Date Distributed:

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD SUBCOMMITTEE INSTALLATION

AGENDA

Meeting of July 15th, 2020
Louisville, KY

The National Board of Boiler & Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, Ohio 43229-1183
Phone: (614)888-8320
FAX: (614)847-1828

1. **Call to Order**

   8:00 AM

2. **Introduction of Members and Visitors**

3. **Check for a Quorum**

4. **Awards/Special Recognition**

5. **Announcements**

   - The National Board will be hosting a reception for all committee members and visitors on Wednesday evening at 5:30pm at the SKY Grand Terrace on the 16th floor of The Brown Hotel.

6. **Adoption of the Agenda**

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

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

8. **Review of Rosters (Attachment Pages 1-3)**

   a. **Membership Nominations**

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

   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

   c. **Officer Appointments**

      Mr. Eddie Wiggins – Vice Chair

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)

10. Action Items

Item Number: NB11-1901	**NBIC Location: Part 1**	**Attachment Pages 4-11**

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

January 2020 Meeting Action: Progress Report – R. Smith discussed with the SC 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.

Item Number: 18-2	**NBIC Location: Part 1**	**Attachment Pages 12-13**

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, P. Schuelke, M. Wadkinson, G. Tompkins and M. Washington

January 2020 Meeting Action: Proposal – Added G. Tompkins and M. Washington and removed P. Schuelke on the TG. A break out session took place in the SG and a revised proposal was generated and presented. 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 14-26**

General Description: Address the use & definition of the word inspector.

Subgroup: SG Installation

Task Group: P. Jennings (PM), R. Smith, M. Washington, R. Spiker, R. Adams, and T. Creacy

January 2020 Meeting Action: Progress Report – P. Jennings presented a summary document and held discussions amongst the SG. The TG continues to work on this item with intentions of having a proposal to present. R. Spiker, M. Washington and R. Adams have been added to the TG. B. Moore and T. Griffin were removed and P. Jennings was designated PM.

Item Number: 19-45	**NBIC Location: Part 1, S1**	**No Attachment**

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: Progress Report - This item also affects Part 2 under item 19-46. Part 2 has separated these out into 3 separate items. V. Newton is the PM and continues to liaison between Part 1 and Part 2 so as to keep all informed. Venus presented an update to the SG.

Item Number: 19-81	NBIC Location: Part 1, Table 3.7.9.1-b	Attachment Page 27

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 Non-pressurized 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.

Subgroup: SG Installation

Task Group: None R. Smith (PM), M. Washington, T. Creacy, and R. Austin

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.

January 2020 Meeting Action: Progress Report – A TG was assigned of R. Smith (PM), M. Washington, T. Creacy, and R. Austin. The SG held discussions and determined that further work is needed on this item. A proposal will be drafted and presented in the July 2020 meeting.

11. New Items:

Item Number: 20-9	NBIC Location: Part 1, 9.1	See Attachment on Cloud

General Description: Define "Verify" in the NBIC Glossary

Subgroup: Repairs and Alterations

Task Group: N. Carter (PM)

Explanation of Need: Defining "Verify" in the NBIC Part 1, 2, 3, and 4 to align with the definition in NB-263, RCI-1, Rules for Commissioned Inspectors.

Item Number: 20-13	NBIC Location: Part 1, 3.7.9.1	Attachment Page 28

General Description: Expansion Tank Maximum Operating Pressure

Subgroup: SG Installation

Task Group: None assigned.

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.

July 2020 Meeting Action:

Item Number: 20-27	NBIC Location: Part 1, 1.6.9 & S6.3	No Attachment

General Description: Carbon Monoxide Detector/Alarm NBIC 2019

Subgroup: SG Installation

Task Group: None assigned.

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?

July 2020 Meeting Action:

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:

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:

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:

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:

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:

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:

Item Number: 20-36	NBIC Location: Part 1	No Attachment

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:

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:

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:

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:

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:

Item Number: 20-41	NBIC Location: Part 1	Attachment Page 29

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:

Item Number: 20-42	NBIC Location: Part 1	No Attachment

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:

Item Number: 20-43	NBIC Location: Part 1	No Attachment

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:

Item Number: 20-44	NBIC Location: Part 1	No Attachment
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:**		

Item Number: 20-45	NBIC Location: Part 1	No Attachment
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:**		

12. Future Meetings

January 11th – 14th, 2021 – New Orleans, LA
July 12th – 15th, 2021 – Cincinnati, OH

13. Adjournment

Respectfully submitted,

Jeanne Bock
NBIC Part 1 Secretary

Contents

Subcommittee Installation

Last Name	First Name	Interest Category	Role	Exp. Date	More
Wadkinson	Melissa	Manufacturers	Chair	08/30/2021	Details
Bock	Jeanne		Secretary	01/30/2099	Details
Austin	Randall	Users	Member	10/30/2022	Details
Creacy	Todd	Authorized Inspection Agencies	Member	01/30/2021	Details
Downs	James	Manufacturers	Member	10/30/2022	Details
Halley	Geoffrey	General Interest	Member	08/30/2021	Details
Konopacki	Stanley	Users	Member	01/30/2023	Details
Patten	Don	Manufacturers	Member	01/30/2023	Details
Richards	H. Michael	General Interest	Member	08/30/2021	Details
Smith	Rex	Authorized Inspection Agencies	Member	01/30/2023	Details
Washington	Milton	Jurisdictional Authorities	Member	01/30/2023	Details
Wiggins	Edward	Jurisdictional Authorities	Member	03/30/2023	Details

Joe Brockman

573-821-2227

September 2019- Present

Jurisdictional Consultant II/ FM Global

Manage, inspect, evaluate and consult with clients at a variety of basic insured locations for jurisdictional purposes. These evaluations are conducted to verify equipment conditions are in compliance with Jurisdictional Regulations and FM Global Standards.

February 2019- August 2019

Senior Risk Engineering Consultant/ Liberty Mutual Insurance

Conducts and manages inspections for the territories assigned in accordance with jurisdictional requirements. Investigates claims and conducts on site risk assessments.

January 2014 – February 2019

Deputy Chief Boiler/Pressure vessel unit, State of Missouri

Manager of the Missouri boiler and pressure vessel unit ensuring all rules and regulations set by the Boiler Board are enforced according to Missouri statue. Supervises six inspectors, maintains data base for all inspection conducted in the state and promulgates new rules for consideration to be adopted by the board. Currently hold a National Board commission for In-service Inspector, commission number 13709 and a Missouri Boiler and Pressure Vessel Inspector commission number 0444. Have a National Board commission of 541 for Team Leader to conduct Joint Reviews.

November 2007 - December 2013

Work independently and under the supervision of the Public Safety Manager of the Boiler and Pressure Vessel Unit inspecting boilers and pressure vessels as required by statute, rules and regulations.

March 2007 – October 2007

Scruggs Lumber

August 2006 - February 2007

Wackenhut Security- Nuclear Security Office

July 2001 - July 2006

Maintenance Manager, Scheduling Officer, Craftmaster

U.S. NAVY - Senior Chief Gas Turbine Systems Technician - 20 Years Service
ASSAULT CRAFT UNIT FOUR - Naval Amphibious Base, Little Creek, Norfolk, VA
Maintenance Manager/Scheduling Officer/Craftmaster
Supervised a team that maintained a $1 million annual budget for parts/materials and inventory stocks. Ensured a timely distribution of materials and parts to work centers. Coordinated, supervised and provided technical oversight in all aspects of maintenance/repair of 36 landing craft. Including engine repair and overhauls, welding, hydraulic components, as well as electrical systems. Served as technical representative between operations and maintenance departments.

June 1997 - June 2001
Senior Engineer Instructor/Inspector
Trained and certified crewmembers in the proper operation, and maintenance of landing craft. Revised and implemented technical version of Engineering and Operations Procedures Manual. Supervised a team of 10 inspectors insuring that the material and administrative logistics were maintained in accordance with regulations.

July 1993 – May 1997
Engineer/Assistant Officer in Charge
Responsible for the safe operation and maintenance of 4 gas turbine engines, 2 auxiliary gas turbine generators, and associated engineering plant equipment. Performed inspections and accomplished maintenance and repairs to auxiliary and propulsion equipment. Maintained maintenance records and logs for all equipment associated with engineering plant.

July 1986 – June 1993
Shop Supervisor/ Maintenance Tech
Performed maintenance and operation of LM2500 Marine Gas Turbines, Allison 501/K17 Gas Turbine Generators and 115 lb. waste heat boilers with their associated equipment. Overhauled main reduction gear right angle gear boxes and clutches. Valve replacement and maintenance. A/C unit maintenance. Repair and calibration of mechanical and electro-mechanical devices used to monitor and control automated engineering propulsion.

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

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.

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:

1.X.X or 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~~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?

Location and Usage – Inspector – inspector	Comments
1.1 Scope Middle of main paragraph. "Otherwise the requirements specified in NBIC part 1 provide guidance for installers, contractor, owners, *inspectors*, and jurisdictions to ensure safe and satisfactory installation of specified pressure-retaining items.	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. Inspector is little i. Could mean jurisdictional or other.
1.4.1 Responsibility b) The National Board Commissioned *Inspector* providing inservice inspection for the facility in which the pressure-retaining item is installed have 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 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 c) Unless otherwise specifically required by the Jurisdiction, the duties of the inservice *inspector* 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.	Inservice inspector responsibilities under Part 1. Capital I IS endorsement Little I, but references a commission. This should be capitalized
2.10.2 Pressure Test 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 *Inspector.*	Capital Inspector so a Commissioned inspector Inservice or shop? (IS vs. R) Do we want to differentiate?

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 *Inspector* shall witness the pressure test of the completed installation, including piping….	Is this the AI? It is a commissioned Inspector so Capital I is appropriate, but which one?
Supplement 1 Installation of Yankee Dryers **S1.2 ASSESSMENT OF INSTALLATION** a. The *Inspector* verifies that the owner or user is properly controlling the operating conditions of the dryer. The *Inspector* does this by reviewing the owners comprehensive assessments of the complete installation. f. To maintain produce quality, the dryer surface is periodically refurbished by grinding…. The manufacturer, or another qualified source acceptable to the *Inspector*, instead provided a series of curves that graphically defines these maximum allowable operating parameters…. h. If nonstandard load events (incidents) have occurred during installation, then the *Inspector* should ensure that an appropriate assessment of the structural integrity….	Inservice Inspector Capital I and context fits.
Supplement 2 - Pressure relief valves on the low-pressure side of steam pressure reducing valves **S2.2 PRESSURE RELIEF VALVE CAPACITY** b. By using the formula in NBIC Part 1, S2.3, *Inspectors* may calculate the required relieving capacities of the pressure relief valve(s) installed on the low-pressure side of the reducing valve.	Assume meant for inservice Capital I and context.
Supplement 5 Installation of thermal fluid heaters **S5.8.2 PRESSURE TEST** 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 recommendations. Hydrostatic testing of the system is not recommended due to possible contamination of the system. All pressure testing should be witnessed by an *Inspector*.	Prior to operation. Capitol I Is this an in-service or shop as it is the system test. AIA typically doesn't test completed systems but in-service don't inspect prior to operation.
Definitions Confined space - … the *Inspector* is a cautioned of the need to comply with…	Any commissioned Inspector.

Dutchman - Generally limited to tube or pipe cross-section replacement. … meeting the service requirements and installation procedures acceptable to the *Inspector*….	Dutchman are repair – shop/repair Not in-service.
National Board Commissioned *Inspector* - An individual who holds a valid and current National Board Commission.	Definition – No distinction between in-service and AIA
Owner-user *Inspector* - An individual who holds a valid and current National Board Commission.	Same definition as an NBIC commissioned inspector. Should we add to the definition? " and is employed by an Owner or User who has an Owner-User Inspection Organization?
Interpretations Multiple references to *Inspector.*	Most appear to reference repairs. Some are older references and difficult to ascertain from the Subject.
Location and Usage **Inspection - inspection**	
1.4 CERTIFICATION, INSPECTION, AND JURISDICTIONAL REQUIREMENTS 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	Inspection – little i but by context should be I. Also should be I, not i.

required by the Jurisdiction.	
1.4.2 EQUIPMENT CERTIFICATION 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 inspection. The manufacturer of the package boiler is responsible for determining a method of traceability.	Little i, but unclear.
1.4.4 INSPECTION All boilers, pressure vessels, piping, and other pressure-retaining items shall be inspected and tested after installation and prior to commencing operation. 1.4.5 BOILER INSTALLATION REPORT a) Upon completion, inspection, 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.	Little i, the installation report is by the installer. Not an Inspector reference.
1.6.4 LADDERS AND RUNWAYS a) All walkways, runways, and platforms shall be: 1) of metal construction or equivalent material; 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 inspection;	Little i. Reference to generic inspection activities that may include big I Inspection. (“Generic i” in the following cases)
2.3.3 CLEARANCES	

a) Boiler installations shall allow for normal operation, maintenance, and inspections. There shall be at least 36 in. (915 mm) of clearance on each side of the boiler to enable access for maintenance and/or inspection 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. e) Boilers with a bottom opening used for inspection or maintenance shall have at least 12 in. (305 mm) of unobstructed clearance.	Generic i.
2.7.5 BLOWOFF 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 inspection of the entire shell and heads of the tank can be made.	Generic i.
2.10 TESTING AND ACCEPTANCE 2.10.1 GENERAL 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 inspection of the interior of the boiler and its appurtenances shall be made for the presence of foreign debris prior to making the final closure.	Generic i.
2.10.6 BOILER INSTALLATION REPORT a) Upon completion, inspection, 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.	Not an Inspector. Little i. ?

3.3.4 CLEARANCES c) Heating boilers shall be located so that adequate space is provided for proper operation, maintenance, and inspection of equipment and appurtenances, which shall include the removal of tubes if applicable.	Generic i.
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 inspection 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 inspection or cleaning, safety relief valve, 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.	Generic i

3.10.3 BOILER INSTALLATION REPORT a) Upon completion, inspection, 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. 4.3.2 CLEARANCES a) All pressure vessel installations must allow sufficient clearance for normal operation, maintenance, and inspection (internal and external).	Not the in-service inspector prior to first "inspection"
4.5.6 INSTALLATION AND DISCHARGE PIPING REQUIREMENTS e) There shall be no intervening stop valves…except under the following conditions: 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 inspection 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. 3) A full area stop valve may also 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 inspection and repair. This stop valve shall be arranged so that it can be locked or sealed open, and it shall not be closed except	Generic i.

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. h) Pressure relief devices shall be installed so they are readily accessible for inspection, repair, or replacement.	
4.7.2 CLEARANCE AND ACCEPTABILITY 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 inspection and maintenance.	Generic i.
5.3.6 INLET AND DISCHARGE PIPING REQUIREMENTS e) There shall be no intervening stop valves … except under the following conditions: 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 inspection 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; 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	Generic i.

these other devices from flowing back to the first device during inspection 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 i) Pressure relief devices shall be installed so they are accessible for inspection, 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.	
5.4 EXAMINATION, INSPECTION, AND TESTING The owner shall ensure that all examinations, inspections, and tests required by the code of construction have been performed prior to operation.	As it is required by the code of construction, should this be a capitol I? Why both examinations and inspections.
S3.2.1 GENERAL REQUIREMENTS (ENCLOSED AND UNENCLOSED AREAS) 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. b) LCDSVs shall be installed with sufficient clearance for filling, operation, maintenance, inspection, and replacement.	Generic i
S5.3.4 CLEARANCES	Generic i

a) Thermal fluid heater installations shall allow for normal operation, maintenance, and inspections. 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 inspection 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. c) Heaters with a bottom opening used for inspection or maintenance shall have at least 18 in. (460 mm) of unobstructed clearance.	
S5.8.1 GENERAL 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 inspection 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.	Generic i
S5.8.6 INSTALLATION REPORT a) Upon completion, inspection, and acceptance of the installation, the installer should complete and certify the Boiler Installation Report I-1. See 1.4.5.1.	Generic i?
S7.3.1 RECEIVING AND INITIAL INSPECTION OF GRAPHITE PRESSURE EQUIPMENT Graphite equipment should be thoroughly inspected and tested as it is received in order to identify any in transit damage. Whenever possible, this inspection 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….	This is not a Inspector responsibility?

PART 1, SECTION 8 INSTALLATION — PREPARATION OF TECHNICAL INQUIRIES TO THE NATIONAL BOARD INSPECTION CODE COMMITTEE SKIPPED INSPECTION IN THIS SECTION	
Authorized Inspection Agency (AIA) **Inservice**: An Authorized Inspection Agency is either: 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 Inspection Agencies Performing Inservice Inspection Activities; NB-371, Accreditation of Owner-User Inspection Organizations (OUIO); or NB-390, Qualifications and duties for Federal Inspection Agencies (FIAs) Performing Inservice Inspection Activities. **New Construction**: An Authorized Inspection Agency is one that is accredited by the National Board meeting the qualification and duties of NB-360, Criteria for Acceptance of Authorized Inspection Agencies for New Construction. **Authorized Nuclear Inspection Agency** — An Authorized Inspection Agency intending to perform nuclear inspection activities and employing nuclear Inspectors / Supervisors	
Inspection — A process of review to ensure engineering design, materials, assembly, examination, and testing requirements have been met and are compliant with the code.	Capitol I Inspection.
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 Inspection 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.	
NBIC — The National Board Inspection Code published by The National Board of Boiler and Pressure Vessel Inspectors.	
Owner-User Inspection Organization — An owner or user of pressure-retaining items that maintains an established inspection program, whose organization and inspection 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.	
Some in Interpretations	
Index **Inservice Inspection** (Introduction), (1.4.1), (8.1), (9.1) **Inspection** (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)	

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)~~15 (57)
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 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 (b) Pressure relief valve shall be manufactured in accordance with a national or international standard.

Proposed change: 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 4.5.1(a))

3.9.1 (only mentions installation of PRV)

Proposed change: (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, 3.2 for the scope of pressure retaining items covered by these requirements. (3.2 is definitions)

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