

Date Distributed:



**THE
NATIONAL
BOARD**
OF BOILER AND
PRESSURE VESSEL
INSPECTORS

NATIONAL BOARD SUBCOMMITTEE INSTALLATION

MINUTES

Meeting of July 15th, 2020
Louisville, KY

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
1055 Crupper Avenue
Columbus, Ohio 43229-1183
Phone: (614)888-8320
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1. Call to Order

Chair, M. Wadkinson, called the meeting to order at 8:00 a.m.

2. Introduction of Members and Visitors

Introductions took place amongst all members and visitors both by in person and Webex. The attendance sheet was checked off by the Secretary. See Attachment 1.

Subcommittee Installation

Last Name	First Name	Interest Category	Role
Wadkinson	Melissa	Manufacturers	Chair
Bock	Jeanne		Secretary
Austin	Randall	Users	Member
Creacy	Todd	Authorized Inspection Agencies	Member
Downs	James	Manufacturers	Member
Halley	Geoffrey	General Interest	Member
Konopacki	Stanley	Users	Member
Patten	Don	Manufacturers	Member
Richards	H. Michael	General Interest	Member
Smith	Rex	Authorized Inspection Agencies	Member
Washington	Milton	Jurisdictional Authorities	Member
Wiggins	Edward	Jurisdictional Authorities	Member

J. Brockman, M. Richards, R. Spiker, and M. Byrum in for K. Watson attended **in person**.

D. Patten, A. Williams, R. Austin, T. Creacy, J. Downs, G. Tompkins in for G. Halley, P. Jennings, S. Konopacki, R. Smith, M. Wadkinson, M. Washington, and E. Wiggins attended **via Webex**.

Visitors:

Tom Clark (State of OR)	
Michael Carlson (State of WA)	
Bernard Shelley (FRP Group)	

3. Check for a Quorum

- Gene Tompkins (present via Webex) in for Geoffrey Halley
- Marvin Byrum (present in person) in for Kenneth Watson
- Roger Adams (present via Webex) in for Todd Creacy

With the attached roster and the noted individuals, a quorum was established. There was a motion to approve the roster. The motion was unanimously approved.

Subcommittee Installation

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Wadkinson	Melissa	Manufacturers	Chair
Bock	Jeanne		Secretary
Austin	Randall	Users	Member
Creacy	Todd	Authorized Inspection Agencies	Member
Downs	James	Manufacturers	Member
Halley	Geoffrey	General Interest	Member
Konopacki	Stanley	Users	Member
Patten	Don	Manufacturers	Member
Richards	H. Michael	General Interest	Member
Smith	Rex	Authorized Inspection Agencies	Member
Washington	Milton	Jurisdictional Authorities	Member
Wiggins	Edward	Jurisdictional Authorities	Member

4. Awards/Special Recognition

None to report

5. Announcements

Noted: Due to COVID – 19, all NBIC receptions and sponsored meals will be plated, not buffet-style.

- The National Board hosted a reception for all committee members and visitors on Wednesday evening at 5:30pm in the Crystal room on the 2nd floor of The Brown Hotel.
- The National Board hosted breakfast for all committee members and visitors on Thursday morning at 7:00 am and a lunch at 11:30 am at the English Grill on the 2nd floor of The Brown Hotel.
- Voice Voting for each item was used. It was assumed all voted approved and then asked if anyone is voting “not approved”, “abstention”, or “not voting”.

6. Adoption of the Agenda

Added New Item 20-50

Added Item 18-73 and 15-0308 (PRD)

There was a motion to adopt the Agenda with the noted additions/changes. The motion was unanimously approved.

7. Approval of the Minutes of January 15th, 2020 Meeting

The minutes are available for review on the National Board website, www.nationalboard.org.

There was a motion to approve the Minutes of January 15th, 2020 as published. The motion was unanimously approved.

8. Review of Rosters (See Attachment 1)

- Mr. Joe Brockman has requested the subcommittee consider him for membership. He would be representing the AIA interest category.

The SC took a vote to recommend Joe Brockman to the SC Installation. The vote was unanimously approved.

b. Membership Reappointments

The following subgroup member terms are set to expire on 8/30/2020:

- Mr. Joseph Millette – User
- Mr. Milton Washington – Jurisdictional Authority

M. Wadkinson did reach out to Mr. Joseph Millette with no response. E. Wiggins stated that travel has been restricted and that it would be ok to take no action on his reappointment. The membership will just expire.

The SC took a vote to reappoint Milton Washington to the SC. The vote was unanimously approved.

c. Officer Appointments

- Mr. Eddie Wiggins – Vice Chair

The SC took a vote to recommend Eddie Wiggins to Vice Chair of the SC Installation. The vote was unanimously approved.

9. Open PRD Items Related to Installation

- NB15-0108B – Address pressure relief devices in new supplement on high temperature hot water boilers – D. Marek (PM)
- NB15-0305 – Create Guidelines for Installation of Overpressure Protection by System Design – D. Marek (PM)
- NB15-0308 – Create Guidelines for Installation of Pressure Relief Devices for Organic Fluid Vaporizers – T. Patel (PM). This item is on hold pending ASME action.
- NB15-0315 – Review isolation valve requirements in Part 1, 4.5.6 and 5.3.6 – D. DeMichael (PM)
- 17-115 – Complete rewrite of Part 4, Section 2 combining common requirements into a general requirements section for all pressure relief devices – A. Renaldo (PM)
- 17-119 – Part 4, 2.2.5 states that pressure setting may exceed 10% range. Clarify by how much – T. Patel (PM). This item is on hold pending ASME action.
- 17-128 – Fix contradiction between Part 4, 2.4.1.6 a) and 2.4.4.3 regarding Y bases. – B. Nutter (PM)
- 18-73 – Update installation requirements for Thermal Fluid Heaters (Part 1, S5.7.6) – T. Patel (PM)

The 2 highlighted items above were added to our agenda to review and get back with PRD on our input. The SG reviewed each and is in agreement with PRD's proposals.

10. Action Items

Item Number: NB11-1901	NBIC Location: Part 1	Attachment Pages 1-8
General Description: Add guidance for the safe installation of high pressure composite pressure vessels operating in close proximity to the public.		
Subgroup: FRP		
Task Group: R. Smith (PM), M. Richards, S. Konopacki, D. Patten and E. Wiggins		
July 2020 Meeting Action: Progress Report – R. Smith discussed with the SC in the January 2020 meeting the 1 comment from D. Marek and how the group would want to address it. Rex will make changes based off of the SC’s feedback and send it to FRP. Mr. Smith had arranged to meet with FRP however it got cancelled. Bernard Shelley spoke on this item to the SC. It will be arranged for Rex Smith to attend the next FRP meeting.		

Item Number: 18-2	NBIC Location: Part 1	Attachment Pages 9-10
General Description: Result of NB16-0101, add verbiage regarding commissioning fired boilers & fired pressure vessels with a calibrated combustion analyzer.		
Subgroup: SG Installation		
Task Group: E. Wiggins (PM), D. Patten, M. Wadkinson, G. Tompkins and M. Washington		
July 2020 Meeting Action: Proposal – A proposal was sent to the Main Committee as a letter ballot from the January 2020 meeting. The ballot received a few negative comments, which Mr. Wiggins discussed in the July 2020 meeting. A revised proposal was presented and discussed amongst the SG and SC. There was a motion to approve the revised proposal to the MC. The motion was unanimously approved.		

Item Number: 18-57	NBIC Location: Part 1	Attachment Pages 11-24
General Description: address the use & definition of the word inspector		
Subgroup: SG Installation		
Task Group: P. Jennings (PM), R. Smith, T. Creacy, R. Spiker, M. Washington and R. Adams.		
July 2020 Meeting Action: Progress Report – P. Jennings presented a proposal. The SG held discussions and determined that further work needs to be completed on this item with regards to the capitalization of the word inspections along with inspector.		

Item Number: 19-45	NBIC Location: Part 1, S1	Attachment Page 25
General Description: Revisions to Yankee Dryer Supplement Wording in Part 1		
Subgroup: SG Installation		
Task Group: R. Spiker (PM), J. Jessick, and D. Patten		
Explanation of Need: Various technical and editorial revisions for S1.1, S1.2, and S1.4.		
January 2020 Meeting Action: Proposal – This item also affects Part 2 under item 19-46. Mr. Spiker presented a proposal and discussed with the SG and SC. It was confirmed that the word “yankee” should be lower case when not at the beginning of the sentence. There was a motion to approve the proposal to the MC. The motion was unanimously approved.		

Item Number: 19-81	NBIC Location: Part 1, Table 3.7.9.1-b	Attachment Page 26
<p>General Description: Correction to value in TABLE 3.7.9.1-b The table in question is generated using the equation in 3.7.9.1 a) 2). The values in the table are all based on the same temperatures and pressures. The only thing that changes is the volume. The ratio of the Nonpressurized Type column value to the System Volume is 0.15 in all cases except the 100 gallon case which ends up being 0.18. Thus multiplying any system volume by 0.15 should give the third column value.</p> <p>Subgroup: SG Installation</p> <p>Task Group: R. Smith (PM), M. Washington, T. Creacy, and R. Austin</p> <p>Explanation of Need: There is only one incorrect value in the NBIC table and the rationale is in the background information. In addition, ASME Section IV, Table HG-709.2 has the correct value.</p> <p>July 2020 Meeting Action: Proposal – A proposal was presented and discussed amongst the SG and SC. There was a motion to approve the proposal to the MC. The motion was unanimously approved.</p>		

11. New Items:

Item Number: 20-13	NBIC Location: Part 1, 3.7.9.1	Attachment Page 27
<p>General Description: Expansion Tank Maximum Operating Pressure</p> <p>Subgroup: SG Installation</p> <p>Task Group: None assigned. <u>M. Wadkinson (PM) and M. Downs</u></p> <p>Explanation of Need: Table 3.7.9.1-b - 30 psig matches note (a) of Table HG-709.2 of ASME Sect IV. 3.7.9.1 a) 2) The "except for prepressurized tanks" phrase is misplaced and belongs with the provisions for draining tanks. See last sentence in HG-709.2 on p. 62 and first sentence in that same section just prior to the formulas on pg. 63.</p> <p>July 2020 Meeting Action: Proposal – A TG was assigned of <u>M. Wadkinson (PM) and M. Downs</u>. The TG in the SG meeting worked on completing a proposal. The proposal was presented and discussed amongst the SG and SC. There was a motion to approve the proposal to the MC. The motion was unanimously approved.</p>		

Item Number: 20-27	NBIC Location: Part 1, 1.6.9 & S6.3	No Attachment
<p>General Description: Carbon Monoxide Detector/Alarm NBIC 2019</p> <p>Subgroup: SG Installation</p> <p>Task Group: None assigned. <u>G. Tompkins (PM), R. Spiker, R. Smith, E. Wiggins, S. Konopacki, and R. Austin</u></p> <p>Explanation of Need: These codes are being enforced by some jurisdictions on existing installations. Inspectors need to know what codes we need to enforce. Do the detectors have specific levels of CO when an alarm is to go off? Is there a requirement for an audible alarm or decibel level of the alarm? Where in the boiler room should the alarm/monitor be mounted?</p> <p>July 2020 Meeting Action: Progress Report – A TG was assigned <u>of G. Tompkins (PM), R. Spiker, R. Smith, E. Wiggins, S. Konopacki, and R. Austin</u>. It was confirmed that this item came from Part 4, Mr. Schirmer. A summary of this item was presented to the SG and SC and discussions took place amongst the SG and SC. The TG will work on this item accordingly.</p>		

Item Number: 20-30	NBIC Location: Part 1	No Attachment
General Description: Review of installation requirements for Motors		
Subgroup: SG Installation		
Task Group: J. Brockman (PM), K. Watson, T. Creacy		
Explanation of Need: Incorporation of applicable CSD-1 Requirements.		
July 2020 Meeting Action: Close with No Action – The SG and SC determined this was already covered in 2.5.3.1 for Power Boilers, therefore no action is needed. There was a motion to close this item with no action. The motion was unanimously approved.		

Item Number: 20-31	NBIC Location: Part 1	No Attachment
General Description: Overcurrent Protection		
Subgroup: SG Installation		
Task Group: M. Washington (PM), R. Smith, R. Adams		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Close with No Action – The SG and SC determined that this item was not NBIC related, therefore no action is needed. There was a motion to close this item with no action. The motion was unanimously approved.		

Item Number: 20-32	NBIC Location: Part 1	No Attachment
General Description: Electric Boilers		
Subgroup: SG Installation		
Task Group: T. Creacy (PM), M. Wadkinson, W. Anderson, T. Clark		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Close with No Action – D. Patten took a look at this item and determined that this item was already covered in Part 1, therefore no action is needed. There was a motion to close this item with no action. The motion was unanimously approved.		

Item Number: 20-33	NBIC Location: Part 1	No Attachment
General Description: Flow or Temp Sensing Devices forced Circulation Boilers		
Subgroup: SG Installation		
Task Group: M. Downs (PM), D. Patten, M. Wadkinson		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Progress Report – The SG and SC held discussions. M. Wadkinson noted that there is an open ballot in CSD-1 at this time and would like to keep this item open.		

Item Number: 20-34	NBIC Location: Part 1	No Attachment
General Description: Venting of gas train components		
Subgroup: SG Installation		
Task Group: P. Jennings (PM), M. Washington, R. Adams		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Progress Report – P. Jennings reviewed a proposal with the SG and SC from the January 2020 meeting. This is going to be sent out as a Review & Comment. This item will be worked on by the TG in conjunction with items 20-35 and 20-40.		

Item Number: 20-35	NBIC Location: Part 1	No Attachment
General Description: Installation requirements for Fuel Oil Trains		
Subgroup: SG Installation		
Task Group: G. Tompkins (PM), D. Patten, M. Washington		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Progress Report – G. Tompkins gave a summary on this item to the SG and SC. Discussions took place. This item will be worked on by the TG in conjunction with items 20-34 and 20-40.		

Item Number: 20-36	NBIC Location: Part 1	Attachment Page 28
General Description: Review Installation requirements for Bonding & Grounding		
Subgroup: SG Installation		
Task Group: R. Smith (PM) T. Creacy, R. Spiker		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Proposal – R. Smith presented a proposal to the SG and SC. The group held discussions. There was a motion to approve the proposal to the MC. The motion was unanimously approved.		

Item Number: 20-37	NBIC Location: Part 1	No Attachment
General Description: Electrical Requirements		
Subgroup: SG Installation		
Task Group: D. Patten (PM), K. Watson, R. Austin		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Close with No Action – The SG and SC determined this was already covered in Part 1, therefore no action is needed. There was a motion to close this item with no action. The motion was unanimously approved.		

Item Number: 20-38	NBIC Location: Part 1	No Attachment
General Description: General Requirements for Wiring		
Subgroup: SG Installation		
Task Group: R. Spiker (PM), W. Anderson, T. Clark		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Close with No Action – The SG and SC determined this was already covered in Part 1, therefore no action is needed. There was a motion to close this item with no action. The motion was unanimously approved.		

Item Number: 20-39	NBIC Location: Part 1	No Attachment
General Description: Modular Boilers		
Subgroup: SG Installation		
Task Group: T. Clark (PM), M. Downs, M. Wadkinson, D. Patten, R. Austin		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Progress Report – A summary on this item (NBIC verses CSD-1) was presented to the SG and SC. Extensive discussions took place. Tom will work on this item and see what happens w/Section IV.		

Item Number: 20-40	NBIC Location: Part 1	No Attachment
General Description: Gas Train Requirements		
Subgroup: SG Installation		
Task Group: R. Adams (PM), P. Jennings, G. Tompkins		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Progress Report – A summary was presented on this item to the SG and SC. Discussions took place. This item will be worked on by the TG in conjunction with items 20-34 and 20-35.		

Item Number: 20-41	NBIC Location: Part 1	Attachment Pages 29-30
General Description: Safety and Safety Relief Valves for Steam and Hot Water Heating Boilers.		
Subgroup: SG Installation		
Task Group: E. Wiggins (PM), J. Brockman, G. Tompkins		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Progress Report – A summary was presented on this item to the SG and SC. A working session was held in the afternoon at the SG level. A proposal was generated in which the SG and SC would like PRD to review. It was also noted that “ 3.9 PRESSURE RELIEF VALVES to See NBIC Part 1, 3.2 for the scope of pressure retaining items covered by these requirements ” is incorrect. If you go to 3.2 it is “ 3.2 DEFINITIONS ” not the Scope. It should say to “See NBIC Part 1, 3.1 SCOPE”. Extensive discussions were held amongst the SG on this item. The proposal will be forwarded to T. Beirne of PRD for review. This item will be worked on in conjunction with item 20-43.		

Item Number: 20-42	NBIC Location: Part 1	Attachment Pages 31-34
General Description: Pressure Controls for Steam Boilers		
Subgroup: SG Installation		
Task Group: R. Austin (PM), T. Creacy, G. Tompkins		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Proposal – A proposal was presented to the SG and SC. It was suggested to combine 2 documents into 1 and take out “to the boiler”. The TG worked on revising the proposal at the SG level. The revised proposal was presented and discussed amongst the SG and SC. There was a motion to approve the revised proposal to the MC. The motion was unanimously approved.		

Item Number: 20-43	NBIC Location: Part 1	Attachment Page 35
General Description: Safety Relief valve for Hot Water Supply Boilers		
Subgroup: SG Installation		
Task Group: W. Anderson (PM), E. Wiggins, J. Brockman		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Progress Report – A summary was presented on this item to the SG and SC. A working session was held in the afternoon at the SG level. A proposal was generated in which the SG and SC would like PRD to review. Extensive discussions were held amongst the SG on this item. The proposal will be forwarded to T. Beirne of PRD for review. This item will be worked on in conjunction with item 20-41.		

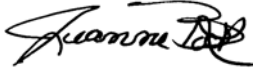
Item Number: 20-44	NBIC Location: Part 1	Attachment Page 36
General Description: CW Vacuum Boilers		
Subgroup: SG Installation		
Task Group: K. Watson (PM), M. Washington, P. Jennings		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Proposal – A proposal was presented and discussions took place amongst the SG and SC. It was decided to remove c) to address controls in the general requirements section (open a new item to place under General Requirements). There was a motion to approve the revised proposal to the MC. The motion was unanimously approved.		

Item Number: 20-45	NBIC Location: Part 1	Attachment Page 37
General Description: Temperature Control for Hot Water Boilers		
Subgroup: SG Installation		
Task Group: M. Wadkinson (PM), T. Clark, D. Patten		
Explanation of Need: Incorporation of applicable CSD-1 requirements.		
July 2020 Meeting Action: Proposal – A proposal was presented and discussions took place amongst the SG and SC. It was decided to remove e) in the proposal. There was a motion to approve the revised proposal to the MC. The motion was unanimously approved.		

General Description: Pressure Gage Range For Power Boilers**Subgroup:** SG Installation**Task Group:** M. Wadkinson (PM)**Explanation of Need:** Harmonizing the words between NBIC and ASME Section I regarding the gage ranges.**July 2020 Meeting Action: Proposal** – M. Wadkinson presented a proposal and discussions took place amongst the SG and SC. There was a motion to approve the proposal to the MC. The motion was unanimously approved.**12. Future Meetings**January 11th – 14th, 2021 – New Orleans, LAJuly 12th – 15th, 2021 – Cincinnati, OH**13. Adjournment**

A motion was made and unanimously approved to adjourn the meeting at 10:00 am

Respectfully submitted,

Jeanne Bock
NBIC Part 1 Secretary

1. Call to Order

Chair, M. Wadkinson, called the meeting to order at 8:00 a.m.

2. Introduction of Members and Visitors

Introductions took place amongst all members and visitors both by in person and Webex. Attendance sheet was checked off by the Secretary.

Subcommittee Installation

Last Name	First Name	Interest Category	Role
Wadkinson	Melissa	Manufacturers	Chair
Bock	Jeanne		Secretary
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Creacy	Todd	Authorized Inspection Agencies	Member (webex) <i>Roger Adams</i>
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Patten	Don	Manufacturers	Member
Richards	H. Michael	General Interest	Member
Smith	Rex	Authorized Inspection Agencies	Member
Washington	Milton	Jurisdictional Authorities	Member
Wiggins	Edward	Jurisdictional Authorities	Member

E. Wiggins, J. Brockman, M. Richards, and R. Spiker will be attending **in person**.

D. Patten, A. Williams, R. Austin, T. Creacy, J. Downs, G. Tompkins in for G. Halley, P. Jennings, S. Konopacki, R. Smith, M. Wadkinson, M. Washington, and M. Byrum in for K. Watson will be attending **via Webex**.

Visitors:

<i>Bernard Shelley - FRP Group</i>	
<i>Michael Carlson - st of WA visitor</i>	
<i>Tom Clark - st of Oregon</i>	

NB11-1901

SUPPLEMENT X

INSTALLATION OF HIGH PRESSURE COMPOSITE PRESSURE VESSELS

SX.1 SCOPE

This supplement provides requirements for the installation of high-pressure composite pressure vessels. This supplement is applicable to pressure vessels with an MAWP not exceeding 15,000 psi, and is applicable to the following classes of vessels:

- a) Metallic vessel with a Fiber Reinforced Plastic (FRP) hoop wrap over the shell part of the vessel (both load sharing)
- b) Metallic vessel with a full FRP wrap (both load sharing)
- c) FRP vessel with a non-load sharing metallic liner
- d) FRP vessel with a non-load sharing non-metallic liner

SX.2 SUPPORTS

Design of supports, foundations, and settings shall consider the dead loads, live loads, wind, and seismic loads. Vibration and thermal expansion shall also be considered. The design of supports, foundations, and settings shall be in accordance with ASCE/SEI 7, *Minimum Design Loads for Buildings and Other Structures*. The importance factors used in calculating the seismic and wind loads shall be the

highest value specified for any category in ASCE/SEI 7.

SX.3 CLEARANCES

The pressure vessel installation shall allow sufficient clearance for normal operation, maintenance, and inspection. Stacking of pressure vessels is permitted. The minimum clear space between pressure vessels shall be 1 ft. vertical and 2 ft. horizontal. Vessel nameplates shall be visible after installation for inspection. The location of vessels containing flammable fluids shall comply with NFPA 2. The vessel owner shall document the vessel pressure and pipe diameters used as a basis for compliance with NFPA 2 location requirements.

SX.4 PIPING LOADS

Piping loads on vessel nozzles shall be determined by a formal flexibility analysis per ASME B31.12: paragraph IP-6.1.5(b). The piping loads shall not exceed the maximum nozzle loads defined by the vessel manufacturer.

SX.5 MECHANICAL CONNECTIONS

Mechanical connections shall comply with pressure vessel manufacturer's instructions, and with requirements of the Jurisdiction. Connections to threaded nozzles shall have primary and secondary seals. The seal design shall include a method for detecting a leak in the primary seal. Seal functionality shall be demonstrated at the initial pressurization of the vessel.

SX.6 PRESSURE INDICATING DEVICES

Each pressure vessel shall be equipped with a pressure gage mounted on the vessel. The dial range shall be from 0 psi to not less than 1.25 times the vessel MAWP. The pressure gage shall have an opening not to exceed 0.0550in (1.4mm) (No. 54 drill size) at the inlet connection. In addition, vessel pressure shall be monitored by a suitable remote pressure indicating device with alarm having an indicating range of 0 psi to not less than 1.25 times the vessel MAWP.

SX.7 PRESSURE RELIEF DEVICES

Each pressure vessel shall be protected by pressure relief devices per the following requirements:

- a) Pressure relief devices shall be suitable for the intended service.
- b) Pressure relief devices shall be manufactured in accordance with a national or international standard and certified for capacity (or resistance to flow for rupture disk devices) by the National Board.
- c) Dead weight or weighted lever pressure relief valves are prohibited.
- d) Pressure relief valves shall not be fitted with lifting devices.
- e) The pressure relief device shall be installed directly on the pressure vessel with no isolation valves between the vessel and the pressure relief device except:

1) When these isolation valves are so constructed or positively controlled below the minimum required capacity, that closing the maximum number of valves at one time will not reduce the pressure relieving capacity, or

2) Upon specific acceptance of the Jurisdiction, an isolation valve between vessel and its pressure relief device may be provided for vessel inspection and repair only. The isolation valve shall be arranged so it can be locked or sealed open.

f) The discharge from pressure relief device(s) shall be directed upward to prevent any impingement of escaping fluid upon the vessel, adjacent vessels, adjacent structures, or personnel. The discharge must be to outdoors, not under any structure or roof that might permit formation of a "cloud". The pressure relief device(s) discharge piping shall be designed so that it cannot become plugged by animals, insects, rainwater, or other materials.

g) When a single pressure relieving device is used, it shall be set to operate at a pressure not exceeding the MAWP of the vessel. When the required capacity is provided in more than one pressure relieving device, only one device need be set at or below the MAWP, and the additional device(s) may be set to open at higher pressures but in no case at a pressure higher than 105% of the MAWP. The requirements of RR-130 of ASME Section X shall also apply.

h) The pressure relief device(s) shall have sufficient capacity to ensure the pressure vessel does not exceed the MAWP of that specified in the original code of construction.

i) The owner shall document the basis for selection of the pressure relief device(s) used, including capacity.

j) The owner shall have such analysis available for review by the Jurisdiction.

k) Pressure relief devices and discharge piping shall be supported so that reaction forces are not transmitted to the vessel.

l) Heat detection system: a heat activated system shall be provided so that vessel contents will be vented per f) (above), if any part of the vessel is exposed to a temperature greater than 220°F.

m) Positive methods shall be incorporated to prevent overfilling of the vessel.

SX.8 ASSESSMENT OF INSTALLATION

a) Isolation valve(s) shall be installed directly on each vessel, but not between the vessel and the pressure relief device except as noted in 3.7, e), above.

b) Vessels shall not be buried.

c) Vessels may be installed in a vault subject to a hazard analysis, verified by the manufacturer, owner, user, qualified engineer, or the Jurisdiction, to include as a minimum the following:

1) Ventilation

2) Inlet and outlet openings

3) Access to vessels

4) Clearances

5) Intrusion of ground water

6) Designed for cover loads

7) Explosion control

8) Ignition sources

9) Noncombustible construction

10) Remote monitoring for leaks, smoke, and fire

11) Remote controlled isolation valves

d) Fire and heat detection/suppression provisions shall comply with the requirements of the Jurisdiction and, as a minimum, include relief scenarios in the event of a fire or impending overpressure from heat sources.

e) Installation locations shall provide the following:

1) Guard posts shall be provided to protect the vessels from vehicular damage per NFPA 2. Protection from wind, seismic events shall be provided.

2) Supports and barriers shall be constructed of non-combustible materials.

3) Vessels shall be protected from degradation due to direct sunlight.

4) Access to vessels shall be limited to authorized personnel.

5) Any fence surrounding the vessels shall be provided with a minimum of two gates. The gates shall open outward, and shall be capable of being opened from the inside without a key.

6) Access for initial and periodic visual inspection and NDE of vessels, supports, piping, pressure gages or devices, relief devices and related piping, and other associated equipment.

7) Completed installations shall be validated as required by the Jurisdiction as addressing all of the above, and any requirements of the Jurisdiction, prior to first use. This verification shall be posted in a conspicuous location near the vessel and, when required, on file with the

Jurisdiction. Certificates shall be updated as required by mandated subsequent inspections.

8) Piping installation shall comply with ASME B31.12 or NFPA 2.

9) The vessels shall be electrically bonded and grounded per NFPA 55.

SX.9 LADDERS AND RUNWAYS

See NBIC Part 1, Section 1.6.4 *Ladders and Runways*

Action Item Request Form

Item Number:	18-2 E. Wiggins 1-10-18
General Description:	Add verbiage regarding commissioning fired boilers & fired pressure vessels with a calibrated combustion analyzer.
Subgroup:	SG Installation

Statement of Need

Task Group:	E. Wiggins (PM), D. Patten, P. Schuelke, M. Wadkinson
<p>With the addition of requiring Carbon Monoxide (CO) detector(s) / alarm(s) the concern that the combustion equipment needs to be commissioned and potentially maintained of air/fuel ratios to meet emission requirements / limits of the manufacturer and as imposed by EPA, Area Air Quality Management District and Jurisdiction, as required.</p>	

c) Background Information

Provide background information to support the revision or addition, including any data or changes in technology that form the basis for the request that will allow the Committee to adequately evaluate the proposed revision or addition. Sketches, tables, figures, and graphs should be submitted as appropriate.

When applicable, identify any pertinent paragraph in the Code that would be affected by the revision or addition and identify paragraphs in the Code that reference the paragraphs that are to be revised or added.

Task Group Notes:

7-17-18 TG – (EW, DP, MW, GH, Matt Downs & Bryan Ahee) reviewed the action item and following verbiage is going to be proposed:

Part of 1.6.9-10.x Testing and Final Acceptance

All fuel fired ~~equipment~~ boiler and/or fuel fired pressure vessel combustion air-~~fuel ratios shall be analyzed, adjusted, and values documented during commissioning to meet emission requirements of the Jurisdiction and/or -limits of the manufacturer and Jurisdiction, as required.~~

May 11th – June 13th Main Committee Letter Ballot Comments:

Mr. Marty Toth: I understand the intent of this and partially support its intent. However, I have concerns with the verbiage, its structure, and assigned placement within Part 1, Section 1.

- 1) I do not see anything in the proposed verbiage that mentions “calibrated combustion analyzer” as stated in the general description.
- 2) The proper term should read either “air-fuel” or “fuel-air”, not air/fuel to indicate fuel-to-air ratio. The use of the forward slash indicates an alternative, as used in the proposed for “requirement/limits”.
- 3) Since this is in conjunction with the requirement in 1.6.9 why not spell out fuel fired boilers and/or fuel fired pressure vessels. The use of “equipment” is vague and can lead to confusion or misinterpretation (though used in several locations throughout the NBIC without definition). We are addressing pressure-retaining items, not a furnace, oven, etc.
- 4) Within the NBIC we should concentrate on the manufacturer’s “recommendations” and Jurisdictional Authority. At least for package boilers the manufacturer requires a Start-Up Report that indicates various commissioning information item, one of which is combustion reading. If this is what we are referring to why not just state that. I personally do not think we need anything beyond that. Anything beyond that opens up confusion.

NOTE: OGA’s outside of the Jurisdictional Authority that require NOx and CO reports require them on a regular and scheduled basis, not just at start-up/commissioning, we’re talking start-up in the proposed verbiage...right?

ITEM 18-57

Proposed Changes – Where highlighted, the term capitalization is proposed to be changed.

1.4.1 RESPONSIBILITY

- a) The owner is responsible for satisfying jurisdictional requirements for certification and documentation. When required by jurisdictional rules applicable to the location of installation, the boilers, pressure vessels, piping, and other pressure-retaining items shall not be operated until the required documentation has been provided by the installer to the owner and the Jurisdiction.
- b) The National Board Commissioned Inspector providing inservice **inspection** for the facility in which the pressure-retaining item is installed has the following responsibilities: 1) Verify the Boiler Installation Report (I-1 Report) has been completed and signed by the installer, when required by the Jurisdiction; 2) Verify pressure-retaining items comply with the laws and regulations of the Jurisdiction governing the specific type of boiler or pressure vessel; 3) Verify any repairs or alterations to pressure-retaining items, which are conducted prior to, or during, the initial installation, are in accordance with the NBIC; 4) Request or assign jurisdictional identification number, when required by the Jurisdiction; and 5) Complete and submit the first inservice inspection/certificate report to the Jurisdiction when required by the Jurisdiction.
- c) Unless otherwise specifically required by the Jurisdiction, the duties of the inservice **inspector** do not include the installation's compliance with manufacturer's recommendations or applicability of, or compliance with, other standards and requirements (e.g., environmental, construction, electrical, undefined industry standards, etc.) for which other regulatory agencies have authority and responsibility to oversee.

5.4 EXAMINATION, INSPECTION, AND TESTING {piping}

The owner shall ensure that all examinations, **inspections**, and tests required by the code of construction have been performed prior to operation.

BACKGROUND INFORMATION – Review of Inspector, Inspect, Inspection

- 1) The proposal does not address locations where the addition of the endorsement could be considered. This includes the following:

- 4.6 – Testing and Acceptance – “the Inspector shall witness the pressure test of the completed installation...”
- Definitions – Dutchman – references “acceptable to the Inspector”

2) Two instances where the terms appear generic.

Location and Usage – Inspector – inspector	Comments
<p>1.1 Scope</p> <p>Middle of main paragraph. “Otherwise the requirements specified in NBIC part 1 provide guidance for installers, contractor, owners, <u>inspectors</u>, and jurisdictions to ensure safe and satisfactory installation of specified pressure-retaining items.</p>	<p>The first part of the paragraph states that the owner-user is responsible for ensuring that the installation meet all the requirements of the Jurisdiction at the point of installation including licensing, registration, or certification of those performing installations.</p> <p>Inspector is little i. Could mean jurisdictional or other.</p>
<p>1.4.1 Responsibility</p> <p>b) The National Board Commissioned <u>Inspector</u> providing inservice inspection for the facility in which the pressure-retaining item is installed have the following responsibilities:</p> <ol style="list-style-type: none"> 1) Verify the Boiler Installation Report (I-1 Report) has been completed and signed by the installer, when required by the jurisdiction, 2) Verify pressure-retaining items comply with the laws and regulations of the Jurisdiction governing the specific type of boiler or pressure vessel 3) Verify any repairs or alteration to pressure-retaining item, which are conducted prior to or during, the initial installation, are in accordance with the NBIC; 4) Request or assign jurisdictional identification number, when required by the Jurisdiction; and 5) Complete and service the first inservice inspection/certificate report to the Jurisdiction when required by the Jurisdiction <p>c) Unless otherwise specifically required by the Jurisdiction, the duties of the inservice <u>inspector</u> do not include the installation’s compliance to other standards and requirements (e.g., environmental, construction, electrical, undefined industry standards, etc.) for which other regulatory agencies have authority and responsibility to oversee.</p>	<p>Inservice inspector responsibilities under Part 1.</p> <p>Capital I IS endorsement</p> <p>Little I, but references a commission. This should be capitalized</p>
<p>2.10.2 Pressure Test</p>	<p>Capital Inspector so a Commissioned</p>

<p>Prior to initial operation, the completed boiler, including pressure piping, water columns, superheaters, economizers, stop valves, etc., shall be pressure tested in accordance with the original code of construction. Any pressure piping and fittings such as water columns, blowoff valves, feedwater regulators, superheaters, economizers, stop valves, etc., which are shipped connected to the boiler as a unit, shall be hydrostatically tested with the boiler and witnessed by an <u>Inspector</u>.</p>	<p>inspector</p> <p>Inservice or shop? (IS vs. R) Do we want to differentiate?</p>
<p>4.6 testing and acceptance (pressure vessels) b. The completed pressure vessel shall be pressure tested in the shop or in the field in accordance to the original code of construction. When required by the Jurisdiction, owner or user, the <u>Inspector</u> shall witness the pressure test of the completed installation, including piping....</p>	<p>Is this the AI?</p> <p>It is a commissioned Inspector so Capital I is appropriate, but which one?</p>
<p>Supplement 1 Installation of Yankee Dryers S1.2 ASSESSMENT OF INSTALLATION</p> <p>a. The <u>Inspector</u> verifies that the owner or user is properly controlling the operating conditions of the dryer. The <u>Inspector</u> does this by reviewing the owners comprehensive assessments of the complete installation.</p> <p>f. To maintain produce quality, the dryer surface is periodically refurbished by grinding.... The manufacturer, or another qualified source acceptable to the <u>Inspector</u>, instead provided a series of curves that graphically defines these maximum allowable operating parameters....</p> <p>h. If nonstandard load events (incidents) have occurred during installation, then the <u>Inspector</u> should ensure that an appropriate assessment of the structural integrity....</p>	<p>Inservice Inspector</p> <p>Capital I and context fits.</p>
<p>Supplement 2 - Pressure relief valves on the low-pressure side of steam pressure reducing valves S2.2 PRESSURE RELIEF VALVE CAPACITY</p> <p>b. By using the formula in NBIC Part 1, S2.3, <u>Inspectors</u> may calculate the required relieving capacities of the pressure relief valve(s) installed on the low-pressure side of the reducing valve.</p>	<p>Assume meant for inservice</p> <p>Capital I and context.</p>
<p>Supplement 5 Installation of thermal fluid heaters S5.8.2 PRESSURE TEST</p> <p>Prior to initial operation, the completed thermal fluid heater system, including pressure piping, pumps, stop valves, etc. shall be pressure tested in accordance with the manufacturer's</p>	<p>Prior to operation. Capital I</p> <p>Is this an in-service or shop as it is the system</p>

<p>recommendations. Hydrostatic testing of the system is not recommended due to possible contamination of the system. All pressure testing should be witnessed by an <u>Inspector</u>.</p>	<p>test. AIA typically doesn't test completed systems but in-service don't inspect prior to operation.</p>
<p>Definitions</p> <p>Confined space - ... the <u>Inspector</u> is cautioned of the need to comply with...</p>	<p>Any commissioned Inspector.</p>
<p>Dutchman - Generally limited to tube or pipe cross-section replacement. ... meeting the service requirements and installation procedures acceptable to the <u>Inspector</u>...</p>	<p>Dutchman are repair – shop/repair</p> <p>Not in-service.</p>
<p>National Board Commissioned <u>Inspector</u> - An individual who holds a valid and current National Board Owner-user Commission.</p>	<p>Definition – No distinction between in-service and AIA</p>
<p>Owner-user <u>Inspector</u> - An individual who holds a valid and current National Board Commission.</p>	<p>Same definition as an NBIC commissioned inspector. This was originally copied from NBIC part 1 incorrectly. This is correct as shown and the definition is acceptable.</p>
<p>Interpretations</p> <p>Multiple references to <u>Inspector</u>.</p>	<p>Most appear to reference repairs. Some are older references and difficult to ascertain from the Subject.</p>
<p>Location and Usage</p> <p><u>Inspection - inspection</u></p>	
<p>1.4 CERTIFICATION, <u>INSPECTION</u>, AND JURISDICTIONAL REQUIREMENTS</p> <p>b) The National Board Commissioned Inspector providing inservice <u>inspection</u> for the facility in which the pressure-retaining item is installed has the following responsibilities:</p> <p>1) Verify the Boiler Installation Report (I-1 Report) has been completed and signed by the installer, when required by the Jurisdiction;</p> <p>2) Verify pressure-retaining items comply with the laws and regulations of the Jurisdiction</p>	<p>Inspection – little i but by context should be I.</p> <p>Also should be I, not i.</p>

<p>governing the specific type of boiler or pressure vessel; 3) Verify any repairs or alterations to pressure-retaining items, which are conducted prior to, or during, the initial installation, are in accordance with the NBIC; 4) Request or assign jurisdictional identification number, when required by the Jurisdiction; and 5) Complete and submit the first inservice <u>inspection</u>/certificate report to the Jurisdiction when required by the Jurisdiction.</p>	
<p>1.4.2 EQUIPMENT CERTIFICATION</p> <p>b) Package boilers having external piping disassembled and shipped with the boiler shall have a method for traceability of the disassembled piping that can be verified at the time of installation and <u>inspection</u>. The manufacturer of the package boiler is responsible for determining a method of traceability.</p>	<p>Little i, but unclear.</p>
<p>1.4.4 <u>INSPECTION</u></p> <p>All boilers, pressure vessels, piping, and other pressure-retaining items shall be inspected and tested after installation and prior to commencing operation.</p> <p>1.4.5 BOILER INSTALLATION REPORT</p> <p>a) Upon completion, <u>inspection</u>, testing, and acceptance of the installation, the installer shall complete and certify the Boiler Installation Report (I-1) for all power boilers, hot-water heating boilers, steam-heating boilers, hot-water supply boilers, and potable water heaters.</p>	<p>Little i, the installation report is by the installer. Not an Inspector reference.</p>
<p>1.6.4 LADDERS AND RUNWAYS</p> <p>a) All walkways, runways, and platforms shall be: 1) of metal construction or equivalent material;</p>	<p>Little i. Reference to generic inspection activities that may include big I Inspection. (“Generic i” in the following cases)</p>

<p>2) provided between or over the top of boilers, heaters, or vessels that are more than 8 ft. (2.4 m) above the operating floor to afford accessibility for normal operation, maintenance, and <u>inspection</u>;</p>	
<p>2.3.3 CLEARANCES</p> <p>a) Boiler installations shall allow for normal operation, maintenance, and <u>inspections</u>. There shall be at least 36 in. (915 mm) of clearance on each side of the boiler to enable access for maintenance and/or <u>inspection</u> activities. Boilers operated in battery shall not be installed closer than 48 in. (1220 mm) from each other. The front or rear of any boiler shall not be located nearer than 36 in. (915 mm) from any wall or structure.</p> <p>e) Boilers with a bottom opening used for <u>inspection</u> or maintenance shall have at least 12 in. (305 mm) of unobstructed clearance.</p>	<p>Generic i.</p>
<p>2.7.5 BLOWOFF</p> <p>q) Where necessary to install a blowoff tank underground, it shall be enclosed in a concrete or brick pit with a removable cover so that <u>inspection</u> of the entire shell and heads of the tank can be made.</p>	<p>Generic i.</p>
<p>2.10 TESTING AND ACCEPTANCE</p> <p>2.10.1 GENERAL</p> <p>a) Care shall be exercised during installation to prevent loose weld material, welding rods, small tools, and miscellaneous scrap metal from getting into the boiler. Where possible, an <u>inspection</u> of the interior of the boiler and its appurtenances shall be made for the presence of foreign debris prior to making the final closure.</p>	<p>Generic i.</p>

<p>2.10.6 BOILER INSTALLATION REPORT a) Upon completion, <u>inspection</u>, and acceptance of the installation, the installer shall complete and certify the Boiler Installation Report I-1. See NBIC Part 1, 1.4.5.1.</p>	<p>Not an Inspector. Little i. ?</p>
<p>3.3.4 CLEARANCES c) Heating boilers shall be located so that adequate space is provided for proper operation, maintenance, and <u>inspection</u> of equipment and appurtenances, which shall include the removal of tubes if applicable.</p>	<p>Generic i.</p>
<p>3.7.4 FEEDWATER, MAKEUP WATER, AND WATER SUPPLY a) Steam Boilers Feedwater or water treatment shall be introduced into a boiler through the return piping system. Alternatively, feedwater or water treatment shall be introduced through an independent connection. The water flow from the independent connection shall not discharge directly against parts of the boiler exposed to direct radiant heat from the fire. Feedwater or water treatment shall not be introduced through openings or connections provided for <u>inspection</u> or cleaning, safety valve, water column, water-gage glass, or pressure gage. The feedwater pipe shall be provided with a check valve, or a backflow preventer containing a check valve, near the boiler and a stop valve or cock between the check valve and the boiler, or between the check valve and the return pipe system. b) Hot-Water Boilers Makeup water may be introduced into a boiler through the piping system or through an independent connection. The water flow from the independent connection shall not discharge directly against parts of the boiler exposed to direct radiant heat from the fire. Makeup water shall not be introduced through openings or connections provided exclusively for <u>inspection</u> or cleaning, safety relief valve,</p>	<p>Generic i</p>

<p>pressure gage, or temperature gage. The makeup water pipe shall be provided with a check valve, or a backflow preventer containing a check valve, near the boiler and a stop valve or cock between the check valve and the boiler, or between the check valve and the piping system.</p>	
<p>3.10.3 BOILER INSTALLATION REPORT</p> <p>a) Upon completion, <u>inspection</u>, and acceptance of the installation, the installer shall complete and certify the Boiler Installation Report I-1. See NBIC Part 1, 1.4.5.1.</p> <p>4.3.2 CLEARANCES</p> <p>a) All pressure vessel installations must allow sufficient clearance for normal operation, maintenance, and <u>inspection</u> (internal and external).</p>	<p>Not the in-service inspector prior to first "inspection"</p>
<p>4.5.6 INSTALLATION AND DISCHARGE PIPING REQUIREMENTS</p> <p>e) There shall be no intervening stop valves...except under the following conditions:</p> <p>2) Upon specific acceptance of the Jurisdiction, when necessary for the continuous operation of processing equipment of such a complex nature that shutdown of any part is not feasible, a full area stop valve between a pressure vessel and its pressure relief device may be provided for <u>inspection</u> and repair purposes only. This stop valve shall be arranged so that it can be locked or sealed open, and it shall not be closed except by an authorized person who shall remain stationed there during that period of operation while the valve remains closed. The valve shall be locked or sealed in the open position before the authorized person leaves the station.</p> <p>3) A full area stop valve may also be placed on the discharge side of a pressure relief</p>	<p>Generic i.</p>

<p>device when its discharge is connected to a common header for pressure relief devices to prevent discharges from these other devices from flowing back to the first device during <u>inspection</u> and repair. This stop valve shall be arranged so that it can be locked or sealed open, and it shall not be closed except by an authorized person who shall remain stationed there during that period of operation while the valve remains closed. The valve shall be locked and sealed in the open position before the authorized person leaves the station. This valve shall only be used when a stop valve on the inlet side of the pressure relief device is first closed.</p> <p>h) Pressure relief devices shall be installed so they are readily accessible for <u>inspection</u>, repair, or replacement.</p>	
<p>4.7.2 CLEARANCE AND ACCEPTABILITY</p> <p>a) The required nameplate (marking or stamping) should be exposed and accessible. b) The openings when required should be accessible to allow for entry for <u>inspection</u> and maintenance.</p>	<p>Generic i.</p>
<p>5.3.6 INLET AND DISCHARGE PIPING REQUIREMENTS</p> <p>e) There shall be no intervening stop valves ... except under the following conditions:</p> <p>2) Upon specific acceptance of the Jurisdiction, when necessary for the continuous operation of processing equipment of such a complex nature that shutdown of any part is not feasible, a full area stop valve between a piping system and its pressure relief device may be provided for <u>inspection</u> and repair purposes only. This stop valve shall be arranged so that it can be locked or sealed open and it shall not be closed except by an authorized person who shall remain stationed there during</p>	<p>Generic i.</p>

<p>that period of operation while the valve remains closed. The valve shall be locked or sealed in the open position before the authorized person leaves the station;</p> <p>3) A full area stop valve may be placed on the discharge side of a pressure relief device when its discharge is connected to a common header for pressure relief devices to prevent discharges from these other devices from flowing back to the first device during <u>inspection</u> and repair. This stop valve shall be arranged so that it can be locked or sealed open, and it shall not be closed except by an authorized person who shall remain stationed there during that period of operation while the valve remains closed. The valve shall be locked or sealed in the open position before the authorized person leaves the station. This valve shall only be used when a stop valve on the inlet side of the pressure relief device is first closed; or</p> <p>i) Pressure relief devices shall be installed so they are accessible for <u>inspection</u>, repair, or replacement. These stop valves shall be so constructed or positively controlled that the closing of the maximum number of block valves at one time will not reduce the pressure relieving capacity below the required relieving capacity.</p>	
<p>5.4 EXAMINATION, <u>INSPECTION</u>, AND TESTING</p> <p>The owner shall ensure that all examinations, <u>inspections</u>, and tests required by the code of construction have been performed prior to operation.</p>	<p>As it is required by the code of construction, should this be a capitol I? Why both examinations and inspections.</p>
<p>S3.2.1 GENERAL REQUIREMENTS (ENCLOSED AND UNENCLOSED AREAS)</p> <p>a) LCDSVs shall not be located within 10 feet (3,050 mm) of elevators, unprotected platform ledges, or other areas where falling would result in dropping distances exceeding half the container height.</p>	<p>Generic i</p>

<p>b) LCDSVs shall be installed with sufficient clearance for filling, operation, maintenance, <u>inspection</u>, and replacement.</p>	
<p>S5.3.4 CLEARANCES</p> <p>a) Thermal fluid heater installations shall allow for normal operation, maintenance, and <u>inspections</u>. There shall be at least 18 in. (460 mm) of clearance on each side of the thermal fluid heater to enable access for maintenance and/or <u>inspection</u> activities. Thermal fluid heaters operated in battery shall not be installed closer than 18 in. (460 mm) from each other. The front or rear of any thermal fluid heater shall not be located nearer than 36 in. (915 mm) from any wall or structure.</p> <p>c) Heaters with a bottom opening used for <u>inspection</u> or maintenance shall have at least 18 in. (460 mm) of unobstructed clearance.</p>	<p>Generic i</p>
<p>S5.8.1 GENERAL</p> <p>a) Care shall be exercised during installation to prevent loose weld material, welding rods, small tools, and miscellaneous scrap metal from getting into the thermal fluid system. Where possible, an <u>inspection</u> of the interior of the thermal fluid heater and its appurtenances shall be made for the presence of foreign debris prior to making the final closure.</p>	<p>Generic i</p>
<p>S5.8.6 INSTALLATION REPORT</p> <p>a) Upon completion, <u>inspection</u>, and acceptance of the installation, the installer should complete and certify the Boiler Installation Report I-1. See 1.4.5.1.</p>	<p>Generic i?</p>

<p>S7.3.1 RECEIVING AND INITIAL <u>INSPECTION</u> OF GRAPHITE PRESSURE EQUIPMENT</p> <p>Graphite equipment should be thoroughly inspected and tested as it is received in order to identify any in transit damage. Whenever possible, this <u>inspection</u> should be made before the exchanger is removed from the carrier. To verify the unit has arrived in an undamaged condition, a pressure test may be performed. The bolt torques and spring heights should be verified prior to a pressure test. This pressure test shall not exceed the MAWP of the vessel....</p>	<p>This is not a Inspector responsibility?</p>
<p>PART 1, SECTION 8 INSTALLATION — PREPARATION OF TECHNICAL INQUIRIES TO THE NATIONAL BOARD INSPECTION CODE COMMITTEE</p> <p><u>SKIPPED INSPECTION IN THIS SECTION</u></p>	
<p>Authorized <u>Inspection</u> Agency (AIA)</p> <p>Inservice: An Authorized <u>Inspection</u> Agency is either:</p> <p>a) a jurisdictional authority as defined in the National Board Constitution; or b) an entity that is accredited by the National Board meeting NB-369, Accreditation of Authorized <u>Inspection</u> Agencies Performing Inservice <u>Inspection</u> Activities; NB-371, Accreditation of Owner-User <u>Inspection</u> Organizations (OUIO); or NB-390, Qualifications and duties for Federal <u>Inspection</u> Agencies (FIAs) Performing Inservice <u>Inspection</u> Activities.</p> <p>New Construction: An Authorized <u>Inspection</u> Agency is one that is accredited by the National Board meeting the qualification and duties of NB-360, Criteria for Acceptance of Authorized <u>Inspection</u> Agencies for New Construction.</p> <p>Authorized Nuclear <u>Inspection</u> Agency — An Authorized <u>Inspection</u> Agency intending to perform nuclear <u>inspection</u> activities and employing nuclear Inspectors / Supervisors</p>	
	<p>Capitol I Inspection.</p>

<p>Inspection — A process of review to ensure engineering design, materials, assembly, examination, and testing requirements have been met and are compliant with the code.</p>	
<p>Jurisdiction — The National Board member Jurisdiction where the organization is located. Alternatively, where the Jurisdiction elects not to perform the review or where there is no Jurisdiction or where the Jurisdiction is the organization's Authorized <u>Inspection</u> Agency, The National Board of Boiler and Pressure Vessel Inspectors will represent the Jurisdiction. At the Jurisdiction's discretion, the Jurisdiction may choose to be a member of the review team if the Jurisdiction chooses not to be the team leader.</p>	
<p>NBIC — The National Board <u>Inspection</u> Code published by The National Board of Boiler and Pressure Vessel Inspectors.</p>	
<p>Owner-User <u>Inspection</u> Organization — An owner or user of pressure-retaining items that maintains an established <u>inspection</u> program, whose organization and <u>inspection</u> procedures meet the requirements of the National Board rules and are acceptable to the jurisdiction or jurisdictional authority wherein the owner or user is located.</p>	
<p>Some in Interpretations</p>	
<p>Index</p> <p>Inservice <u>Inspection</u> (Introduction), (1.4.1), (8.1), (9.1)</p> <p>Inspection</p>	

(Foreword), (Introduction), (1.4), (1.4.1), (1.4.2),
(1.4.4), (1.4.5), (1.6.4), (2.3.3), (2.7.5), (2.10.1),
(2.10.6), (3.3.4), (3.7.4), (3.10.3), (4.3.2), (4.5.6),
(4.7.2), (5.3.6), (5.4), (S1.2), (S3.2.1), (S5.3.4),
(S5.8.1), (S5.8.6), (7.1), (8.4), (9.1)

Owner-User Inspection Organization

(Introduction), (9.1)

PURPOSE: Revision of present (2017) NB-23 Code

BACKGROUND INFORMATION: Suggested revisions are supported by the contributor's 30yr industry experience within large corporate owner/user environments including purchase and design, manufacturing, installation, inspection and repair.

Part 1 - Supplement 1/Part 2 - Supplement 5

OBSERVATION: The wording of Part 1, S1.1, SCOPE and the wording of Part 2, S5.1, SCOPE serve identical purpose within the Code, but are not identically written.

RECOMMENDATION: Ensure that wording in Part 2, S5.1, is identical to that found in Part 1, S1.1.

Part 1

INSTALLATION OF YANKEE DRYERS (ROTATING ~~CAST IRON~~ PRESSURE VESSELS) WITH FINISHED SHELL OUTER SURFACES

S1.1 SCOPE

This supplement provides guidelines for the installation of a ~~Yankee-yankee~~ dryer. A ~~Yankee-yankee~~ dryer ~~is a pressure vessel with~~ has the following characteristics:

- a) ~~This supplement describes guidelines for the installation of a Yankee dryer. A Yankee dryer~~ It is a rotating steam-pressurized cylindrical vessel commonly used in the paper industry, and ~~is typically made of cast iron,~~ finished to a high surface quality, and characterized by a center shaft connecting the heads. While traditionally made of cast iron, bolted or welded steel vessels are in use.
- b) Yankee dryers are primarily used in the production of tissue-type paper products. When used to produce machine-glazed (MG) paper, the dryer is termed an MG cylinder. A wet paper web is pressed onto the finished dryer surface using one or two pressure (pressing) rolls. Paper is dried through a combination of mechanical dewatering by the pressure roll(s), thermal drying by the pressurized Yankee dryer, and a steam-heated or fuel-fired hood. After drying, the paper web is removed from the dryer.
- c) A ~~Y~~yankee dryer is typically manufactured in a range of outside diameters from 8 to 23 ft. (2.4 to 7 m), widths from 8 to 28 ft. (2.4 to 8.5 m), pressurized and heated with steam up to 160 psi (1,100 kPa), and rotated at speeds up to 7,000 ft/min (2,135 m/min). Typical pressure roll loads against the Yankee dryer are up to 600 pounds per linear inch (105 kN/m). A thermal load results from the drying process due to difference in temperature between internal and external shell surfaces. The dryer has an internal system to remove steam and condensate. These vessels can weigh up to 220 tons (200 ~~tonnestons~~).
- d) The typical ~~Y~~yankee dryer is an assembly of several large castings components. The cylindrical shell is ~~normally a gray iron casting, in accordance with commonly ASME designation SA-278 gray cast iron, or SA-516 steel.~~ Shells internally may be smooth bore or ribbed. Heads, center shafts, and journals may be gray cast iron, ductile cast iron, or steel.

Item 19-81

Correction to value in Table 3.7.9.1-b

Background Information: The table in question is generated using the equation in 3.7.9.1 a) 2). The values in the table are all based on the same temperatures and pressures. The only thing that changes is the volume. The ratio of the Nonpressurized Type column value to the System Volume is 0.15 in all cases except the 100 gallon case which ends up being 0.18. Thus multiplying any system volume by 0.15 should give the third column value.

Proposed Change:

TABLE 3.7.9.1-b**EXPANSION TANK CAPACITIES FOR FORCED HOT-WATER SYSTEMS**

Based on average operating water temperature 195°F [91°C], fill pressure 12 psig [83 kPa], and maximum operating pressure 29 psig [200 kPa]		
Tank Capacities, gallon (l)		
System Volume	Pressurized Diaphragm Type	Nonpressurized Type
100 (379)	9 (34)	18 (68) <u>15 (57)</u>
200 (757)	17 (64)	30 (114)
300 (1136)	25 (95)	45 (170)
400 (1514)	33 (125)	60 (227)
500 (1893)	42 (159)	75 (284)
1,000 (3785)	83 (314)	150 (568)
2,000 (7571)	165 (625)	300 (1136)

Item 20-13

Expansion Tank Maximum Operating Pressure

Part 1, 3.7.9.1 a) 2) and Table 3.7.9.1-b

Submitted by: Luis Ponce – lponce@nationalboard.org**Explanation of Need:**

Table 3.7.9.1-b - 30 psig matches note (a) of Table HG-709.2 of ASME Sect IV. 3.7.9.1 a) 2) The "except for prepressurized tanks" phrase is misplaced and belongs with the provisions for draining tanks. See last sentence in HG-709.2 on p. 62 and first sentence in that same section just prior to the formulas on pg. 63.

Background Information:

Prior to the 2007 Edition/2010 Addenda the table value was 30 psig. For whatever reason, it was changed to 29 psig in this issue. Prior to the 2007 Edition/2007 Addenda the paragraph read correctly.

Proposed Change:**3.7.9.1 EXPANSION TANKS AND PIPING FOR STEAM HEATING, HOT-WATER HEATING AND HOT-WATER SUPPLY BOILERS**

a) Expansion Tanks for Hot-Water Heating and Hot-Water Supply Boilers

All hot-water heating systems incorporating hot-water tanks or fluid relief columns shall be so installed as to prevent freezing under normal operating conditions.

1) Heating Systems With Open Expansion Tank

An indoor overflow from the upper portion of the expansion tank shall be provided in addition to an open vent, the indoor overflow shall be carried within the building to a suitable plumbing fixture or drain.

2) Closed Heating Systems

An expansion tank shall be installed that will be consistent with the volume and capacity of the system. If the system is designed for a working pressure of 30 psig (200 kPa) or less, the tank shall be suitably designed for a minimum hydrostatic test pressure of 75 psig (520 kPa). Expansion tanks for systems designed to operate above 30 psig (200 kPa) shall be constructed in accordance with an acceptable code of construction. Provisions shall be made for draining the tank without emptying the system, except for prepressurized tanks. ~~Except for prepressurized tanks, t~~ The minimum capacity of the closed-type expansion tank should be determined from NBIC Part 1, Tables 3.7.9.1-a and 3.7.9.1-b or from the following formula where the necessary information is available:

TABLE 3.7.9.1-b

EXPANSION TANK CAPACITIES FOR FORCED HOT-WATER SYSTEMS

Based on average operating water temperature 195°F [91°C], fill pressure 12 psig [83 kPa], and maximum operating pressure 29 30 psig [200 kPa]		
Tank Capacities, gallon (l)		
System Volume	Pressurized Diaphragm Type	Nonpressurized Type

Item 20-36

1.6.1 SUPPORTS, FOUNDATIONS, AND SETTINGS

Each boiler, potable water heater, thermal fluid heater and pressure vessel and the associated piping must be safely supported. Design of supports, foundations, and settings shall consider vibration (including seismic where necessary), movement (including thermal expansion and contraction), grounding/bonding to minimize electrolytic corrosion and loadings (including the weight of the fluid in the system during a pressure test) in accordance with jurisdictional requirement, manufactures recommendations, and/or other industry standards, as applicable.

Item Number: 20-41

ASME CSD-1 2018 Edition

CW-510 Requirements for Steam and Hot-Water Heating Boilers

The safety and safety relief valves of all steam and hot-water heating boilers shall conform to the ASME Boiler and Pressure Vessel Code, Section I or Section IV, as applicable.

NBIC Part I 2019 Edition

2.9.1 (c) ~~Pressure relief valve shall be manufactured in accordance with a national or international standard.~~ Pressure relief valve shall be manufactured in accordance with a national or international standard and be certified for capacity or flow resistance by the National Board.

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3.9.2 (a) Pressure Relief Valve requirements for steam heating boilers

(a) Pressure relief valve shall be manufactured in accordance with a national or international standard and be certified for capacity or flow resistance by the National Board.

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(b) The following general requirements pertain to installing, mounting and connecting pressure relief valves on heating boilers.

(Note: certified for capacity or flow resistance by the NB is referenced in 4.5.1(a))

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Item Number: 20-41

ASME CSD-1 2018 Edition

CW-510 Requirements for Steam and Hot-Water Heating Boilers

The safety and safety relief valves of all steam and hot-water heating boilers shall conform to the ASME Boiler and Pressure Vessel Code, Section I or Section IV, as applicable.

NBIC Part I 2019 Edition

2.9.1 (c) ~~Pressure relief valve shall be manufactured in accordance with a national or international standard.~~ Pressure relief valve shall be manufactured in accordance with a national or international standard and be certified for capacity or flow resistance by the National Board.

3.9.2 (a) Pressure Relief Valve requirements for steam heating boilers

(a) Pressure relief valve shall be manufactured in accordance with a national or international standard and be certified for capacity or flow resistance by the National Board.

(b) The following general requirements pertain to installing, mounting and connecting pressure relief valves on heating boilers.

(Note: certified for capacity or flow resistance by the NB is referenced in 4.5.1(a))

Note: 3.9 says: See NBIC Part 1, 3.21 for the scope of pressure retaining items covered by these requirements. (3.2 is definitions)

Proposed correction: See NBIC Part 1, 3.1 for the scope of pressure retaining items covered by these requirements.

Item Number: 20-42**Power Boilers (NBIC, Part 1, Section 2, Installation 2019)****2.8.4 PRESSURE CONTROL**

Each automatically fired steam boiler shall be protected from overpressure by two pressure operated controls.

- a) Each individual steam boiler or each system of commonly connected steam boilers shall have a control that will cut off the fuel supply when the steam pressure reaches an operating limit, which shall be less than the maximum allowable working pressure.
- b) Each individual automatically fired steam boiler shall have a safety limit control, with a manual reset, that will cut off the fuel supply to prevent steam pressure from exceeding the maximum allowable working pressure of the boiler. Each control shall be constructed to prevent a pressure setting above the maximum allowable working pressure of the boiler.
- c) Shutoff valves of any type shall not be placed in the steam pressure connection between the boiler and the controls described in a) and b) above. These controls shall be protected with a siphon or equivalent means of maintaining a water seal that will prevent steam from entering the control. The connections to the boiler shall not be less than NPS 1/4 (DN 8) for lengths up to and including 5 ft (1.5 m) and not less than NPS 1/2 (DN 15) for lengths over 5 ft (1.5 m) but where steel or wrought iron pipe or tubing is used, they shall not be less than NPS 1/2 (DN 15) for lengths up to and including 5 ft (1.5 m) and not less than NPS 1 (DN 25) for lengths over 5 ft (1.5 m). The minimum size of an external siphon shall be NPS 1/4 (DN 8) or 3/8 in. (10 mm) outside diameter nonferrous tubing. ~~For manifold connections, the minimum size shall be as specified in the original code of construction.~~
- d) Pressure controls should have separate connections, however manifolding is permitted. When multiple pressure controls are connected to the boiler with a common manifold, the connection at the boiler up to and including the entire manifold, for pipe of nonferrous material, shall not be less than NPS 1/2 (DN 15) for lengths up to and including 5 ft (1.5 m) and not less than NPS 3/4 (DN 20) for lengths over 5 ft (1.5 m). For manifolds using ferrous material, the connection at the boiler up to and including the entire manifold shall not be less than NPS 3/4 (DN 20) for lengths up to and including 5 ft (1.5 m) and not less than NPS 1 1/4 (DN 32) for lengths over 5 ft (1.5 m). Individual controls are to be piped from the manifold according to the provisions of c) above.

Steam Heating Boilers (NBIC, Part 1, Section 3, Installation 2019)

3.8.1.4 PRESSURE CONTROL

Each automatically fired steam boiler shall be protected from overpressure by two pressure operated controls.

- a) Each individual steam boiler or each system of commonly connected steam boilers shall have a control that will cut off the fuel supply when the steam pressure reaches an operating limit, which shall be less than the maximum allowable working pressure.
- b) Each individual automatically fired steam boiler shall have a safety limit control, with a manual reset, that will cut off the fuel supply to prevent steam pressure from exceeding the maximum allowable working pressure of the boiler. Each control shall be constructed to prevent a pressure setting above the maximum allowable working pressure of the boiler.
- c) Shutoff valves of any type shall not be placed in the steam pressure connection between the boiler and the controls described in a) and b) above. These controls shall be protected with a siphon or equivalent means of maintaining a water seal that will prevent steam from entering the control. The connections to the boiler shall not be less than NPS 1/4 (DN 8) for lengths up to and including 5 ft (1.5 m) and not less than NPS 1/2 (DN 15) for lengths over 5 ft (1.5 m) but where steel or wrought iron pipe or tubing is used, they shall not be less than NPS 1/2 (DN 15) for lengths up to and including 5 ft (1.5 m) and not less than NPS 1 (DN 25) for lengths over 5 ft (1.5 m). The minimum size of an external siphon shall be NPS 1/4 (DN 8) or 3/8 in. (10 mm) outside diameter nonferrous tubing. ~~For manifold connections, the minimum size shall be as specified in the original code of construction.~~
- d) Pressure controls should have separate connections, however manifolding is permitted. When multiple pressure controls are connected to the boiler with a common manifold, the connection at the boiler up to and including the entire manifold, for pipe of nonferrous material, shall not be less than NPS 1/2 (DN 15) for lengths up to and including 5 ft (1.5 m) and not less than NPS 3/4 (DN 20) for lengths over 5 ft (1.5 m). For manifolds using ferrous material, the connection at the boiler up to and including the entire manifold shall not be less than NPS 3/4 (DN 20) for lengths up to and including 5 ft (1.5 m) and not less than NPS 1 1/4 (DN 32) for lengths over 5 ft (1.5 m). Individual controls are to be piped from the manifold according to the provisions of c) above.

Below is for reference only

(ASME CSD-1, 2018)

CW-300 PRESSURE CONTROLS

CW-310 Requirements for Pressure Controls for Steam Boilers

- (a) Each boiler pressure control shall conform to UL 353, Standard for Limit Controls, and shall be accepted by a nationally recognized testing agency.
- (b) Each automatically fired steam boiler or system of commonly connected steam boilers shall have at least one steam pressure control device that will shut off the fuel supply to each boiler or system of commonly connected boilers when the steam pressure reaches a preset maximum operating pressure. This requirement does not preclude the use of additional operating control devices where required.
- (c) In addition to the pressure control required in (b) above, each individual automatically fired steam boiler shall have a high steam pressure limit control that will prevent generation of steam pressure greater than the maximum allowable working pressure. Functioning of this control shall cause safety shutdown and lockout. The manual reset may be incorporated in the pressure limit control. Where the reset device is separate from the pressure limit control, a means shall be provided to indicate actuation of the pressure limit control. Each limit and operating control shall have its own sensing element and operating switch.

EXCEPTION: Lockout is not required for boiler units installed in residences, as defined by the authority having jurisdiction.

- (d) A pressure limit control of the automatic or manual reset type shall be electrically connected in accordance with CE-110(j).
- (e) No shutoff valve of any type shall be placed in the steam pressure connection between the boiler and the high-pressure limit control device and steam pressure control device or between the boiler and steam pressure control device.
- (f) Each pressure control device shall be protected with a siphon, or equivalent means of maintaining a water seal, that will prevent steam from entering the control. The minimum size of a siphon shall be NPS 1/4 (DN 8). Tubing suitable for the temperatures and pressures involved, with an inside diameter at least equal to standard pipe sizes, may be substituted for pipe. When a control incorporating a mercury switch is mounted on the siphon, the loop of the siphon shall be in a plane that is 90 deg (1.57 rad) from the plane of the mercury switch.
- (g) Steam pressure supply connections to a single pressure control using pipe of nonferrous material shall not be less than NPS 1/4 (DN 8) for lengths up to and including 5 ft (1.5 m) and not less than NPS 1/2 (DN 15) for lengths over 5 ft (1.5 m). Tubing suitable for the temperatures and pressures involved, having an inside diameter at least equal to that of standard pipe, may be substituted for pipe.

- (h) Steam pressure supply connections to a single pressure control using pipe of ferrous material shall not be less than NPS 1/2 (DN 15) for lengths up to and including 5 ft (1.5 m) and not less than NPS 1 (DN 25) for lengths over 5 ft (1.5 m). Tubing suitable for the temperatures and pressures involved, having an inside diameter at least equal to that of standard pipe, may be substituted for pipe.
- (i) Pressure controls should have separate pressure connections; however, manifolding is permitted. When multiple controls are fed from a manifold, the manifold and common source connection to the boiler, for pipe of nonferrous material, shall not be less than NPS 1/2 (DN 15) for lengths up to and including 5 ft (1.5 m) and not less than NPS 3/4 (DN 20) for lengths over 5 ft (1.5 m). For manifolds using ferrous material, the manifold and common source connection to the boiler shall not be less than NPS 3/4 (DN 20) for lengths up to and including 5 ft (1.5 m) and not less than NPS 1 1/4 (DN 32) for lengths over 5 ft (1.5 m). Individual controls are to be piped from the manifold according to the provisions of (g) and (h).
- (j) The upper set point limit or maximum fixed stop limit of the pressure control selected shall not exceed the maximum allowable working pressure of the boiler.

Item Number: 20-43

ASME CSD-1 2018 Edition

CW-510 Requirements for Hot-Water Supply Boilers

The safety and safety relief valves of all hot-water supply boilers shall conform to the ASME Boiler and Pressure Vessel Code, Section I or Section IV, as applicable.

3.9.3 (a) ~~Pressure relief valve shall be manufactured in accordance with a national or international standard.~~ Pressure relief valve shall be manufactured in accordance with a national or international standard and be certified for capacity or flow resistance by the National Board.

(Note: certified for capacity or flow resistance by the NB is referenced in Part 1, 4.5.1(a))

It is intended that the number be 3.8.1.7 and that the item currently 3.8.1.7 becomes 3.8.1.8

3.8.1.7 Vacuum Boilers

Vacuum Boilers shall be provided with instruments, fittings and controls in accordance with Section 3.8 but are exempt from the following requirements if pressure and temperature controls are installed as described in 3.8.1.7 below:

<u>3.8.1.2</u>	<u>Water-Gage Glasses</u>
<u>3.8.1.3</u>	<u>Water Column and Water Level Control Piping</u>
<u>3.8.1.4</u>	<u>Pressure Control</u>
<u>3.8.1.5</u>	<u>Auto Low Water Cut-Off and /or Water feeding device</u>
<u>3.7.7</u>	<u>Blow Off and Drain Valves</u>

The exemptions are allowed only when the following controls are installed:

- a) Pressure Control – Each boiler shall have a pressure control that interrupts the burner operation in response to boiler pressure. This pressure control shall be set from 2.5 psig (17 kpa) to 14.7 psig (101 kpa).
- b) Temperature Control- Each boiler shall have two temperature controls responsive to boiler temperature that interrupt burner operation. One shall operate at a temperature below 210°F (99°C). The other shall at a temperature not exceeding 210°F (99°C) and shall cause a safety shutdown and lockout.
- c) Safety Relief Valves - Each boiler shall have a properly sized safety valve and shall conform to the following.
 1. Have no test lever
 2. Be set to a maximum pressure of 7.1 psig (49 kpa).
 3. ASME Boiler and Pressure Vessel Code Section IV

Item 20-45

Action: look at temperature control requirements for hot water boilers between CSD-1 paragraph CW-410 and NBIC Part 1 Section 3 3.8.2.3 to determine if NBIC should add additional installation requirements.

Existing 3.8.2.3

3.8.2.3 TEMPERATURE CONTROL

Each automatically fired hot-water heating or hot-water supply boiler shall be protected from over-temperature by two temperature-operated controls.

- a) Each individual hot-water heating or hot-water supply boiler or each system of commonly connected boilers shall have a control that will cut off the fuel supply when the water temperature reaches an operating limit, which shall be less than the maximum allowable temperature.
- b) In addition to a) above, each individual automatically fired hot-water heating or hot-water supply boiler shall have a safety limit control with manual reset that will cut off the fuel supply at or below the maximum allowable temperature at the boiler outlet.

Proposed

3.8.2.3 TEMPERATURE CONTROL

Each automatically fired hot-water heating or hot-water supply boiler shall be protected from over-temperature by at least two temperature-operated controls.

- a) Each individual hot-water heating or hot-water supply boiler or each system of commonly connected boilers shall have a at least one control that will cut off the fuel supply when the water temperature reaches an operating limit, which shall be less than the maximum allowable temperature.
- b) In addition to a) above, each individual automatically fired hot-water heating or hot-water supply boiler shall have a at least one safety limit control with manual reset that will cut off the fuel supply at or below the maximum allowable temperature at the boiler outlet
- c) Each operating and safety limit control shall have its own sensing element and operating switch.
- d) Alternatively, integrated controls with multiple sensors may be used to meet the requirements of a) and b).

Item 20-50

Existing text

2.8.2 PRESSURE GAGE

- a) Each steam boiler shall have a pressure gage connected to the steam space or to the steam connection to the water column. When a pressure-reducing valve is installed in the steam supply piping, a pressure gage shall be installed on the low pressure side of the pressure-reducing valve.
- b) The dial range shall not be less than 1.5 times and no greater than two times the pressure at which the lowest pressure relief valve is set.

Proposed Text

2.8.2 PRESSURE GAGE

- a) Each steam boiler shall have a pressure gage connected to the steam space or to the steam connection to the water column. When a pressure-reducing valve is installed in the steam supply piping, a pressure gage shall be installed on the low pressure side of the pressure-reducing valve.
- b) The dial range shall not be less than 1.5 times and no greater than approximately two times the pressure at which the lowest pressure relief valve is set.

Rational:

There is a conflict between the wording in ASME Section I and in NBIC Part I Section 2.

ASME Section I

The dial of the pressure gage shall be graduated to approximately double the pressure at which the safety valve is set, but in no case less than 1 1 /2 times the pressure.