements are the same, but worded or ordered differently. In order to promote better understanding of code requirements and consistency in their application, I propose making sections 2.5.3 and 3.5.5 as uniform as possible.		
<b>July 2023 Meeting Action: Progress Report</b>		
Mr. Clark reviewed the discussion from subgroup meeting as well as the intent of this item being to harmonize where we talk about the electrical requirements of power and heating boilers.		

<b>Item Number: 23-53</b>	<b>NBIC Location: Part 1, 1.4.1, 1.4.5</b>	<b>No Attachment</b>
<b>General Description:</b> Remove "Form" from the title of the various NBIC reports.		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> T. Creacy (PM), T. Clark, and R. Adams		
<b>Explanation of Need:</b> There are many inconsistencies in the terms and titles regarding the various reports used to document installation, inspection, repair, and alteration activity used in the NBIC. For standardization, this proposal has two parts, 1) revise the I-2, NB-6, NB-7, NB-136, NB-66, NB-299 etc., report titles to delete "form", and 2) to replace "form" in the applicable areas with "report." An example of a revision to the text in the body of the NBIC is shown in the "Proposed Text."		
<b>July 2023 Meeting Action: Close with no Action</b>		
Mr. Patten reviewed the discussion from the subgroup meeting. National Board staff will work on the necessary editorial changes. A motion was made to close this item with no further action from the subcommittee. The motion was seconded and unanimously approved.		

### 13. New Business

- Both PRD and Part 1 would like to work alongside one another to get through their shared items at set points during these meetings.
- The subcommittee looked at various letter ballot procedures within the NB-240 and the NBIC Handbook (both uploaded on the Cloud). They also discussed informing new members about these documents.

### 14. Future Meetings

Mr. Patten reviewed the future NBIC meetings.

- January 8-11, 2024 – Charlotte, NC
- July 2024 – TBD

### 13. Adjournment

Mr. Patten adjourned the meeting at 11:06 a.m. Central Time.

Respectfully submitted,



Michelle Vance  
Subcommittee Installation Secretary

## Subcommittee Installation Attendance: July 12, 2023

<b>MEMBERS:</b>	<b>Interest Category</b>	<b>In Person</b>	<b>Remote</b>	<b>Not In Attendance</b>
Don Patten	NB Certificate Holders	x		
Eddie Wiggins	Jurisdictional Authorities			x
Joe Brockman	Authorized Inspection Agencies			x
Tom Clark	Jurisdictional Authorities	x		
Todd Creacy	Authorized Inspection Agencies	x		
J. Matt Downs	Manufacturers	x		
Pat Jennings	Authorized Inspection Agencies	x		
Stan Konopacki	Users	x		
H. Michael Richards	General Interest		x	
Ron Spiker	Jurisdictional Authorities	x		
Melissa Wadkinson	Manufacturers	x		
Michelle Vance	Secretary	x		

<b>VISITORS:</b>	<b>Company / Interest</b>	<b>In Person</b>	<b>Remote</b>
Bryan Ahee	Bradford White Corporation	x	
Jeff Kleiss	Lochinvar, LLC	x	
Jim Byrum	ARISE Boiler	x	
Jonathan Choitz	Hartford Steam Boiler	x	
Robert Black	ABMA	x	
Robert Smith	Naval Facilities Engineering Systems Command	x	
Rodger Adams	Zurich	x	
Luis Ponce	NBBI Staff	x	



<b>Item Number: 22-30</b>	<b>NBIC Location: Part 1, 3.6.3</b>	<b>No Attachment</b>
<b>General Description:</b> Drains in equipment rooms with heating boilers containing glycol		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> P. Jennings (PM), R. Adams, D. Zalusky, D. Patten, and R. Smith		
<b>Explanation of Need:</b> Glycol should be disposed of in accordance with regulations. The intent of this addition to the text is to identify that drains may not be the proper way to dispose of glycol.		
<b>January 2023 Meeting Action:</b> Mr. Patten said that a task group has been assigned to this item, and that they are currently working on a proposal.		

### **Suggested Proposal.**

#### **3.6.3 DRAINS**

Drain systems shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and/or industry standards, as applicable. Unobstructed ~~floor~~ drains, properly located in the equipment room, will facilitate proper cleaning of the equipment room. ~~Floor~~ ~~#Drains~~ that are used infrequently should have water poured into them periodically to prevent the entrance of sewer gasses and odors. If there is a possibility of freezing, an environmentally safe antifreeze mixture should be used in the drain traps. Drains receiving blowdown water should be connected to the sanitary sewer by way of an acceptable blowdown tank or separator or an air gap that will allow the blowdown water to cool to at least 140°F (60°C) and reduce the pressure to 5 psig (34 kPa) or less.

#### **3.7.7 BOTTOM BLOWOFF AND DRAIN VALVES**

##### **3.7.7.1 STEAM HEATING, HOT-WATER HEATING, AND HOT-WATER SUPPLY BOILERS**

###### a) Bottom Blowoffs

- 1) Each steam boiler shall have a bottom blowoff connection fitted with a valve or cock connected to the lowest water space practicable with a minimum size as shown in NBIC Part 1, Table 3.7.7.1. The discharge piping shall be full size to the point of discharge.
- 2) Boilers having a capacity of 25 gallons (95 l) or less are exempt from the above requirements, except that they shall have a NPS 3/4 (DN 20) minimum drain valve.

###### b) Drains

- 1) Each steam or hot-water boiler shall have one or more drain connections, fitted with valves or cocks connecting to the lowest water containing spaces. All parts of the boiler must be capable of being drained (the boiler design will dictate the number and size of drains). The minimum size of the drain piping, valves, and cocks shall be NPS 3/4 (DN 20). The discharge piping shall be full size to the

point of discharge.

2) For hot-water boilers with potentially hazardous fluids, such as ethylene glycol, discharge to drains should consider any environmental requirements.

3) When the blowoff connection is located at the lowest water containing space, a separate drain connection is not required.

### 3.9.1.5 PRESSURE RELIEF VALVE DISCHARGE PIPING

- a) A discharge pipe shall be used. Its internal cross-sectional area shall be not less than the full area of the valve outlet or of the total of the valve outlets discharging thereinto, and shall be as short and straight as possible and arranged as to avoid undue stress on the valve or valves. A union may be installed in the discharge piping close to the valve outlet. When an elbow is placed on a pressure relief valve discharge pipe, it shall be located close to the valve outlet downstream of the union to minimize reaction moment stress.
- b) The discharge from pressure relief valves shall be so arranged that there will be no danger of scalding attendants. The pressure relief valve discharge shall be piped away from the boiler to a safe point of discharge, and there shall be provisions made for properly draining the piping. The size and arrangement of discharge piping shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the relieving devices below that required to protect the boiler.
- c) Discharge piping shall be rated for the discharge fluid conditions of pressure and temperature including a minimum and maximum design temperature. Material selection for the discharge piping shall consider the reduction in material toughness at the low end of design temperature and the reduction in material strength at the high end of design temperature. Rigid pipe or tubing should be used for discharge lines that carry hot water or steam.
- d) Plastic discharge pipe and fittings are permitted (when compatible with the process fluid, system design temperatures, and other ambient conditions such as light and humidity) and shall conform to NSF/ANSI 14 Plastics Piping System Components and Related Materials.
- e) Discharge piping shall be rated for any static pressure present and the back pressure that may develop when the pressure relief device is at full capacity. Where multiple pressure relief devices or vents discharge into common piping, the back pressure that could develop due to simultaneous flow from all sources shall be considered.
- f) For hot-water boilers with potentially hazardous fluids, such as ethylene glycol, discharge to drains should consider any environmental requirements.

### **NOTES – The following are explanatory and are not part of the proposal**

There are three appropriate places to address the issue of discharge of glycol or other hazardous fluids in heating boilers:

- 1) floor drains – Conform this section to other sections where environmental requirements are discussed.
- 2) Bottom blowdown discharge piping – Add a “should consider”
- 3) Relief valve discharge piping – Add a “should consider” for glycol

#### FOR DRAINS

*COMMENT – The proposed language already exists in the book.*

#### ) 1.6.5 FUEL

All fuel systems shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and/or industry standards, such as ASME CSD-1; ANSI Z/CSA; NFPA 85; Boiler and Combustion Systems Hazards Codes; or others as applicable. The following are requirements for Natural Gas, Propane, and #2 fuel oil.

- a) Natural Gas and Propane

2.5.3.3 also and 2.6.2

#### 2.6.2 ASH REMOVAL

Ash removal systems shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and/or industry standards, as applicable.

### **2.8.5 AUTOMATIC LOW-WATER FUEL CUTOFF AND/OR WATER FEEDING DEVICE FOR STEAM OR VAPOR SYSTEM BOILERS**

a) Each automatically fired steam-or vapor-system boiler shall have an automatic low-water fuel cutoff so located as to automatically cut off the fuel supply when the surface of the water falls to the lowest visible part of the water-gage glass. If a water feeding device is installed, it shall be so constructed that the water inlet valve cannot feed water into the boiler through the float chamber and so located as to supply requisite feedwater.

b) Such a fuel cutoff or water feeding device may be attached directly to a boiler. A fuel cutoff or water feeding device may also be installed in the tapped openings available for attaching a water glass directly to a boiler, provided the connections are made to the boiler with nonferrous tees or Y's not less than NPS 1/2 (DN 15) between the boiler and water glass so that the water glass is attached directly and as close as possible to the boiler; the run of the tee or Y shall take the water glass fittings, and the side outlet or branch of the tee or Y shall take the fuel cutoff or water feeding device. The ends of all nipples shall be reamed to full-size diameter.

c) In addition to the requirements in a) and b) above, a secondary low-water fuel cutoff with manual reset shall be provided on each automatically fired steam or vapor system boiler.

d) When installed external to the boiler, low-water fuel cutoffs shall be installed in separate water columns or chambers, which shall be connected to the boiler by piping connections below the waterline. A shared steam piping connection is permissible, though not required.

~~e)~~e) Fuel cutoffs and water feeding devices embodying a separate chamber shall have a vertical drain pipe, extended to a safe point of discharge, and a blowoff valve not less than NPS 3/4 (DN 20), located at the lowest point in the water equalizing pipe connections so that the chamber and the equalizing pipe can be flushed and the device tested.

~~e)~~f) Each electric steam boiler of the resistance element type shall be equipped with an automatic low-water cutoff so located as to automatically cut off the power supply to the heating elements before the surface of the water falls below the visible part of the glass. No low-water cutoff is required for electrode-type boilers.

### **3.8.1.5 AUTOMATIC LOW-WATER FUEL CUTOFF AND/OR WATER FEEDING DEVICE**

a) Each automatically fired steam boiler shall have an automatic low-water fuel cutoff. The low-water fuel cutoffs must be located to automatically cut off the fuel supply when the surface of the water falls to a level not lower than the lowest visible part of the water-gage glass. If a water feeding device is installed, it shall be so constructed that the water inlet valve cannot feed water into the boiler through the float chamber and so located as to supply requisite feedwater.

b) Such a fuel cutoff or water feeding device may be attached directly to a boiler. A fuel cutoff or water feeding device may also be installed in the tapped openings available for attaching a water-gage glass directly to a boiler, provided the connections are made to the boiler with nonferrous tees or Y's not less than NPS 1/2 (DN 15) between the boiler and water glass so that the water glass is attached directly and as close as possible to the boiler; the run of the tee or Y shall take the water glass fittings, and the side outlet or branch of the tee or Y shall take the fuel cutoff or water feeding device. The ends of all nipples shall be reamed to full-size diameter.

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c) In addition to the requirements in a) and b) above, a secondary low-water fuel cutoff with manual reset shall be provided on each automatically fired steam boiler.

d) When installed external to the boiler, low-water fuel cutoffs shall be installed in separate water columns or chambers, which shall be connected to the boiler by piping connections below the waterline. A shared steam piping connection is permissible, though not required.

~~d)~~e) Fuel cutoffs and water feeding devices embodying a separate chamber shall have a vertical drain pipe and a blowoff valve not less than NPS 3/4 (DN 20), located at the lowest point in the water equalizing pipe connections so that the chamber and the equalizing pipe can be flushed and the device tested.

**CW-120 Requirements for Water Level Controls for Low-Pressure Steam Boilers**

(a) Each automatically fired, low-pressure steam boiler shall have at least two automatic low-water fuel cutoffs, one of which may be a combined feeder/cutoff device. When installed external to the boiler, each device shall be installed in individual chambers (water columns), which shall be attached to the boiler by separate pipe connections below the waterline. A common steam connection is permissible. Each cutoff device shall be installed to prevent start-up and to cut off the boiler fuel or energy supply automatically, prior to the fall of the surface of the water below the level of the lowest visible part of the gage glass (see [CW-210](#)).

EXCEPTION: Only one low-water cutoff is required on gravity return units installed in residences, as defined by the authority having jurisdiction.

A water feeding device, when used, shall be constructed and installed so that the water inlet valve cannot feed water into the boiler through the float chamber or its connections to the boiler. The water feeding device shall be located to maintain the operating water level.

**CW-140 Requirements for Water Level Controls for High-Pressure Steam Boilers**

(a) Each automatically fired, high-pressure steam boiler, except miniature boilers, shall have at least two automatic low-water fuel cutoff devices. When installed external to the boiler, each device shall be installed in individual chambers (water columns), which shall be attached to the boiler by separate pipe connections below the waterline. A common steam connection is permissible. Each cutoff device shall be installed to prevent start-up and cut off the boiler fuel or energy supply automatically when the surface of the water falls to a level not lower than the lowest visible part of the gage glass. One control shall be set to function ahead of the other.