



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

# **NATIONAL BOARD SUBGROUP INSTALLATION**

## **MINUTES**

---

Meeting of January 15<sup>th</sup>, 2019  
San Antonio, TX

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  
FAX: (614)847-1828

## **1. Call to Order**

Chair, D. Patten, called the meeting to order at 8:00 a.m.

## **2. Introduction of Members and Visitors**

Introductions took place amongst all members and visitors and an attendance sheet was circulated for review and check off.

Gene Tompkins was present in for Geoffrey Halley.

With the attached roster a quorum was established. There was a motion to approve the roster as published. The motion was unanimously approved.

## **3. Announcements**

- The National Board hosted a reception for all committee members and visitors on Wednesday evening at 5:30 p.m. at the Agave Bar on the Riverwalk.
- Breakfast and lunch was provided to NBIC Committee members and visitors on Thursday.
- A snack was provided with the first coffee break.
- Recognition for time served was presented to E. Wiggins (5 years on the SG) and P. Schuelke (5 years on the SC). Each were awarded a service pin.
- The SG was reminded to name files in the format of (Item Number) (Person) (Date).
- M. Wadkinson gave a summary of items that were discussed in the Executive Meeting regarding letter ballot voting of negative/abstaining, policy when changing interest categories, and the appointments of new members to the SG and SC.
- B. Moore announced his retirement and that this is his last meeting. Patrick Jennings is interested in becoming a member in his place.

## **4. Adoption of the Agenda**

- Item 18-1 and 18-2 were missing from the agenda.

There was a motion to adopt the Agenda as published with the correction of adding 18-1 and 18-2. The motion was unanimously approved.

## **5. Approval of the Minutes of July 17<sup>th</sup>, 2018 Meeting**

There was a motion to approve the Minutes of July 17<sup>th</sup>, 2018 as published. The motion was unanimously approved.

## 6. Review of Rosters (Attachment Pages 1-2)

### a. Membership Nominations

R. Spiker and W. Anderson as new members to SG Installation.

### b. Membership Reappointments

- P. Schuelke's membership to the subgroup expires on 1/31/2019.
- R. Austin changed interest categories. By National Board procedure, he has to be reappointed to the subgroup in order to continue his membership to the group.

The noted members above are interested in continuing and/or being reappointed with their membership to the SG. A vote was taken by the SC for the reappointment of P. Schuelke's membership and was unanimously approved.

Due to a hold on the procedure for new appointments, R. Austin's membership was not voted on in the SC meeting pending the new procedure.

### c. Officer Appointment

## 7. Open PRD Items Related to Installation

- NB15-0108B – Address pressure relief devices in new supplement on high temperature hot water boilers – A. Renaldo (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)**
- NB15-0315 – Review isolation valve requirements in Part 1, 4.5.6 and 5.3.6 – D. DeMichael (PM)
- NB16-0805 – Temperature ratings for discharge piping and fittings – A. Renaldo (PM)
- NB17-0401 – Valve drain plug recommendations for shipping – K. Beise (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)
- 17-128 – Fix contradiction between Part 4, 2.4.1.6 a) and 2.4.4.3 regarding Y bases. – B. Nutter (PM)
- **17-131 – Preface by Part 4, 2.5.7 a) with the phrase “Unless otherwise protected” – J. Ball (PM)**
- **18-73 – Update installation requirements for Thermal Fluid Heaters (Part 1, S5.7.6) – T. Patel (PM)**
- **18-90 (Interpretation) - Is it acceptable to plug the Valve Casing Drain and provide the required drainage by another drain connection installed at the bottom of the inlet end of the discharge elbow, as long as it is below the level of the valve seat? (Part 1, 2.9.6 h) and Part 4, 2.2.10 h))**

Met with T. Beirne of PRD to find out which items above that the PRD group was planning to move forward to PRD SC and then to MC (these items are shown in red above). The SG Installation viewed and discussed those items as it related to Part 1. The group had issues with NB15-0308 and 18-73. The installation SG and SC requests that they be added to be able to review and comment on the letter ballot.

## 8. Action Items

<b>Item Number:</b> NB12-0302	<b>NBIC Location:</b> Part 1	<b>Attachment Pages</b> 3-7
<b>General Description:</b> Add installation requirements for pressure vessels for human occupancy (PVHOs)		
<b>Subgroup:</b> Installation		
<b>Task Group:</b> B. Moore (PM), T. Creacy, T. Millette, M. Richards		
<b>Meeting Action:</b> <b>Proposal</b> – A proposal was approved by both SG and SC Installation at the July 2018 meeting. The item was left as a progress report at the Main Committee meeting as they wanted more time to read the full proposal. B. Moore presented the original and a revised proposal to the SG. The group held discussions and made a motion to approve the revised proposal to the SC. The motion was unanimously approved.		

<b>Item Number:</b> NB14-0403	<b>NBIC Location:</b> Part 1	<b>No Attachment</b>
<b>General Description:</b> Identify terms from Part 1 that need to be added to the index		
<b>Subgroup:</b> Installation		
<b>Task Group:</b> B. Moore (PM), M. Richards, T. Creacy, M. Washington		
<b>Meeting Action:</b> <u>Proposed to close w/no action</u> – B. Moore stated that the TG has not identified any further items. After discussions amongst the SG a motion was made to close this item with no action and instead have it listed as a noted topic to always discuss on the agenda. The motion was unanimously approved.		

<b>Item Number:</b> NB16-0102	<b>NBIC Location:</b> Part 1	<b>Attachment Pages 8-10</b>
<b>General Description:</b> Address post installation pressure testing		
<b>Subgroup:</b> Installation		
<b>Task Group:</b> S. Konopacki (PM), E. Wiggins, P. Cole, R. Smith, M. Wadkinson, D. Patten		
<b>Meeting Action:</b> Progress Report - In reviewing Item 18-45 at the Main Committee meeting in July 2018, it was determined that the changes being made to paragraphs a), b) and c) needed to be reviewed. The SG held extensive discussions on the effects, comments, and disapproves. It was decided by the SG to continue working on this item.		

<b>Item Number:</b> 17-159	<b>NBIC Location:</b> Part 1, 4.7	<b>Attachment Pages 11-12</b>
<b>General Description:</b> Result of 17-147; review Part 1, 4.7 for references to hot water storage tanks		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> J. Brockman (PM), D. Patten, and E. Wiggins		
<b>Meeting Action:</b> <u>Proposal w/PRD Item Number 17-131</u> – A break out session was held and a proposal was presented. T. Beirne of PRD was present to answer concerns the SG had with the proposal. After discussions a motion was made to approve the proposal to the SC. The motion was unanimously approved.		

<b>Item Number:</b> 18-1	<b>NBIC Location:</b> Part 1, 2.8.1 and 2.8.5	<b>No Attachment</b>
<b>General Description:</b> Review 2.8.1 and 2.8.5 for potential duplication of paragraphs.		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> M. Wadkinson (PM), D. Patten, S. Konopacki, T. Griffen, and R. Dalton		
<b>Meeting Action:</b> Progress Report – The TG continues to discuss the validity of looking into the duplicate wording and adding clarity.		

<b>Item Number:</b> 18-2	<b>NBIC Location:</b> Part 1	<b>No Attachment</b>
<b>General Description:</b> Result of NB16-0101, add verbiage regarding commissioning fired boilers & fired pressure vessels with a calibrated combustion analyzer.		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> E. Wiggins (PM), D. Patten, P. Schuelke, and M. Wadkinson		
<b>Meeting Action:</b> Progress Report – The TG continues to discuss the commissioning of new equipment for proper combustion.		

<b>Item Number: 18-26</b>	<b>NBIC Location: Part 1, S3</b>	<b>Attachment Page 13</b>
<b>General Description:</b> Review installation requirements for CO2 vessels		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> R. Smith (PM), B. Moore, J. Brockman, T. Creacy, R. Spiker, and <a href="#">M. Washington</a>		
<b>Meeting Action:</b> <b>Proposal w/Inspection Item Number 18-27</b> – V. Newton presented a proposal to be made to S3.4 in Part 1 and S12.5 in Part 2. After discussions on this proposal, revisions were made and a motion followed to move forward w/the revised wording. The motion was unanimously approved. <a href="#">M. Washington</a> was added to the TG.		

<b>Item Number: 18-44</b>	<b>NBIC Location: Part 1, S3</b>	<b>Attachment Pages 14-32</b>
<b>General Description:</b> Remove the modular limits of BTU/Hr., 3gal for oil and 117 kW for electricity to be consistent with ASME Section IV 2017.		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> M. Wadkinson (PM), J. Downs, and B. Ahee		
<b>Meeting Action:</b> <b>Proposal</b> – Discussions took place amongst the SG with regards to the original proposal that was declined in the SG July 2018 meeting due to they felt more information was needed. M. Wadkinson stated that this is no longer in Section IV, therefore she makes a motion to move the original proposal forward as proposed to the SC. The motion was approved with 2 opposed (G. Tompkins and B. Moore).		

<b>Item Number: 18-45</b>	<b>NBIC Location: Part 1, S3</b>	<b>Attachment Pages 33-34</b>
<b>General Description:</b> Addition of a paragraph d) to Part 1, 1.6.9		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> T. Creacy (PM), D. Patten, and S. Konopacki		
<b>Meeting Action:</b> Progress Report – The SG discussed concerns from Mr. Pillow and Mr. Cook being if there was any difference between new paragraph d) and the existing paragraph c). In the MC meeting July 2018 discussions were held on how to word the paragraphs so that the information being presented was clear. Mr. Scribner brought up some concerns with paragraphs a), b), and c) and suggested work needed to be done on those as well. Ms. Wadkinson mentioned that a), b), and c) were approved in a different item (NB16-0102) and that they should be revoked as Mr. Scribner’s concerns. Mr. Richards agreed and motioned that the items be pulled back for more work. The committee unanimously approved the motion to revoke NB16-0102 for more work. The TG continues to discuss.		

9. New Items:

<b>Item Number: 18-57</b>	<b>NBIC Location: Part 1</b>	<b>No Attachment</b>
<b>General Description:</b> address the use & definition of the word inspector		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> Brian Moore (PM), <a href="#">R. Smith, T. Griffin, P. Jennings and T. Creacy</a>		
<b>Meeting Action:</b> Progress Report – 18-57 was added to address the use & definition of the word inspector. A TG was assigned of B. Moore (PM), <a href="#">R. Smith, and T. Griffin</a> in the July 2018 meeting. In this meeting <a href="#">P. Jennings and T. Creacy</a> have been added to the TG. B. Moore presented a brief background summary.		

<b>Item Number: 18-81</b>	<b>NBIC Location: Part 1, 3.8.1.5</b>	<b>No Attachment</b>
<b>General Description:</b> Should an assembled modular steam boiler have a single manual LWCO to protect to total assembly?		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> <del>None Assigned</del> <a href="#">M. Washington (PM), T. Creacy, K. Watson, M. Wadkinson, J. Downs, and B. Ahee</a>		
<b>Meeting Action:</b> Progress Report – This item was submitted by Bill Vallance. A TG of <a href="#">M. Washington (PM), T. Creacy, K. Watson, M. Wadkinson, J. Downs, and B. Ahee</a> have been assigned. M. Wadkinson will look at it and see how we reference Modular Boilers to see if it is consistent. She will look in 2019 to see if any changes are needed.		

<b>Item Number: 18-96</b>	<b>NBIC Location: Part 1, 1.6.3</b>	<b>Attachment Pages 35-36</b>
<b>General Description:</b> In reference to item NB16-0905, should “fired or electrically heated pressure vessels” be specified instead of stating “pressure vessels”		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> <del>None Assigned</del> <a href="#">E. Wiggins (PM), S. Konopacki, G. Hayley, and G. Tompkins</a>		
<b>Meeting Action:</b> Progress Report – This item is a result of public review comment PR18-0101 for the 2019 Draft Edition of the NBIC. A TG of <a href="#">E. Wiggins (PM), S. Konopacki, G. Hayley, and G. Tompkins</a> have been assigned. The SG held discussions on this topic.		

<b>Item Number: 18-97</b>	<b>NBIC Location: Part 1, 1.6.9</b>	<b>Attachment Pages 37-38</b>
<b>General Description:</b> In reference to item NB16-0101, should specific fuel fired boilers and pressure vessels be listed in Part 1, 1.6.9		
<b>Subgroup:</b> SG Installation		
<b>Task Group:</b> <del>None Assigned</del> <a href="#">R. Spiker (PM), B. Anderson and D. Patten</a>		
<b>Meeting Action:</b> Progress Report – This item is a result of public review comment PR18-0102 for the 2019 Draft Edition of the NBIC. A TG of <a href="#">R. Spiker (PM), B. Anderson and D. Patten</a> have been assigned. The SG held discussions on this topic.		

**Note:** M. Wadkinson announced an upcoming project regarding a review of Installation Requirements of CSD-1 to be put in Part I. A TG group of D. Patten, S. Konopacki, G. Tompkins, M. Wadkinson, R. Austin, K. Watson and P. Schulke has been assigned. Melissa will hold a conference call before the July 2019 meeting.

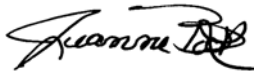
## 10. Future Meetings

- July 15<sup>th</sup>-18<sup>th</sup> – Kansas City, MO
- January 2020 – Location TBD

## 11. Adjournment

A motion was made and unanimously approved to adjourn the meeting at 2:05 p.m.

Respectfully submitted,



Jeanne Bock

NBIC Part 1 Secretary

# attending the reception

SG Installation Attendance Sheet - 1/15/2019

Name	Company	Phone Number	Email	Signature	
Don Patten	Bay City Boiler	(510) 786-3711	<a href="mailto:dpatten@baycityboiler.com">dpatten@baycityboiler.com</a>		1
Edward Wiggins	Liberty Mutual	(256) 357-2825	<a href="mailto:edward.wiggins@libertymutual.com">edward.wiggins@libertymutual.com</a>		1
Jeanne Bock	National Board	(614) 431-3233	<a href="mailto:jbock@nationalboard.org">jbock@nationalboard.org</a>		1
Joe Brockman	State of Missouri	(573) 751-8708	<a href="mailto:Joe.Brockman@dfs.dps.mo.gov">Joe.Brockman@dfs.dps.mo.gov</a>		1
Todd Creacy	Zurich Services Corporation	(847)706-2417	<a href="mailto:todd.creacy@zurichna.com">todd.creacy@zurichna.com</a>		1
Geoffrey Halley	ABMA	(314) 406-9591	<a href="mailto:ghalleysj@aol.com">ghalleysj@aol.com</a>		1
Stanley Konopacki	NRG	(847) 599-2214	<a href="mailto:Stanley.Konopacki@nrg.com">Stanley.Konopacki@nrg.com</a>		1
Joseph Millette	UAB	(205) 975-4091	<a href="mailto:jmillett@uab.edu">jmillett@uab.edu</a>		1
Brian Moore	Hartford Steam Boiler	(860) 722-5657	<a href="mailto:brian_moore@hsb.com">brian_moore@hsb.com</a>		1
Mike Richards	Southern Company	(205) 706-0748	<a href="mailto:hmichaelrichards.pe@gmail.com">hmichaelrichards.pe@gmail.com</a>		1
Paul Schuelke	Weil-McLain	(219) 879-6561	<a href="mailto:pschuelke@weil-mclain.com">pschuelke@weil-mclain.com</a>		2
Rex Smith	Authorized Inspection Associates	(281) 751-1150	<a href="mailto:rsmith@aiallc.org">rsmith@aiallc.org</a>		1
Melissa Wadkinson	Fulton Thermal	(315) 298-7112	<a href="mailto:melissa.wadkinson@fulton.com">melissa.wadkinson@fulton.com</a>		1
Milton Washington	State of New Jersey	(609) 292-2345	<a href="mailto:milton.washington@dol.nj.gov">milton.washington@dol.nj.gov</a>		1
Kenneth Watson	ARISE	(501)590-6730	<a href="mailto:Kenneth.Watson@ariseinc.com">Kenneth.Watson@ariseinc.com</a>		1
Gene Tompkins	ABMA	920-289-0290	<a href="mailto:gene@abma.com">gene@abma.com</a>	Alternate to Geoff Halley	1
William Anderson	State of MS	601-576-7192	<a href="mailto:william.anderson@ms.gov">william.anderson@ms.gov</a>		1
RADWY AUSTIN	LOS ALAMOS NAT LAB	505-645-6036	<a href="mailto:RDAUSTIN@LANL.GOV">RDAUSTIN@LANL.GOV</a>		1
MICHAEL RICHARDS	SCOTT	205 992-7111	<a href="mailto:HMICHAELRICHARDS@PEEGMAIL.COM">HMICHAELRICHARDS@PEEGMAIL.COM</a>		1
BRIAN AHEE	Intellihot	319 572-6838	<a href="mailto:BAHEE@INTELLIHOT.COM">BAHEE@INTELLIHOT.COM</a>		1
S. Matt Downs	Weil-McLain	219 210-8564	<a href="mailto:mcdowns@weil-mclain.com">mcdowns@weil-mclain.com</a>		2

X  
X  
X  
X  
X





NBIC Part 1 Item Number: NB12-0302  
Proposed Supplement to Part 1, Section 6  
Revision 1 to July 2018 NBIC Meeting - Showing the changes

## Supplement X

### INSTALLATION OF PRESSURE VESSELS FOR HUMAN OCCUPANCY (PVHOS)

#### SX.2.1 SCOPE

This Supplement provides general information and guidance for installation to help manufacturers, owners, users, inspectors, and jurisdictional authorities understand PVHO systems and their unique characteristics. The PVHO systems covered in this supplement include only monoplace (single human occupancy) medical systems used for Hyperbaric Oxygen Therapy (HBO). The PVHO system is comprised of one or more monoplace PVHOs each with pressurization and vent controls, monitoring, and communication supplied by facility medical gas systems or dedicated breathing gas systems, gas distribution, controls, and gas storage.

#### SX.1.2 GENERAL

A pressure vessel for human occupancy, as defined by ASME PVHO-1 is a pressure vessel that encloses one or more human beings within its pressure boundary while it is subject to internal or external pressure that exceeds a 2 psi (15 kPa) differential pressure. PVHOs include, but are not limited to submersibles, diving bells, personal transfer capsules, decompression chambers, recompression chambers, hyperbaric chambers, high-altitude chambers, and medical hyperbaric oxygenation facilities.

#### SX.2 SCOPE

This Supplement provides general information and guidance for installation to help manufacturers, owners, users, inspectors, and jurisdictional authorities understand these PVHO systems and their unique characteristics. The PVHO systems covered in this supplement include only monoplace (single human occupancy) medical systems used for Hyperbaric Oxygen Therapy (HBO). The PVHO system is comprised of one or more monoplace PVHOs each with pressurization and vent controls, monitoring, and communication supplied by facility medical gas systems or dedicated breathing gas systems, gas distribution, controls, and gas storage.

### SX.3 DOCUMENTATION, REGISTRATION, AND REGULATORY REQUIREMENTS

- a) PVHO systems should be designed and constructed in accordance with ASME PVHO-1. This code requires Section VIII for steel and other allowed vessel materials and therefore should bear a "U" or "U2" ASME designator and forms. PVHO-1 also has several Code Cases that address PVHOs manufactured from non-Section VIII materials such as reinforced fabrics. PVHO Code Cases are subject to jurisdictional authority and should have all the documentation required by the Code Case, but not necessarily Section VIII forms.

- b) Viewport acrylic windows should be designed and constructed in accordance with PVHO -1 and maintained following the rules of PVHO-2. The owner/user should follow PVHO-2 and manufacturer manuals for in-service guidance.
- c) The manufacturer should retain PVHO system documentation or submit and register with the National Board, subject to jurisdictional and/or regulatory authorities.
- d) The PVHO system owner should have copies of the following documents on site.
  - 1) Manufacturer Data Report for Section VIII vessel (Form U1-A or U2-A)
  - 2) Manufacturer Data Report for PVHO-1 Form GR-1
  - 3) PVHO-1 Forms VP-1 through VP-5
  - 4) PVHO system Installation Instructions
  - 5) PVHO system operation and maintenance manuals
- e) Unique PVHO Characteristics
  - 1) Fire hazard due to oxygen enrich environment
  - 2) Fire hazard due to in-service hydrocarbon contamination
  - 3) Rapid decompression hazard
  - 4) Pressure boundary valves at PVHO penetrators
  - 5) Cleanliness of gases inside the PVHO system
  - 6) In-service life expectancy of flat disc acrylic windows in protected environments, including cylindrical windows, can be up to twenty years with periodic inspections.
  - 7) Manual and/or pneumatic control systems
  - 8) Heat, UV light, and solvents are harmful to acrylic windows

#### SX.4 PVHO SYSTEM CONFIGURATION AND INSTALLATION

- a) The PVHO includes the following pressure boundary components.
  - 1) Shells and heads of revolution
  - 2) Openings and their reinforcement
  - 3) Nozzles and other connections
  - 4) Door seals and quick actuating closures
  - 5) Viewports including acrylic windows
  - 6) A quick opening manual shutoff valve shall be located between the chamber and pressure relief valve (burst discs are prohibited)
  - 7) Quick-opening manual valve shall be sealed open using a frangible seal.
- b) The PVHO system, comprised of one or more monoplace PVHOs each with operational controls, should be supplied by a hospital or clinic medical gas system. Installers of medical gas systems that meet NFPA 99 Chapter 5 requirements should be qualified to, and hold third-party certification, in accordance with American Society of Safety Engineers ASSE 6010.
- c) Facility Installation

- 1) PVHO systems installed and operated within buildings are subject to local building codes, National Fire Protection Association NFPA 99, and applicable jurisdictional and regulatory requirements.
  - 2) The rooms designated for PVHO systems should be adequately sized allowing operation and inspection access to all sides of the PVHO system and dedicated to only hyperbaric system operation.
  - 3) PVHO system oxygen exhaust and ventilation lines shall be independently piped to the building exterior.
  - 4) Temperature in the PVHO room should be maintained for patient comfort.
- d) Electrical
- 1) All electrical controls should be located external of the PVHO.
  - 2) PVHO electrical powered control equipment should be connected to grounded facility outlets matching the equipment power specifications.
  - 3) PVHO electrical penetration connectors should be as specified by the manufacturer and checked for leak tightness.
  - 4) Electrical wiring should be supported to prevent obstruction or tripping hazard.
  - 5) Electrical systems within the PVHO should ~~be~~ protect low-voltage communication and monitoring equipment from being exposed to voltages greater than 28 volts AC and currents greater than 0.5 amps and should be grounded in accordance with NFPA 99 Chapter 14.
- e) PVHO Controls
- 1) Medical PVHO controls, piping, hoses, connections, pressure gages, control valves, gas system should meet PVHO-1 Section 4 – Piping Systems and Section 5 – Medical Hyperbaric Systems.
  - 2) PVHO pressurization, ~~ventilation, and depressurization-and-venting~~ controls should be manual or pneumatic.
  - 3) The operator at the PVHO control station should be present and have visual sight and audio communication with PVHO occupant during operation.
  - 4) Separate oxygen and air supply to the PVHO and occupant should be from the facility medical gas systems or a standalone medical gas system.
  - 5) The gas system should be sized (both flow and volume) for normal and emergency PVHO operations in accordance with manufacturer specification or manual. The owner should have this information available on-site.
  - 6) The facility gas system piping or tubing and controls should be secured to the facility structure up to the adjacent PVHO wall connects. Hoses or tubing connect to these wall connections and supply the gases to the PVHO operational controls. Hoses or tubing should be secured to prevent obstruction or tripping hazards.
- f) Facility Medical Gas System
- 1) NFPA Chapter 5 requirements shall apply to the medical gas supplies from the source to the wall valve adjacent to the PVHO.
  - 2) The PVHO-1 requirements should apply to PVHO gas supplies downstream of the facility medical gas wall valve.
- g) Standalone Medical Gas System

- 1) The PVHO system includes a gas storage system that supplies gas to the PVHO controls for pressurization, ventilation, depressurization, and occupant breathing. The storage system is comprised of control valves, gages, and manifolds that attached to installed tanks or removable cylinders (i.e. DOT).
  - 2) For manifolds attached to removable cylinders, there should be additional controls allowing isolation and depressurization prior to change-out of cylinders.
  - 3) The gas distribution with installed tanks and or cylinders should meet PVHO-1 and NFPA 99 Chapter 5 or equivalent.
  - 4) The storage system should be configured to supply the PVHO from two separate supplies.
- h) Internal System Cleanliness and Toxicity
- 1) PVHO systems include breathing gas systems with air and oxygen enriched gases (greater than 25% oxygen) that should be cleaned and maintained to NFPA 99 Chapter 5 and national standards (e.g., Compressed Gas Association).
  - 2) Manufacturer maintenance manuals should be available on site and provide guidance for the owner or user to maintain system cleanliness and prevent contamination during operation and maintenance.
  - 3) Hoses should be off-gas toxicity tested prior to installation.
- i) Maintenance
- 1) PVHO system should be maintained in accordance with PVHO-2 and manufacturer's maintenance manual.
  - 2) Periodic window inspections should be performed in accordance with PVHO-2.
  - 3) Replacement windows should meet PVHO manufacturer specifications with new PVHO-1 VP-1 to VP-5 forms and once installed checked for leak tightness.

### SX.5 Responsibilities

The owner/user, manufacturer, installer, and inspector shall verify the following is part of the PVHO system installation and documentation available on-site.

Does the PVHO have the applicable ASME VIII and PVHO certification mark and label plate?

- a) Is the PVHO registered with the National Board, if required by the jurisdictional authority?
- b) Are the PVHO documentation forms available on-site, signed, and dated. Forms should include:
  - 1) U1 or U2 M Manufacturer Data Report
  - 2) PVHO GR-1 Manufacturer Data Report
  - 3) PVHO Window VP-1 through VP-5 forms
  - 4) Acrylic window markings traceable to the VP forms
- c) Is the PVHO pressure relief valve constructed in accordance with ASME Section VIII?
- d) Does PVHO have a quick opening manual shutoff valve between PVHO and relief valve, and is the manual valve sealed open with a frangible seal?
  - 1) Are piping and controls labelled and color coded?

- 2) Are there external heat sources close to the PVHO that could damage the windows?
- 3) Is there room lighting and emergency building lighting that illuminates the PVHO interior and control station?
- 4) Are the acrylic windows free of crazing, discoloration, cracks, chips, scratches, gouges, or pits?
- 5) Do pressure piping or hoses that connect to the PVHO have shutoff valves?
- 6) For door closures that are pressure loaded, does the closure meet quick actuating closures per ASME Section VIII?
- 7) Does the operator position at the control station allow for visual and audible communication with the PVHO occupant?
- 8) Are there local procedures prohibiting personal warming, cellular, sparking, or entertainment devices from entering the PVHO?
- 9) Are the PVHO and support system rooms posted with signage to prohibit smoking or open flames?
- 10) Are there system operating manuals on-site?
- 11) Is there a qualified PVHO system operator?
- 12) Is there at least one gage measuring the PVHO internal pressure?

#### SX.6 OTHER CODES, STANDARDS, AND REFERENCES

The following codes, standards, and references may be used as guidance.

- a) ASME Section VIII Division 1 and Division 2
- b) ASME PVHO-1 Safety Standard for Pressure Vessel for Human Occupancy: PVHO System Design
- c) ASME PVHO-2 Safety Standard for Pressure Vessel for Human Occupancy: In-Service Guidelines
- d) ASME Bulletin STP-PT-047 PVHO Medical Chamber
- e) NFPA 99 Health Care Facilities
- f) ASSE 6010
- g) ~~Undersea and Hyperbaric Medical Society (UHMS) Committee on Hyperbaric Oxygen Therapy~~

NB16-0102

**Action Item Request Form****8.2 CODE REVISIONS OR ADDITIONS**

Request for Code revisions or additions shall provide the following:

a) Proposed Revisions or Additions

For revisions, identify the rules of the Code that require revision and submit a copy of the appropriate rules as they appear in the Code, marked up with the proposed revision. For additions, provide the recommended wording referenced to the existing Code rules.

Existing Text:

**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.

**2.10.4 SYSTEM TESTING**

Prior to final acceptance, an operational test shall be performed on the complete installation. The test data shall be recorded and the data made available to the jurisdictional authorities as evidence that the installation complies with the provisions of the governing code(s) of construction. This operational test may be used as the final acceptance of the unit.

**3.10.1 PRESSURE TEST**

Prior to initial operation, the completed boiler, individual module, or assembled module, shall be subjected to a pressure test in accordance with the requirements of the original code of construction.

**4.6 TESTING AND ACCEPTANCE**

a) The installer shall exercise care during installation to prevent loose weld material, welding rods, small tools, and miscellaneous scrap metal from getting into the vessel. The installer shall inspect the interior of the vessel and its appurtenances where possible prior to making the final closures for the presence of foreign debris.

b) The completed pressure vessel shall be pressure tested in the shop or in the field in accordance with 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 to the pressure gage, pressure relief device, and, if present, level control devices.

**4.7.6 TESTING AND ACCEPTANCE**

Testing and acceptance shall be in accordance with NBIC Part 1, 4.6

NB16-0102

## b) Statement of Need

Provide a brief explanation of the need for the revision or addition.

NB10-1201 Covered reformatting multiple items. Pressure Testing was inconsistent between the three sections and really needs to be addressed

## 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.

N/A

**Proposed Wording:****1.?? TESTING AND ACCEPTANCE**

a) The completed boiler/ pressure vessel shall be pressure tested in the shop and/or in the field in accordance with the original code of construction.

b) The installer shall exercise care during installation to prevent loose weld material, welding rods, small tools, and miscellaneous scrap metal from getting into the vessel. Prior to making the final closure the installer shall inspect the interior of the vessel and its appurtenances where possible prior to making the final closures for the presence of foreign debris.

c) Subject to the jurisdictional requirements, Prior to final acceptance, an operational pressure test, with the approval of the jurisdiction if required, shall may be performed on any components who's whose pressure test is not documented under the items' Manufacturer's Data Report. This pressure test should not exceed 90% of the lowest pressure relief device setpoint. The test data shall be recorded and the data made available as required. This operational test may be used as the final acceptance of the unit.

## NB16-0102

## Comments for Ballot: NB16-01-02

**Welch,Paul**

voted: **Approve** 10/19/2016 1:50:39 PM

I recommend approval with a minor change to the proposed wording in para b. second sentence to read: Prior to final acceptance, an operational test, with the approval of the Jurisdiction, shall be performed...

**Pillow,James**

voted: **Approve** 10/6/2016 8:00:39 AM

I approve the proposal, but suggest a minor editorial change in last sentence of first paragraph as follows. Prior to making the final closures, the installer shall inspect the interior of the vessel and its appurtenances where possible for the presence of foreign debris.

**Webb,Michael**

voted: **Disapprove** 10/5/2016 3:01:27 PM

At this time, I will vote to "disapprove" this item. My understanding of this action item was to: generally consolidate the pressure testing requirements of the various Part 1, Sections into a more general practice to be described in Part 1, Section 1-General Guidelines. In my read whether intended or my misunderstanding, the product of the SC-Installation effort may have offered the ASME code-required pressure testing to be circumvented as presented in the SC-proposed paragraph "b)". To add, I would propose for consideration the item as presented in the attachment or otherwise presented be inserted as: Part 1, Section 1, 1.4.1 b) with the current 1.4.1 b) re-introduced to become 1.4.1 c). As a note to the attachment: the text in red represents the text implying the operational test may satisfy final acceptance of the unit.—M. Webb, 10-5-16

Reference Document: [NB16-0102-letter ballot Part 1 Section 1 G. Guidelines proposed 1.4.1. b. 10-5-16.pdf](#)

**Troutt,Robby**

voted: **Disapprove** 10/5/2016 8:09:44 AM

My disapproval is based on the lack of reference to a jurisdictional inspection prior to the operational test in paragraph (b). Some jurisdictions do not allow an operational test prior to the initial inspection.

**Sekely,Jim**

voted: **Approve** 10/3/2016 1:07:21 PM

1.?? b): Change who's to whose



January 16, 2019

**Item Numbers:** 17-131 (Pressure Relief) and 17-159 (Installation)

**NBIC Location:** Part 4, 2.5.7 a) and Part 1, 4.7.3 a)

**17-131 General Description:** Review overpressure protection requirements for hot water storage tanks that exceed 160 psi.

**17-159: General Description:** Result of 17-147; review Part 1, 4.7 for references to hot water storage tanks. With the definition of Potable Hot Water Storage Tank items referencing this in Part 1, Section 4.7 need to be updated, modified and or revised.

The following proposal combines the proposals from 17-131 and 17-159.

“Hot water storage tank” is deleted from 4.7.3 a) because it is covered in c), and the temperature could exceed 210 deg. F. for those vessels. The item from installation was not changed otherwise. The Part 4, par. 2.5.7 is new but is just Part 1, par. 4.7 slightly rewritten.

**Proposal:**

**NBIC Location:** Part 1, 4.7

#### **4.7 REQUIREMENTS FOR HOT WATER STORAGE TANKS/POTABLE HOT WATER STORAGE TANK**

##### **4.7.1 SUPPORTS**

Each hot water storage tank shall be supported in accordance with NBIC Part 1, 1.6.1.

##### **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.
- c) Each hot water storage tank shall meet the requirements of NBIC Part 1, 4.3.2.

##### **4.7.3 TEMPERATURE AND PRESSURE RELIEF DEVICES**

- a) Each ~~potable hot water storage tank/ hot water storage tank~~ shall be equipped with an ASME/NB certified temperature and pressure relief ~~device~~ valve set at a pressure not to exceed the maximum allowable working pressure and 210°F (99°C).
- b) Potable hot water storage tanks exceeding the pressure limit of ASME Code Section IV shall meet the original code of construction and shall be protected by a pressure relief device set not to exceed the vessel's maximum allowable working pressure. A temperature limiting device shall be installed so that the water inside the storage tank does not exceed 210°F (99°C).
- c) Each hot water storage tank shall be equipped with an ASME/NB certified pressure relief valve set at a pressure not to exceed the maximum allowable working pressure.
- ~~bd)~~ The temperature and pressure relief ~~device~~ valve shall meet the requirements of NBIC Part 1, 4.5.

**4.7.4 THERMOMETERS**

- a) Each hot water storage potable hot water storage tank shall be equipped with a thermometer.
- b) Each hot water storage potable hot water storage tank shall have a thermometer so located that it shall be easily readable at or near the outlet. The thermometer shall be so located that it shall at all times indicate the temperature of the water in the storage tank.

**4.7.5 SHUT OFF VALVES**

- a) Each hot water storage potable hot water storage tank shall be equipped with stop valves in the water inlet piping and the outlet piping in order for the hot water storage tank to be removed from service without having to drain the complete system.
- b) Each hot water storage potable hot water storage tank shall be equipped with a bottom drain valve to provide for flushing and draining of the vessel.

**NBIC Location: Part 4, 2.5.7**

**2.5.7 TEMPERATURE AND PRESSURE RELIEF DEVICES FOR HOT WATER STORAGE TANKS POTABLE HOT WATER STORAGE TANK**

- a) Each potable hot water storage tank shall be equipped with an ASME/NB certified temperature and pressure relief device valve set at a pressure not to exceed the maximum allowable working pressure and 210°F. (99°C).
- b) Potable hot water storage tanks exceeding the pressure limit of ASME Code Section IV shall meet the original code of construction and shall be protected by a pressure relief device set not to exceed the vessel's maximum allowable working pressure. A temperature limiting device shall be installed so that the water inside the storage tank does not exceed 210°F (99°C).
- c) Each hot water storage tank shall be equipped with an ASME/NB certified pressure relief valve set at a pressure not to exceed the maximum allowable working pressure.
- bd) The temperature and pressure relief device valves shall meet the requirements of 2.5.1 through 2.5.6 above.

Item 18-26, Part 1  
Item 18-27, Part 2

## Current wording (Paragraph's in Part 1 and Part 2 read the same)

### PRT 1, S3.4 GAS DETECTION SYSTEMS Part 2, S12.5 GAS DETECTION SYSTEMS

A continuous gas detection system shall be provided in the room or area where container systems are filled and used, in areas where the heavier than air gas can congregate and in below grade outdoor locations. Carbon dioxide (CO<sub>2</sub>) sensors shall be provided within 12 inches (305mm) of the floor in the area where the gas is most likely to accumulate or leaks are most likely to occur. The system shall be designed to detect and notify at a low level alarm and high level alarm.

## Proposed Changes (the changes are identical in Part 1 and Part 2)

### S3.4 GAS DETECTION SYSTEMS S12.5 GAS DETECTION SYSTEMS

A continuous gas detection system shall be provided in the room or area where container systems are filled/~~and~~ used, ~~and~~ in areas where the ~~heavier than air~~~~heavier than air~~ gas can ~~congregate accumulate, and including in~~ below grade, ~~enclosed, or confined space~~ outdoor locations. ~~Small outdoor, at-grade enclosures which are not large enough for a person to enter are not required to have gas detection.~~ Carbon dioxide (CO<sub>2</sub>) sensors shall be provided within 12 inches (305mm) of the floor in the area where the gas is most likely to accumulate or leaks are most likely to occur, ~~or as specified by the gas detection manufacturer.~~ The system shall be designed to detect and ~~notify alert~~ at a low ~~level alarm and~~ ~~and~~ high level alarm.

## Proposed wording with the changes incorporated

### S3.4 GAS DETECTION SYSTEMS S12.5 GAS DETECTION SYSTEMS

A continuous gas detection system shall be provided in the room or area where container systems are filled/used, and in areas where the heavier-than-air gas can accumulate, including below grade, enclosed, or confined space outdoor locations. Small outdoor, at-grade enclosures which are not large enough for a person to enter are not required to have gas detection. Carbon dioxide (CO<sub>2</sub>) sensors shall be provided within 12 inches (305mm) of the floor in the area where the gas is most likely to accumulate or leaks are most likely to occur, or as specified by the gas detection manufacturer. The system shall be designed to detect and alert at a low and high level alarm.

18-44

### Action Item Request Form

#### NBIC 8.3 CODE REVISIONS OR ADDITIONS

Request for Code revisions or additions shall provide the following:

a) Proposed Revisions or Additions

For revisions, identify the rules of the Code that require revision and submit a copy of the appropriate rules as they appear in the Code, marked up with the proposed revision. For additions, provide the recommended wording referenced to the existing Code rules.

Existing Text: **2017 NBIC PART 1**

**NBIC Part 1 2017 3.7.8.1 INDIVIDUAL MODULES**

a) The individual modules shall comply with all the requirements of the code of construction and this paragraph. ~~The individual modules shall be limited to a maximum input of 400,000 Btu/hr (117 kW/hr) for gas, 3 gal./hr (11.4 l/hr) for oil, or 117 kW for electricity.~~

b) Statement of Need

Provide a brief explanation of the need for the revision or addition.

Some Jurisdictions reference the NBIC Part 1 for the installation of modular boilers and some may also reference ASME Section IV for modular installation requirements.

ASME Section VI 2017 removed the modular limits of BTU/Hr., 3gal for oil and 117 kW for electricity. Reference HG-716.

Since the NBIC seems to be consistent with following the ASME Code in installation aspects I request the Committee evaluate the need to remove the modular boiler limits as in the 2017 ASME Code Section VI.

### 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.

#### **HG-716 MODULAR BOILERS (ASME Section IV 2015)**

##### *(a) Individual Modules*

(1) The individual modules shall comply with all the requirements of [Part HG](#), except as specified in [HG-607](#), [HG-615](#), and this paragraph. The individual modules shall be limited to a maximum input of **400,000 Btuh (gas), 3 gal/hr (11 L/hr) (oil), or 117 kW (electricity).**

(2) Each module of a steam heating boiler shall be equipped with

(-a) safety valve, see [HG-701](#)

(-b) blowoff valve, see [HG-715\(a\)](#)

(-c) drain valve, see [HG-715\(c\)](#)

(3) Each module of a modular hot water heating boiler shall be equipped with

(-a) safety relief valve, see [HG-701](#)

(-b) drain valve, see [HG-715\(c\)](#)

#### **HG-716 MODULAR BOILERS (ASME Section IV 2017)**

##### *(a) Individual Modules*

(1) The individual modules shall comply with all the requirements of [Part HG](#), except as specified in [HG-607](#), [HG-615](#), and this paragraph.

(2) Each module of a steam heating boiler shall be equipped with

(-a) safety valve, see [HG-701](#)

(-b) blowoff valve, see [HG-715\(a\)](#)

(-c) drain valve, see [HG-715\(c\)](#)

Item number 18-44, Eliminating size restriction to modular boilers.

I Disapprove this item.

I disagree with this proposal because I do not feel that the NBIC has shown that eliminating the capacity for Modular boilers will meet reasonable safety concerns for installed boilers, especially with larger capacities. For example, eliminating isolation valves on large multiple boilers would seem to have both operational and safety issues not present in the current limit of 400,000 BTU limits. Eliminating the need for a manual reset LWCO is also of concern on large steam boilers. The ASME Section IV has eliminated this limit, but they have a different scope than the NBIC, and a different code.

I recommend keeping the limit of 400,000 BTU/hr limit until and if a new level can be established by a task group that would provide safe operating and maintenance conditions for the installation.

Gene Tompkins  
January 15, 2019

Part 1 Installation  
Agenda Item NB18-44

Proposal General Description: Remove the modular limits of BTU/Hr., 3gal for oil and 117 kW for electricity to be consistent with ASME Section IV 2017.

Proposed Section NBIC Part 1 2017 change:

3.7.8.1 INDIVIDUAL MODULES

a) The individual modules shall comply with all the requirements of the code of construction and this paragraph.

~~The individual modules shall be limited to a maximum input of 400,000 Btu/hr (117 kW/hr) for gas, 3 gal./hr (11.4 l/hr) for oil, or 117 kW for electricity.~~

In accordance with NB-240 Section 7.1.3, provided below is an explanation of my disapproved vote.

ANSI ASME CSD-1-2018 Part CG-700 defines modular boiler as a steam or hot water heating assembly consisting of a grouping of individual boilers called modules intended to be installed as a unit with no intervening stop valves. Modules may be under one jacket or individually jacketed. The individual modules shall be limited to a maximum input of 400,000 Btu/hr (117 kW) (gas), 3 gph (11.4 L/h) (oil), or 115 kW (electric).

Such boilers are subject to primary safety control requirements that are different from those of boilers with greater heat input ratings. Simply deleting the indicated sentence does not adequately consider those controls. The following are not taken into consideration: a) number and location of fuel pressure switches; b) number, location, and type of fuel train safety shutoff switches; c) number and function of LWCOs; d) number and function of over-temperature controls; and e) number and function of overpressure controls

A review of the ASME Section IV item to delete the 400,000 Btu/hr heat input rate reveals that none of the above listed control differences were mentioned and, therefore presumably, not addressed.

ASME Item 16-2067

In order to clarify the rules for certification of modular boilers in a single data report and under one code nameplate covering the entire assembly, as well as clarify the related requirements for inspection openings and accessibility to nameplate stamping, revised the definition of modular boiler and incorporated new requirements under new paras. HG-330.6; HG-530.3; HG-607(c); HG-615(c); HG-710.4; and HG-716(b)(4). In addition, the current limit of 400,000 Btu/hr limit per module was deleted from HG-716.

The ASME Action Box attached.

NBIC Part 1 Sections 3.7 and 3.8 were written with the 400,000 Btu/hr limitation in mind.

Proposed resolution: either open a new item or expand the current item to include a thorough review of implications other potentially affected installation requirement especially controls and safety devices.

## HG-330 INSPECTION AND ACCESS OPENINGS

### HG-330.1 General Inspection Openings.

(a) All boilers shall be provided with suitable manhole openings and handhole or washout plug openings to permit inspection and removal of accumulated sediment.

(b) Electric boilers of a design employing a removable cover that will permit access for inspection and cleaning and having an internal gross volume (exclusive of casing and insulation) of not more than 5 ft<sup>3</sup> (0.14 m<sup>3</sup>) need not be fitted with washout or inspection openings.

Electric boilers equipped with immersion type resistance elements not provided with a manhole shall have an inspection opening or handhole located in the lower portion of the shell or head. The inspection opening shall not be smaller than NPS 3 (DN 80). In addition, electric boilers designed for steam service shall have an inspection opening or manhole at or near the normal waterline.

(c) Furnaces of internally fired boilers shall be provided with access doors as required by HG-330.5.

**HG-330.2 Manholes.** A manhole shall be placed in the front head below the tubes of a horizontal-return tubular boiler 60 in. (1 500 mm) or over in diameter. There shall be a manhole in the upper part of the shell, or in the head of a firetube boiler over 60 in. (1500 mm) in diameter, except in a vertical firetube boiler.

### HG-330.3 Size of Manholes and Gasket Surfaces.

(a) An elliptical manhole opening shall not be less than 12 in. × 16 in. (300 mm × 400 mm) in size.

(b) A circular manhole opening shall not be less than 15 in. (380 mm) in diameter.

(c) The minimum width of bearing surface for a gasket on a manhole opening shall be  $\frac{11}{16}$  in. (17 mm).

(d) No gasket for use on a manhole or handhole of any boiler shall have a thickness greater than  $\frac{1}{8}$  in. (3 mm) when compressed.

### HG-330.4 Handholes and Washout Plugs.

(a) Boilers of the locomotive or firebox type, except those set in brick or otherwise so constructed as to render such openings inaccessible, shall have one handhole or washout plug near each corner in the lower part of the waterleg and at least one opening near the line of the crown sheet. In addition, boilers designed for steam service shall have at least one inspection opening above the top row of tubes. This inspection opening shall be a minimum of NPS 3 (DN 80) or a handhole as specified in (f) below and used solely for inspection purposes.

(b) A boiler of the scotch type shall have a handhole or washout plug in the front head below or on each side of the furnace or on each side of the shell near the front head, a handhole or washout plug in the bottom of the shell, an opening to inspect the top of the furnace and an inspection opening above the top row of tubes. This inspection opening shall be a minimum of NPS 3 (DN 80) or a handhole as specified in (f) below and used solely for

inspection purposes. Scotch marine boilers (wet-back type) shall also have an opening for inspection of the water space at the rear of the combustion chamber.

(c) Vertical firetube or similar type boilers having gross internal volume (exclusive of casing and insulation) more than 5 ft<sup>3</sup> (0.14 m<sup>3</sup>) shall have at least three handholes or washout plugs in the lower part of the waterleg and at least two handholes or washout plugs near the line of the lower tubesheet. Such boilers having gross internal volume not over 5 ft<sup>3</sup> (0.14 m<sup>3</sup>) shall have at least two washout openings in the lower part of the waterleg and at least one washout opening near the line of the lower tubesheet. In addition, boilers designed for steam service shall have at least one inspection opening above the lowest permissible water level. This inspection opening shall be a minimum of NPS 3 (DN 80) or a handhole as specified in (f) below and used solely for inspection purposes.

(d) Washout plugs shall be not smaller than NPS  $1\frac{1}{2}$  (DN 40) for boilers having gross internal volume more than 5 ft<sup>3</sup> (0.14 m<sup>3</sup>). Washout plugs shall be not smaller than NPS 1 (DN 25) for boilers having gross internal volume not more than 5 ft<sup>3</sup> (0.14 m<sup>3</sup>).

(e) Washout openings may be used for return pipe connections and the washout plug placed in a tee so that the plug is directly opposite and as close as possible to the opening in the boiler.

(f) A handhole opening shall not be less than  $2\frac{3}{4}$  in. ×  $3\frac{1}{2}$  in. (70 mm × 89 mm) but it is recommended that, where possible, larger sizes be used.

### HG-330.5 Access Doors.

(a) A fire door or other access not less than 11 in. × 15 in. (280 mm × 380 mm) or 10 in. × 16 in. (250 mm × 400 mm) or 15 in. (381 mm) in diameter, shall be provided for the furnace of an internally fired boiler in that the least furnace dimension is 28 in. (711 mm) or over. The minimum size of access door used in a boiler setting shall be 12 in. × 16 in. (300 mm × 400 mm), or equivalent area, the least dimension being 11 in. (280 mm).

(b) *Fuel Burning Equipment.* Fuel burning equipment may be installed in the fire door opening provided the cover plate can be unbolted or unlatched to give full-size access to the furnace through the fire door opening.

## HG-340 STAYED SURFACES

### HG-340.1 Required Thickness and Design Pressure.

(a) The required thickness and design pressure for stayed flat plates and those parts that, by these rules, require staying, as flat plates with stays or staybolts of uni-

### HG-330.6 Modular Boilers

Modular boilers that are installed side by side, front to back or by stacking in accordance with the Manufacturer's recommendations shall have their inspection openings located so that they are accessible.



**HG-515.4 Duty of Authorized Inspector.**

(a) Each boiler shall be inspected during construction and after completion and, at the option of the Authorized Inspector, at such other stages of the work as he may designate. For specific requirements, see the applicable parts of this Section. Each Manufacturer or assembler is required to arrange for the services of Authorized Inspectors (see HG-515.2) to perform such inspections on all of this work within the scope of this Section, whether performed in the shop or in the field.

(b) When mass production of boilers or HLW-stamped vessels makes it impracticable for the Inspector to personally perform each of his required duties, the Manufacturer, in collaboration with the Inspector, shall prepare an inspection and quality control procedure setting forth, in complete detail, the method by which the requirements of this Section shall be maintained (for summaries of the responsibilities of the Manufacturer and the duties of the Inspector see HG-515.2 and HG-515.3 for boilers or HLW-600.2 and HLW-600.3 for HLW-stamped vessels). This procedure shall be included in the Manufacturer's written Quality Control System. It shall be developed, accepted, and implemented in accordance with Mandatory Appendix 7.

**HG-520 MASTER AND PARTIAL DATA REPORTS**

**HG-520.1 Manufacturer's Master Data Report.** Each manufacturer of heating boilers of wrought materials to which the Certification Mark with H designator is to be applied shall compile a Manufacturer's Data Report for each boiler he produces, except that an individual Manufacturer's Data Report may be used to include the serial numbers in uninterrupted sequence of identical boilers completed, inspected, and stamped in a continuous 8 hr period. Form H-2 or Form H-3 shall be used.

(a) The boiler Manufacturer shall have the responsibility of furnishing a copy of the completed Manufacturer's Data Report at the place of installation to the inspection agency, the purchaser, and the state, municipal, or provincial authority.

(b) The Manufacturer shall either keep a copy of the Manufacturer's Data Report on file for at least 5 years, or the boiler may be registered and the original Data Report filed with the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229

(15) **HG-520.2 Partial Data Reports.**

(a) Manufacturer's Partial Data Reports for those parts of a boiler requiring inspection under this Code, which are furnished by other than the shop of the manufacturer responsible for the completed boiler, shall be executed by the parts manufacturer and shall be forwarded in duplicate to the manufacturer of the finished boiler.

(b) Partial Data Reports (Form H-4) shall be completed for all parts that require inspection under this Code that are fabricated by a manufacturer other than the

manufacturer of the completed boiler. These Partial Data Reports, together with his own inspection, shall be the final Authorized Inspector's authority to witness the application of the Certification Mark to the completed boiler.

(c) Manufacturers with multiple locations, each with its own Certificate of Authorization, may transfer parts from one of their locations to another without Partial Data Reports, provided the Quality Control System describes the method of identification, transfer, and receipt of the parts.

(15) **HG-520.3 Supplementary Sheet.** Form H-6, Manufacturer's Data Report Supplementary Sheet, shall be used to record additional data where space was insufficient on a Data Report Form. This Manufacturer's Data Report Supplementary Sheet will be attached to the Manufacturer's Data Report Form where used. If Form H-6 is used in conjunction with Form H-5 or H-5A, the Authorized Inspector's certification is not applicable.

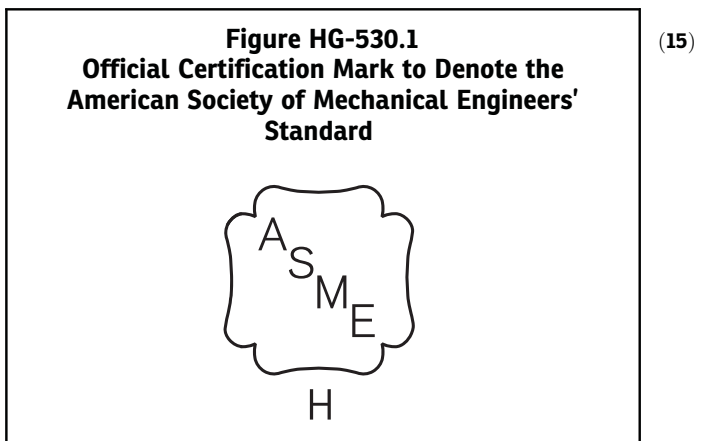
(15) **HG-520.4 Multiple Page Data Reports.** Requirements for completing multiple pages of Data Report Forms are shown in Mandatory Appendix 4.

**HG-530 STAMPING OF BOILERS**

(15) **HG-530.1 Stamping Requirements for Boilers Other Than Those Constructed Primarily of Cast Iron or Cast Aluminum (See HG-530.2).**

(a) All boilers to which the Certification Mark is to be applied shall be built according to the rules of this Section by a manufacturer who is in possession of a Certification Mark and a valid Certificate of Authorization. Each boiler shall be stamped with the Certification Mark with the H designator shown in Figure HG-530.1 and with the following data except as permitted in (f) below:

- (1) the boiler manufacturer's name, preceded by the words "Certified by"
- (2) maximum allowable working pressure
- (3) safety or safety relief valve capacity (minimum), as determined according to HG-400.1(d) and HG-400.2(e)
- (4) heating surface, as determined according to HG-403 (or power input for electric boilers)



- (5) manufacturer's serial number
- (6) year built
- (7) maximum water temperature

NOTE: The year built may be incorporated into the serial number as a prefix consisting of the last two digits of the year.

(b) The information listed in (a) above, including the Certification Mark, shall be applied by stamping or etching that leaves a permanent, legible mark.

(1) The process controls for etching shall be described in the Quality Control System and shall be acceptable to the Authorized Inspector.

(2) The process controls shall be established so that the etched characters shall be at least 0.004 in. (0.10 mm) deep.


(c) Items (a)(1) through (a)(7) listed in (a) above, with the markings arranged substantially as shown in Figure HG-530.2 or Figure HG-530.3, shall be marked with letters at least 5/16 in. (8 mm) high [except as permitted in (f)] and in some conspicuous place on the boiler proper or on a nameplate at least 3/64 in. (1.2 mm) thick permanently fastened to the boiler proper.

(d) The location of the marking shall be as follows:

(1) *Horizontal Tubular Flue Type Boilers*: on the front head above the central rows of tubes or flues.

(15)

**Figure HG-530.3  
Boilers Suitable for Water Only  
Form of Marking on Completed Boilers or Their  
Nameplates  
(Not Applicable for Boilers Constructed  
Primarily of Cast Iron)**

	Certified by _____
	(Name of Manufacturer) _____
	MAWP, Water _____
	Maximum Water Temp. _____
	<sup>1</sup> Heating surface _____ boiler
	<sup>2</sup> Heating surface _____ water wall
	Minimum relief valve capacity _____
	Manufacturer's serial no. _____
	<sup>3</sup> Year built _____


GENERAL NOTE: Acceptable abbreviations to any of the stamp wording may be used.

NOTES:

- (1) Kilowatt power input for electric boilers.
- (2) List each type of surface separately. May be omitted if type heating surface is not present.
- (3) May be omitted when year built is prefix to serial number (see HG-530.1).

(15)

**Figure HG-530.2  
Steam and Water Boilers Form of Marking on  
Completed Boilers or Their Nameplates  
(Not Applicable for Boilers Constructed  
Primarily of Cast Iron)**

	Certified by _____
	(Name of Manufacturer) _____
	<sup>1</sup> MAWP, Steam _____
	<sup>1</sup> MAWP, Water _____
	<sup>1</sup> Maximum Water Temp. _____
	<sup>2</sup> Heating surface _____ boiler
	<sup>3</sup> Heating surface _____ water wall
	Minimum relief valve capacity _____
	Manufacturer's serial no. _____
	<sup>4</sup> Year built _____

GENERAL NOTE: Acceptable abbreviations to any of the stamp wording may be used.

NOTES:

- (1) For steam only boilers, MAWP Water and Maximum Water Temperature markings are optional.
- (2) Kilowatt power input for electric boilers.
- (3) List each type of surface separately. May be omitted if type heating surface is not present.
- (4) May be omitted when year built is prefix to serial number (see HG-530.1).

(2) *Locomotive Firebox, Compact, or Vertical Firetube Type Boilers*: over or near the fire door or handhole or washout plug opening on the front end or side.

(3) *Watertube Type Boilers*: on a head of the top outlet drum. Waterwalls and headers shall carry identifying markings.

(4) *Split-Section and Section Firebox Type Wrought Boilers*: over or near the fire door or handhole or washout plug opening on the front end or side. Each section shall carry identifying markings.

(5) *Scotch Type Boilers*: on either side of the shell near the normal water level line adjacent to the front tubesheet.

(e) On any of the above type boilers where there is not sufficient space in the places designated and on other types and new designs of boilers, the marking shall be located in a conspicuous place.

(f) When there is insufficient space for the marking required above, smaller letter dimensions may be used, provided

(1) marking shall be as required in (a) through (c) above, and

(2) character size shall be no smaller than 5/32 in. (4 mm)

(g) The marking on the boiler proper shall not be covered with insulating or other material unless

(1) the required markings are duplicated and stamped directly on the boiler casing in some conspicuous place using letters and numerals at least 5/16 in. (8 mm) high

(2) an opening with a removable cover is provided in the jacket or other form of casing so that, when removed, the marking or nameplate on the boiler proper can be viewed

(3) the required data are duplicated by stamping, etching, or permanent marking with letters at least 1/8 in. (3 mm) high on a nonferrous nameplate at least 3 in. x 4 in. (75 mm x 100 mm) size and permanently attaching the nameplate to the casing in some conspicuous place by mechanical means or by an adhesive system meeting the requirements of [Mandatory Appendix 3](#)

(h) The Certification Mark may be preapplied to a nameplate. The nameplate may be attached to the boiler after the final fabrication and examination sequence but before the hydrostatic test, provided the procedure for sequence of marking is described in the manufacturer's accepted quality control system.

(i) The Certification Mark shall not be used by an organization to which it was not issued.

**(15) HG-530.2 Marking Requirements for Cast Iron or Cast Aluminum Boilers.**

(a) All cast iron boiler parts or sections to which the Certification Mark is to be applied shall be built according to the rules of this Section by a Manufacturer<sup>11</sup> who is in possession of a Certification Mark and a valid Certificate of Authorization. Each boiler section, including end and intermediate cored sections, shall be cast or etched with the Certification Mark shown in [Figure HG-530.1](#) with the H designator and with the following data cast in letters or numerals at least 5/16 in. (8 mm) high:

(1) the boiler or parts Manufacturer's<sup>11</sup> name or acceptable abbreviation, preceded by the words "Certified by:" (or "Cert. by" on cast boiler sections only where space for marking is limited; the abbreviation "Cert. by" shall not be used on nameplates)<sup>12</sup>

(2) maximum allowable working pressure<sup>12, 13</sup>

(3) pattern number

(4) casting date

Arrangement of data cast or etched on sections shall be substantially as shown in [Figure HG-530.4](#) for cast iron steam or hot water heating boilers or [Figure HG-530.5](#) for cast iron hot water heating boilers.


Etched information shall have a minimum depth of 0.004 in. (0.1 mm) and shall not compromise the minimum wall thickness.

Other data may be cast or etched on the sections. The marking "ASME" or "ASME standard" shall not be used.

(b) All cast aluminum boiler parts or sections to which the Certification Mark is to be applied shall be built according to the rules of this Section by a Manufacturer<sup>11</sup> who is in possession of a Certification Mark and a valid Certificate of Authorization. Each boiler section, including

**Figure HG-530.4  
Steam and Water Boilers  
Form of Data Cast or Marked on Cast Iron Boiler  
Sections**

(15)



Certified by  
(1)  
\_\_\_\_\_  
Name of Manufacturer

MAWP, Steam \_\_\_\_\_  
MAWP, Water \_\_\_\_\_ (2)

(3)  
\_\_\_\_\_  
(Pattern number)

(4)  
\_\_\_\_\_  
(Casting date)

GENERAL NOTE: For (1) through (4), refer to [HG-530.2 \(a\)\(1\)](#) through [HG-530.2 \(a\)\(4\)](#).

end and intermediate cored sections, shall be cast, stamped, or etched with the Certification Mark shown in [Figure HG-530.1](#) with the H designator and with the following data cast in letters or numerals at least 5/16 in. (8 mm) high:


(1) the boiler or parts Manufacturer's<sup>11</sup> name or acceptable abbreviation, preceded by the words "Certified by:" (or "Cert. by" on cast boiler sections only where space for marking is limited; the abbreviation "Cert. by" shall not be used on nameplates)<sup>12</sup>

(2) maximum allowable working pressure<sup>12, 13</sup>

(3) pattern number

**Figure HG-530.5  
Boilers Suitable for Water Only  
Form of Data Cast or Marked on Cast Iron Boiler  
Sections**

(15)



Certified by  
(1)  
\_\_\_\_\_  
Name of Manufacturer

MAWP, Water \_\_\_\_\_ (2)

(3)  
\_\_\_\_\_  
(Pattern number)

(4)  
\_\_\_\_\_  
(Casting date)

GENERAL NOTE: For (1) through (4), refer to [HG-530.2 \(a\)\(1\)](#) through [HG-530.2 \(a\)\(4\)](#).

(4) casting date

(5) the material specification identification number and grade or an abbreviation traceable to the material certification<sup>12, 13</sup>

In lieu of directly marking the castings, the data in items (b)(1), (b)(2), and (b)(5) may be stamped or etched on a permanently attached 3/64 in. (0.2 mm) thick nonferrous nameplate using letters and numerals at least 1/8 in. (3 mm) high.

Arrangement of data marked on sections or on a nameplate shall be substantially as shown in Figure HG-530.6 for cast aluminum hot water heating boilers.

Etched information shall have a minimum depth of 0.004 in. (0.1 mm) and shall not compromise the minimum wall thickness.

Other data may be cast, stamped, or etched on the sections. The marking "ASME" or "ASME standard" shall not be used.

(c) When the boiler size and number of sections have been decided, the completed boiler shall be marked with the Certification Mark shown in Figure HG-530.1 with the H designator and with the following data:

(1) the Shop Assembler's name preceded by the words "Certified by"

(2) maximum allowable working pressure

(3) safety or safety relief valve capacity (minimum), as determined according to HG-400.1(d) and HG-400.2(e)

(4) maximum water temperature

(d) The Shop Assembler that is in possession of a Certification Mark and valid Certificate of Authorization shall be one of the following:

(1) the shop that assembles sections into boilers, performs the hydrostatic test, and installs the nameplate

(2) the shop that installs the nameplate on a boiler, previously assembled and hydrotested by another authorized Certificate Holder

(3) the shop that only installs the nameplate on a boiler.

(e) The markings for the completed boiler shall be arranged substantially as shown in Figure HG-530.7 or Figure HG-530.8.

(f) Data for more than one size boiler in a model series may be listed on the nameplate. When different model numbers having the same number of sections and jacket length have different minimum safety or safety relief valve capacities, the highest value shall be listed. The following additional information shall be included for each size listed:

(1) boiler model number

(2) number of sections

(3) jacket length

(4) the statement: "To determine boiler size, count the number of sections or measure the jacket length"

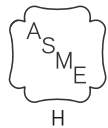
(g) The provisions of (c) above shall be met utilizing one of the following methods:

(1) stamping or etching the required markings on a nonferrous nameplate at least 3 in. x 4 in. (75 mm x 100 mm) in size and 3/64 in. (1.2 mm) thick using letters and numerals at least 1/8 in. (3 mm) high and permanently attaching the nameplate to the boiler proper in some conspicuous place. The nameplate shall not be covered with insulating or other material except that when a jacket or other form of casing is applied to a boiler, an opening with a removable cover shall be provided for viewing the required marking.

(2) stamping or etching the required markings directly into the boiler jacket in some conspicuous place using letters and numerals at least 5/16 in. (8 mm) high.

(15)

**Figure HG-530.6  
Boilers Suitable for Water Only  
Form of Data Cast or Marked on Cast Aluminum  
Boiler Sections**




	Certified by
	(1)
	_____ Name of Manufacturer
	MAWP, Water _____ (2)
	(3)
	_____ (Pattern number)
	(4)
	_____ (Casting date)
	(5)
	_____ (Material specification/grade)

GENERAL NOTE: For (1) through (4), refer to HG-530.2 (b)(1) through HG-530.2 (b)(5).

(15)

**Figure HG-530.7  
Steam and Water Boilers  
Form of Stamping or Marking on Completed  
Cast Iron Boilers or Their Nameplates**



	Certified by
	_____ Name of Shop Assembler
	MAWP, Steam _____
	MAWP, Water _____
	Maximum Water Temp. _____
	Minimum relief valve capacity _____

(15)

**Figure HG-530.8  
Boilers Suitable for Water Only  
Form of Stamping or Marking on Completed  
Cast Iron or Cast Aluminum Boilers or Their  
Nameplates**

Certified by \_\_\_\_\_  
Name of Shop Assembler

MAWP, Water \_\_\_\_\_  
Maximum Water Temp. \_\_\_\_\_

Minimum relief valve capacity \_\_\_\_\_

(3) stamping or etching the required data on a non-ferrous nameplate at least 3 in. × 4 in. (75 mm × 100 mm) in size using letters and numerals at least  $\frac{1}{8}$  in. (3 mm) high and permanently attaching the nameplate to the casing in some conspicuous place by mechanical means or by an adhesive system.

(4) marking the required data on a nonmetallic nameplate at least 3 in. × 4 in. (75 mm × 100 mm) in size using letters and numerals at least  $\frac{1}{8}$  in. (3 mm) high and permanently attaching the nameplate to the casing in some conspicuous place by an adhesive system.

(5) the nameplate and the adhesive system shall meet the requirements of [Mandatory Appendix 3](#). Other data may be marked on the jacket or the nameplate provided the required markings are distinct and separate from the other data. The marking “ASME” or “ASME standard” shall not be used.

(6) the Certification Mark may be preapplied to a nameplate.

(7) the nameplate may be attached to the casing of a cast iron or cast aluminum boiler by the Manufacturer or Shop Assembler at a plant other than that shown on his Certificate of Authorization provided the plant is owned by the Certificate Holder and the nameplate’s control and use is addressed in his Quality Control Manual.

(8) the Certification Mark shall not be used by an organization to which it was not issued.

**HG-531 STAMPING OF PARTS AND ACCESSORIES**

(a) Parts of boilers for which Partial Data Reports are required by [HG-520.2](#) shall be marked with the following:

(1) the official Certification Mark shown in [Figure HG-530.1](#) with the H or PRT designator above the word “Part”

(2) the part manufacturer’s name

(3) the part manufacturer’s serial number

(b) No part or accessory of a boiler may be marked with the Certification Mark shown in [Figure HG-530.1](#) unless so specified in the Code. The markings “ASME” or “ASME standard” shall not be used.

(c) Manufacturers and assemblers of parts who do not perform or assume any design responsibility for the parts they manufacture shall identify on the Partial Data Report the organization responsible for the design of the part.

**HG-532 STAMPING OF FIELD ASSEMBLED WROUGHT BOILERS**

**HG-532.1 Responsibility of Manufacturer of Boiler Unit.** When a boiler manufactured of wrought material is furnished by one manufacturer and is not assembled and subjected to hydrostatic test prior to shipment, the manufacturer of the boiler unit shall compile a Manufacturer’s Data Report [Form H-2](#) or [Form H-3](#) recording all items of the complete boiler unit.

**HG-532.2 Execution of Manufacturer’s Data Report.**

The Manufacturer’s Data Report shall be properly executed by the manufacturer and the Authorized Inspector, who shall sign the certificate of shop inspection certifying that each enumerated item that has been inspected at the shop conforms to the requirements of the ASME Code. The manufacturer in signing each Data Report shall state under his signature the expiration date on the Certificate of Authorization to use the Certification Mark.

**HG-532.3 Application of Stamping and Signing Data Sheets.** (15)

Proper stamping as required by [HG-530.1](#) shall be applied at the shop and the data sheets shall be signed by the same or different Inspectors who shall indicate the portions of the inspections made at the shop and in the field.

**HG-533 INSPECTION AND STAMPING OF FIELD**

**HG-530.3 Modular Boilers**

Modular boilers complying with [HG-607](#), [HG-615](#), [HG-710.4](#) and [HG-716](#) may be stamped and certified as follows:

(a) Individual modules are stamped and certified as complete boilers, each with its own nameplate stamping and Manufacturer’s Data Report. The heating surface and required minimum relief valve capacity of each module shall be stamped on the individual nameplates.

(b) Individual modules are combined together and provided with a single nameplate stamping and Manufacturer’s Data Report. When certified as a single boiler, the aggregate heating surface of all the modules and the combined minimum relief valve capacity shall be stamped on the nameplate. Additionally, the supply and return headers shall be constructed in accordance with [Section IV](#) and recorded on the Manufacturer’s Data Report.

(c) Modular boilers that are installed side by side, front to back or by stacking in accordance with the Manufacturer’s recommendations shall have their nameplate stamping located to provide access for inspection in the assembled position.

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

### HG-607 MODULAR STEAM HEATING BOILERS

(a) Each module of a modular steam heating boiler shall be equipped with

(1) steam gage, see HG-602

(2) water gage glass, see HG-603

(3) a pressure control that will cut off the fuel supply when the pressure reaches an operating limit, which shall be less than the maximum allowable pressure

(4) low water cutoff, see HG-606

(b) The assembled modular steam boiler shall also be equipped with a safety limit control that will cut off the fuel supply to prevent steam pressure from exceeding the 15 psi (100 kPa) maximum allowable working pressure of the boiler. The control shall be constructed to prevent a pressure setting above 15 psi (100 kPa).

### HG-610 FOR HOT WATER HEATING OR HOT WATER SUPPLY BOILERS

#### HG-611 PRESSURE OR ALTITUDE GAGES

(a) Each hot water heating or hot water supply boiler shall have a pressure or altitude gage connected to it or to its flow connection in such a manner that it cannot be shut off from the boiler except by a cock with tee or lever handle, placed on the pipe near the gage. The handle of the cock shall be parallel to the pipe in which it is located when the cock is open.

(b) Mechanical Gages (Analog). The scale on the dial of the pressure or altitude gage shall be graduated to not less than  $1\frac{1}{2}$  nor more than  $3\frac{1}{2}$  times the pressure at which the safety relief valve is set.

(c) Electronic gages used in lieu of mechanical gages shall meet the following requirements:

(1) Gage shall be powered from the boiler power supply and it shall have a display that remains on at all times. The gage shall have a backup power supply.

(2) The full scale range of the transducer must be a minimum of  $1\frac{1}{2}$  times the pressure at which the safety relief valve is set. It shall be accurate to within  $\pm 2\%$  of full scale.

(3) The transducer shall have a media compatibility of both liquids and gases and be temperature compensated.

(4) The gage shall have an operating temperature range of 32°F to 250°F (0°C to 120°C) unless otherwise required by the application.

(d) Piping or tubing for pressure- or altitude-gage connections shall be of nonferrous metal when smaller than NPS 1 (DN 25).

### HG-612 THERMOMETERS/TEMPERATURE SENSORS

Each hot water heating or hot water supply boiler shall have a thermometer or temperature sensor with display so located and connected that it shall be easily readable. The thermometer or sensor shall be so located that it shall at all times indicate the temperature of the water in the boiler at or near the outlet.

(a) Thermometer shall have a minimum reading of 70°F (20°C) or less.

(b) Thermometer shall have a maximum reading at least equal to 320°F (160°C) but not more than 400°F (205°C).

(c) Electronic temperature sensor used in lieu of a thermometer shall meet the following requirements:

(1) The sensor shall be powered from the boiler power supply, and it shall have a display that remains on at all times. The sensor shall have a backup power supply.

(c) When the assembled modular boiler is certified as a single boiler in accordance with HG-530.3(b), the steam gage required on each module by HG-607(a)(1) may be replaced by a single gage located on the supply header.

perature range of 32°F to 120°F (0°C to 50°C) unless otherwise required by the application.

#### HG-613 TEMPERATURE CONTROL

Each automatically fired hot water heating or hot water supply boiler shall be protected from over-temperature by two temperature-operated controls. These temperature control devices shall conform to UL 353, Standard for Limit Controls, and shall be accepted by a nationally recognized testing agency.

(a) Each individual automatically fired hot water heating or hot water supply boiler shall have a high temperature limit control that will cut off the fuel supply to prevent water temperature from exceeding its marked maximum water temperature at the boiler outlet. This control shall be constructed to prevent a temperature setting above the maximum.

(b) Each individual hot water heating or hot water supply boiler shall have a control that will cut off the fuel supply when the system water temperature reaches a preset operating temperature, which shall be less than the maximum water temperature.

#### HG-614 LOW-WATER FUEL CUTOFF

(a) Each automatically fired hot water heating or hot water supply boiler with heat input greater than 400,000 Btu/hr (117 kW) shall have an automatic low-water fuel cutoff that has been designed for hot water service conforming to UL 353, Standard for Limit Controls, and accepted by a nationally recognized testing agency.

This device shall be so located as to automatically cut off the fuel supply when the surface of the water falls to the level established in (b) below (see Figure HG-703.2).

(b) As there is no normal waterline to be maintained in a hot water boiler, any location of the low-water fuel cut-off above the lowest safe permissible water level established by the boiler manufacturer is satisfactory.

(c) A coil-type boiler or a watertube boiler with heat input greater than 400,000 Btu/hr (117 kW) requiring forced circulation to prevent overheating of the coils or tubes shall have a flow-sensing device installed in lieu of the low-water fuel cutoff required in (a) above to automatically cut off the fuel supply when the circulating flow is interrupted.

(d) A means shall be provided for testing the operation of the external low-water fuel cutoff without resorting to draining the entire system. Such means shall not render the device inoperable except as described as follows. If the means temporarily isolates the device from the boiler during this testing, it shall automatically return to its normal position. The connection may be so arranged that the device cannot be shut off from the boiler except by a cock placed at the device and provided with a tee or lever-handle arranged to be parallel to the pipe in which it is located when the cock is open.

### HG-615 MODULAR HOT WATER HEATING BOILERS

(a) Each module of a modular hot water heating boiler shall be equipped with

(1) pressure/altitude gage, see HG-611

(2) thermometer, see HG-612

(3) temperature control that will cut off the fuel supply when the temperature reaches an operating limit, which shall be less than the maximum allowable temperature

(b) The assembled modular hot water heating boiler shall also be equipped with

(1) a safety limit control that will cut off the fuel supply to prevent the water temperature from exceeding the maximum allowable temperature at the boiler outlet. The control shall be constructed to prevent a temperature setting above the maximum. This control shall be located within 3 ft. (1.0 m) of the fitting connecting the last module to the heating supply piping

(2) low water fuel cutoff, see HG-614

### HG-620 FOR ALL BOILERS

### HG-621 INSTRUMENTS, FITTINGS, AND CONTROLS MOUNTED INSIDE BOILER JACKETS

Any or all instruments, fittings, and controls required by these rules may be installed inside of boiler jackets provided the water gage on a steam boiler is accessible

without the use of tools and provided the water gage and pressure gage on a steam boiler or the thermometer and pressure gage on a water boiler are visible through an opening or openings at all times.

## HG-630 ELECTRIC WIRING

### HG-631 ELECTRICAL CODE COMPLIANCE (15)

All field wiring for controls, heat generating apparatus, and other appurtenances necessary for the operation of the boiler or boilers should be installed in accordance with the provisions of the National Electric Code and/or should comply with the applicable local electrical codes. All boilers supplied with factory mounted and wired controls, heat generating apparatus, and other appurtenances necessary for the operation of the boilers should be installed in accordance with the provisions of the nationally recognized standards such as those of HG-640.<sup>16</sup>

### HG-632 TYPE CIRCUITRY TO BE USED

Whether field or factory wired, the control circuitry shall be positively grounded and shall operate at 150 V or less. One of the two following systems may be employed to provide the control circuit.

(a) *Two-Wire Nominal 120 V System With Separate Equipment Ground Conductor*

(1) This system shall consist of the line, neutral, and equipment ground conductors. The control panel frame and associated control circuitry metallic enclosures shall be electrically continuous and be bonded to the equipment ground conductor.

(2) The equipment ground conductor and the neutral conductor shall be bonded together at their origin in the electrical system as required by the NEC.<sup>17</sup>

(3) The line side of the control circuit shall be provided with a time delay fuse sized as small as practicable.

(b) *Two-Wire Nominal 120 V System Obtained By Using an Isolation Transformer*

(1) ~~The two-wire control circuit shall be obtained~~

(c) When the assembled modular boiler is certified as a single boiler in accordance with HG-530.3(b), the pressure/altitude gage and thermometer required on each module by HG-615(a)(1) and HG-615(a)(2) may be replaced by a single gage and thermometer located on the supply header.

potential of 230 V or 208 V or 440 V.

(2) Both sides of the two-wire primary circuit shall be fused. The hot leg on the load side of the isolation transformer shall be fused as small as practicable and in no case fused above the rating of the isolation transformer.

The minimum capacity of the closed type expansion tank may be determined from [Table HG-709.2](#) or from the following formula where the necessary information is available:

(U.S. Customary Units)

$$V_t = [(0.00041T - 0.0466)V_s] / [(P_a/P_f) - (P_a/P_o)]$$

(SI Units)

$$V_t = [(0.000738T - 0.03348)V_s] / [(P_a/P_f) - (P_a/P_o)]$$

where

$P_a$  = atmospheric pressure

$P_f$  = fill pressure

$P_o$  = maximum operating pressure

$T$  = average operating temperature

$V_s$  = volume of system, not including tanks

$V_t$  = minimum volume of tanks

**HG-709.3 Hot Water Supply Systems.** If a system is equipped with a check valve or pressure reducing valve in the cold water inlet line, consideration should be given

#### HG-710.4 Modular Boilers

Modular boilers shall be installed without stop valves between modules and shall be provided with a single set of stop valves on the common supply and return headers in accordance with HG-710.1 and HG-710.2. Flow control valves and circulating pumps may be located in the return line of each module.

**Table HG-709.2**  
**Expansion Tank Capacities for Forced Hot Water Systems**  
**[Based on average operating water temperature 195°F (90°C), fill pressure 12 psig (83 kPa), and maximum operating pressure 30 psig (200 kPa)]**

System Volume, gal (m <sup>3</sup> )	Tank Capacities, gal (m <sup>3</sup> )	
	Prepressurized Diaphragm Type	Nonpressurized Type
100 (0.38)	9 (0.034)	15 (0.057)
200 (0.76)	17 (0.064)	30 (0.114)
300 (1.14)	25 (0.095)	45 (0.170)
400 (1.51)	33 (0.125)	60 (0.227)
500 (1.89)	42 (0.159)	75 (0.284)
1,000 (3.79)	83 (0.314)	150 (0.568)
2,000 (7.57)	165 (0.625)	300 (1.136)

GENERAL NOTE: System volume includes volume of water in boiler, radiation, and piping, not including the expansion tank. Expansion tank capacities are based on an acceptance factor of 0.4027 for prepressurized types and 0.222 for nonprepressurized types. A procedure for estimating system volume and determining expansion tank sizes for other design conditions may be found in Chapter 12 of the 1996 HVAC Systems and Equipment Volume of the ASHRAE Handbook.

or Section X. Except for prepressurized tanks, which should be installed on the cold water side, provisions shall be made for draining the tank without emptying the system. See [Figure HLW-809.1](#) for a typical acceptable installation.

## HG-710 STOP VALVES

**HG-710.1 For Single Steam Boilers.** When a stop valve is used in the supply pipe connection of a single steam boiler, there shall be one used in the return pipe connection.

### HG-710.2 For Single Hot Water Heating Boilers.

(a) Stop valves shall be located at an accessible point in the supply and return pipe connections as near the boiler nozzle as is convenient and practicable, of a single hot water heating boiler installation to permit draining the boiler without emptying the system.

(b) When the boiler is located above the system and can be drained without draining the system, stop valves may be eliminated.

**HG-710.3 For Multiple Boiler Installations.** A stop valve shall be used in each supply and return pipe connection of two or more boilers connected to a common system. See [Figures HG-703.1\(a\)](#), [HG-703.1\(b\)](#), and [HG-703.2](#).

### HG-710.4 Type of Stop Valve(s).

(a) All valves or cocks shall conform with the applicable portions of [HF-203](#) and may be ferrous or nonferrous.

(b) The minimum pressure rating of all valves or cocks shall be at least equal to the pressure stamped upon the boiler, and the temperature rating of such valves or cocks, including all internal components, shall be not less than 250°F (120°C).

(c) Valves or cocks shall be flanged, threaded, or have ends suitable for welding or brazing.

(d) All valves or cocks with stems or spindles shall have adjustable pressure type packing glands and, in addition, all plug type cocks shall be equipped with a guard or gland. The plug or other operating mechanism shall be distinctly marked in line with the passage to indicate whether it is opened or closed.

(e) All valves or cocks shall have tight closure when under boiler hydrostatic test pressure.

## HG-715 BOTTOM BLOWOFF AND DRAIN VALVES

(a) *Bottom Blowoff Valve.* Each steam boiler shall have a bottom blowoff connection fitted with a valve or cock connected to the lowest water space practicable with a minimum size as shown in [Table HG-715](#). The discharge piping shall be full size to the point of discharge.

(b) Boilers having a capacity of 25 gal (95 L) or less are exempt from the above requirements, except that they must have an NPS  $\frac{3}{4}$  (DN 20) minimum drain valve.

(c) *Drain Valve.* Each steam or hot water boiler shall have one or more drain connections, fitted with valves or cocks. These shall be connected at the lowest



(4) When the assembled modular boiler is certified as a single boiler in accordance with HG-530.3(b), the safety valve required on each module by HG-716(a)(2) (-a) and HG-716(a)(3)(-a) may be replaced by one or more safety valves located on the supply header.

Capacity, lb (kg) of steam/hr [Note (1)]	(DN)
Up to 500 (225)	$\frac{3}{4}$ (20)
501 to 1,250 (225 to 550)	1 (25)
1,251 to 2,500 (550 to 1 200)	$1\frac{1}{4}$ (32)
2,501 to 6,000 (1 200 to 2 700)	$1\frac{1}{2}$ (40)
6,001 (2 700) and larger	2 (50)

## NOTE:

(1) To determine the discharge capacity of safety relief valves in terms of Btu, the relieving capacity in lb of steam/hr is multiplied by 1,000.

practicable point on the boiler, or to the lowest point on piping connected to the boiler, at the lowest practicable point on the boiler. The minimum size of the drain piping, valves, and cocks shall be NPS  $\frac{3}{4}$  (DN 20). The discharge piping shall be full size to the point of discharge. When the blowoff connection is located at the lowest water containing space, a separate drain connection is not required.

(d) *Minimum Pressure Rating.* The minimum pressure rating of valves and cocks used for blowoff or drain purposes shall be at least equal to the pressure stamped on the boiler but in no case less than 30 psi (200 kPa). The temperature rating of such valves and cocks shall not be less than 250°F (120°C).

## HG-716 MODULAR BOILERS

### (a) Individual Modules

(1) The individual modules shall comply with all the requirements of Part HG, except as specified in HG-607, HG-615, and this paragraph. The individual modules shall be limited to a maximum input of 400,000 Btu/h (gas), 3 gal/hr (11 L/hr) (oil), or 117 kW (electricity).

(2) Each module of a steam heating boiler shall be equipped with

- (-a) safety valve, see HG-701
- (-b) blowoff valve, see HG-715(a)
- (-c) drain valve, see HG-715(c)

(3) Each module of a modular hot water heating boiler shall be equipped with

- (-a) safety relief valve, see HG-701
- (-b) drain valve, see HG-715(c)

### (b) Assembled Modular Boilers

(1) The individual modules shall be manifolded together at the job-site without any intervening valves. The header or manifold piping is field piping and is exempt from Article 2, Part HG, HF, HB, or HC.

(2) The assembled modular steam heating boiler shall also be equipped with

- (-a) feedwater connection, see HG-705(a)
- (-b) return pipe connection, see HG-703.2

(3) The assembled modular hot water heating boiler shall also be equipped with

- (-a) makeup water connection, see HG-705(b)
- (-b) provision for thermal expansion, see HG-709
- (-c) stop valves, see HG-710.2

## HG-720 SETTING

Boilers of wrought materials of the wet-bottom type having an external width of over 36 in. (900 mm) shall have not less than 12 in. (300 mm) between the bottom of the boiler and the floorline, with access for inspection. When the width is 36 in. (900 mm) or less, the distance between the bottom of the boiler and the floorline shall be not less than 6 in. (150 mm), except that, when any part of the wet bottom is not farther from an outer edge than 12 in. (300 mm), this distance shall be not less than 4 in. (100 mm).

## HG-725 METHODS OF SUPPORT

### HG-725.1 Loadings.

(a) The design and attachment of lugs, hangers, saddles, and other supports shall take into account the stresses due to hydrostatic head in determining the minimum thicknesses required. Additional stresses imposed by effects other than working pressure or static head, which increase the average stress by more than 10% of the allowable working stress, shall also be taken into account. These effects include the weight of the component and its contents, and the method of support.

(b) In applying the requirements of (a) above, localized stresses due to concentrated support loads, temperature changes, and restraint against dilation of the boiler due to pressure shall be provided for. Lugs, hangers, brackets, saddles, and pads shall conform satisfactorily to the shape of the shell or surface to which they are attached or are in contact.

**HG-725.2 Boilers Over 72 in. (1 800 mm) in Diameter.** A horizontal-return tubular boiler over 72 in. (1 800 mm) in diameter shall be supported from steel hangers by the outside-suspension type of setting, independent of the furnace wall. The hangers shall be so designed that the load is properly distributed.

**HG-725.3 Boilers Over 54 in. (1 400 mm) up to 72 in. (1 800 mm) in Diameter.** A horizontal-return tubular boiler over 54 in. (1 400 mm) and up to and including 72 in. (1 800 mm) in diameter shall be supported by the outside-suspension type of setting, or at four points by not less than eight steel brackets set in pairs, the brackets of each pair to be spaced not over 2 in. (50 mm) apart and the load to be equalized between them. [see Figure HG-725(a).]

**HG-725.4 Boilers up to 54 in. (1 400 mm) in Diameter.** A horizontal-return tubular boiler up to and including 54 in. (1 400 mm) in diameter shall be supported by the outside-suspension type of setting, or by not less than two steel brackets on each side.

## NONMANDATORY APPENDIX E TERMINOLOGY

### E-100 TERMS RELATING TO DESIGN

*action, popping, or pop:* the action of a safety or safety relief valve when it opens under steam pressure. The disk of the valve is designed so that the force of the steam lifting the disk is increased when the disk is lifted slightly off its seat. The increase in force accelerates the rising action of the disk to the wide open position at or near the opening pressure.

*blowdown:* the difference between the opening and closing pressures of a safety or safety relief valve.

*boiler, automatically fired:* a boiler equipped with a means of introducing heat or of causing fuel, whether solid, liquid, gaseous, or electric, to be introduced into the boiler or boiler furnace, the means being so regulated by the rate of flow, the generating pressure, or temperature of the boiler fluid or of a vessel or space being heated as to maintain a determined, desired condition within a designated tolerance.

*boiler, electric, resistance heating element type:* electric boilers of the resistance heating element type are either:

(a) of a design where the electric resistance element is directly attached to the external surface of the pressure vessel; or

(b) an immersed type where the electric resistance element is inserted through an opening in the pressure vessel so that the element is in direct contact with the water.

*boiler, horizontal-return tubular:* a firetube boiler consisting of a cylindrical shell, with tubes inside the shell attached to both end closures. The products of combustion pass under the bottom half of the shell and return through the tubes.

*boiler, hot water heating:* a boiler designed to heat water for circulation through an external space heating system.

*boiler, hot water supply:* a boiler used to heat water for purposes other than space heating.

*boiler, modular:* a steam or hot-water heating assembly consisting of a grouping of individual boilers called modules, intended to be installed as a unit, with no intervening stop valves between the modules, with a single inlet and a single outlet. Modules may be under one jacket or may be individually jacketed. The individual modules shall be limited to a maximum input of 400,000 Btu/hr (117 kW) (gas), 3 gph (11 L/h) (oil), or 115 kW (electric).

*boiler, steam heating:* a boiler designed to convert water into steam that is supplied to an external space heating system.

*boiler, vacuum:* a factory-sealed steam boiler that is operated below atmospheric pressure.

*bottom blowoff valve:* a valve or cock located in the bottom blowoff connection of a boiler that, when opened, permits free passage of scale and sediment during the blowoff operation.

*column, fluid relief:* that piping, connected to the top of a hot water heating boiler, which is provided for the thermal expansion of the water. It will connect to either an open or a closed expansion tank.

*drain valve:* a valve or cock located in a boiler connection that, when opened, will drain the lowest water space practicable.

*electric boiler, submerged electrode type:* a submerged electrode type electric boiler incorporates a design wherein two or more metallic electrodes are directly suspended in the boiler water. When a source of electric power is connected to the electrodes, current will flow between the electrodes and through the water, thus raising the temperature of the water to produce steam.

*feedwater:* water introduced into a boiler during operation. includes makeup and return condensate or return water.

*flue:* passage through which gases pass from the combustion chamber or furnace to the venting system.

*furnace:* that part of a boiler in which combustion of fuel takes place or in which primary furnace gases are conveyed.

*gases, primary furnace:* gases in a zone where the anticipated temperature of the gas exceeds 850°F (450°C).

*joints, swing:* threaded, flanged, welded, or brazed pipe and fittings so arranged that the piping system that they comprise, when connected to a boiler, can expand and contract without imposing excessive force on it.

*makeup water:* water introduced into the boiler to replace that lost or removed from the system.

## View Component Record# 16-2067

\* Required field

## A. Record Information

<b>1. Record#</b>	<b>2. Primary Committee Responsible</b>	<b>3. Record Level</b>	<b>4. Record Sub-Type *</b>
16-2067	BPV IV SG WB	Administratively Board Approved	Revision

## Committees Involved in This Record

## 5. Board

## Boards Included

Board on Pressure Technology C&amp;S

## 6. Standards Committee

BPV IV

## 7. Sub-Tier Committee

None

## 8. Record Established:

08/23/2016

## 9. Last Updated By:

EisenbergG

## 10. Last Updated On:

11/30/2016

## B. Record Description

## 1. Subject \*

Clarification of requirements for Modular Boilers

## 2. Proposal

Revise requirements for Modular Boilers in HG-330, HG-530, HG-607, HG-615, HG-710, HG-716 and E-100.

## 3. Explanation \*

This item is a spin off on interpretation item 16-413. The interpretation proposed under item 16-413 failed under letter ballot 16-999. Item 16-413 proposed to allow certification of modular boilers as one boiler with a single data report and one Code nameplate covering the entire assembly. The interpretation failed largely due to the feeling that the words in the Code, although they do not prohibit what the inquiry allowed, do not clearly permit it either. To avoid making rules by interpretation, this item was taken out to revise the rules for modular boilers to clarify the rules for certification of modular boilers and add additional details for how that affects the required trim items on individual modules. Additional details are being proposed based on input from Conference Committee members to clarify requirements for inspection openings and accessibility to nameplate stamping. Lastly the current limit of 400,000 Btu/hr limit per module in HG-716 is being deleted.

## 4. Summary of Changes

Add HG-330.6 to clarify accessibility requirements for inspection openings on modules  
 Add HG-530.3 to clarify stamping and certification options for modular boilers  
 Add HG-607(c) to allow a single steam gage when the modular boiler is certified as a single boiler  
 Add HG-710.4 to clarify stop valves for modular boilers  
 Delete the 400,000 Btu/hr input limit for individual modules  
 Add 716(c) to allow a single set of relief valves on the outlet header for modular boilers certified as a single boiler  
 Revise definition of modular boiler in E-100

## C. File Attachments

## 1. Proposal File

(1243KB) [View Current Proposal File](#) - 11-9-16 Proposal

## 2. Background Material File

None

## 3. Committee Correspondence File

None

View/Manage File Attachments

[How to view downloads in Edge browser](#)**D. Project Administrative Manager****1. Staff Contact**

Carlton Ramcharran  
 ramcharranc@asme.org  
 1(212) 591-7955

**2. Staff Notes**

None

**E. Record Creator**

Peter Molvie  
[pmolvie@wi.rr.com](mailto:pmolvie@wi.rr.com)  
 1(262)251-0250

**F. Project Technical Manager****1. Project Manager \***

Molvie, Peter  
[pmolvie@wi.rr.com](mailto:pmolvie@wi.rr.com)  
 1(262)251-0250

**2. Project Manager Notes**

Revised proposal from 8-24-16 BPV IV meeting uploaded.  
 Revised proposal with editorial corrections to address LB2897 comments posted.

**G. Sub-Tier Committee Level****1. Original Inquirer Contact Information**

None

**2. Project Team Name**

None

**3. Project Team Members**

None

**4. Subcommittee Item History**

BPV IV -11/09/16: motion approved to proceed with Recirculation ballot.

BPV IV - 08/24/2016: motion approved to proceed with 1st consideration IV ballot.

**H. Additional Committee information****1. Codes Affected by Proposed Revision**

BPVC-IV

**2. Related Committee Records**

None

**3. Proposal Keywords**

Certification  
 Pressure Relief  
 Scope - General Requirements

**4. Secondary Committee[s] w/Related Actions**

Pending Committees	Committees Responded
None	None

**5. Type (Nuclear Only)**

None

**6. Text of Subordinate Group Negatives****7. Subordinate Group Action Date****8. Exception to CSP-38**

**I. Additional Standards Committee information****1. Standards Committee Description 1**

None

**2. Standards Committee Action 1**

None

**3. Committee Action Date 1**

None

**4. Standards Committee Description 2**

None

**5. Standards Committee Action 2**

None

**6. Committee Action Date 2**

None

**7. Addenda/Edition Year**

2017

**J. Editor Input****1. Editor Acceptance of Proposed Revision Attachment**

N/A

**2. Editorial Review****(Activated only if ItemLevel = Board Approved)**

Has not yet been reviewed by the editor for publication

**3. Editor Notes**

Editor's Fields Last Updated By:

**K. Latest Ballot**

Ballot#: 16-2897RC2

Ballot Level: Standards Committee

Final Record Status: Approved

Date Opened: 11/15/16

Date Closed: 11/30/16

Record Status Date: 11/30/2016

Description:

Boiler and Pressure Vessel Committee on Heating Boilers (BPV IV) Recirculation ballot 16-2897RC2 – November 9, 2016 Meeting endorsed items

Voting Results:

This BPV IV Committee Recirculation ballot has closed with the approval of all included items. The voting tally for all items is identical and is shown below:

approved: 13

disapproved: 0

abstained: 0

not voting: 0

not returned: 0

All the items included in this ballot therefore are considered BPV IV Committee approved and will proceed to the Board on PTCS for procedural review and approval.

**Comments & Negatives Posted for Ballot#: 16-2897RC2****L. Ballot History****1. Board Ballot History****Final Record Status:** Approved**Date Issued:** 11/30/16

**Administratively Board Approved.** This record is without any unresolved consensus committee disapproved votes, substantive supervisory board comments, or public review objections. As per Paragraph 7.2.6 of the ANSI Accredited Procedures, a Board Procedural Review Ballot is not required.

**2. Standards Committee Ballot History**Ballot#: 16-2897RC2 **Please click on the Ballot# button to view comments / negatives for this ballot.**

Ballot Level: Standards Committee

Final Record Status: Approved

Date Opened: 11/15/16

Date Closed: 11/30/16

Record Status Date: 11/30/2016

Description:

Boiler and Pressure Vessel Committee on Heating Boilers (BPV IV) Recirculation ballot 16-2897RC2 – November 9, 2016 Meeting endorsed items

Voting Results:

This BPV IV Committee Recirculation ballot has closed with the approval of all included items. The voting tally for all items is identical and is shown below:

approved: 13  
disapproved: 0  
abstained: 0  
not voting: 0  
not returned: 0

All the items included in this ballot therefore are considered BPV IV Committee approved and will proceed to the Board on PTCS for procedural review and approval.

Ballot#:  [Please click on the Ballot# button to view comments / negatives for this ballot.](#)

Ballot Level: Standards Committee

Final Record Status: Disapproved

Date Opened: 09/14/16

Date Closed: 10/21/16

Record Status Date: 10/21/2016

Description:

Boiler and Pressure Vessel Committee on Heating Boilers (BPV IV) 1st Consideration Ballot – August 2016 Meeting Ballot # 1 - Approval of August 24, 2016 meeting endorsed items

Voting Results:

This BPV IV Standards committee ballot has closed with approval of item 12-631, 12-632 and 12-633. All other items received comments or disapproved votes and required additional review. The rest of the items will be included in the November 2016 meeting Agenda for review and discussion.

Item 12-631, 12-632 and 12-633 will proceed to the Board for procedural review and approval.

### 3. SC Ballot History

None

### M. ANSI Level

1. BSR-8 Record#:

2. Date Submitted: 11/18/16

3. Designation: ASME BPVC Section IV - 20XX

4. Start Date: 12/02/16

5. End Date: 01/16/17

6. BSR-9 Record#:

7. Date Submitted: 03/16/17

8. Designation: ASME BPVC Section IV - 20XX

9. ANSI Approval Date: 04/11/17

### N. Publications Level

Publication Event

Date

Minimum Site Requirements: [IE 6.0+](#) • [Firefox 2.0+](#) • [Chrome 4.0+](#)

## Action Item Request Form

### 8.3 CODE REVISIONS OR ADDITIONS

Existing Text: NBIC PART

#### Action Item NB16-0102 from cycle B

##### 1.6.9 TESTING AND ACCEPTANCE

a) The completed boiler/ pressure vessel shall be pressure tested in the shop and/or in the field in accordance with the original code of construction.

b) The installer shall exercise care during installation to prevent loose weld material, welding rods, small tools, and miscellaneous scrap metal from getting into the vessel. Prior to making the final closure the installer shall inspect the interior of the vessel and its appurtenances for the presence of foreign debris.

c) Subject to the jurisdictional requirements, an operational pressure test may be performed on any components whose pressure test is not documented under the items' Manufacturer's Data Report. This pressure test should not exceed 90% of the lowest pressure relief device setpoint. The test data shall be recorded and the data made available as required. This operational test may be used as the final acceptance of the unit.

#### b) Statement of Need

Provide a brief explanation of the need for the revision or addition.

As a jurisdiction I used Paragraph 2.10.4 to allow us to require controls and safety device operational testing on **all** HP boilers. Our Jurisdiction, Michigan, did adopt CSD-1 and the testing required in it but CSD-1 stopped at 12,500,000 Btu/hr. for HP boilers.

The NBIC Part 1 has been pretty much silent on initial control and safety device testing when any PRI installation is completed.

##### **2.10.4 SYSTEM TESTING (current 2017 Part 1 wording)**

Prior to final acceptance, an **operational** test shall be performed on the complete installation. The test data shall be recorded and the data made available to the jurisdictional authorities as evidence that the installation complies with the provisions of the governing code(s) of construction. This operational test may be used as the final acceptance of the unit.

I researched this paragraph back to its entry into the NBIC 2001/2003 addenda and the wording is identical to the 2017 2.10.4 paragraph without mentioning pressure.

c) 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.

I suggest to the Committee to add a paragraph d)

d) All operating control systems and safety devices shall be tested by a person familiar with the equipment and qualified to do such tasks. The test data shall be recorded and the data made available to the jurisdiction, and inspector, as required.

**Action Item NB16-0102 from cycle B**

**1.6.9 TESTING AND ACCEPTANCE**

a) The completed boiler/ pressure vessel shall be pressure tested in the shop and/or in the field in accordance with the original code of construction.

b) The installer shall exercise care during installation to prevent loose weld material, welding rods, small tools, and miscellaneous scrap metal from getting into the vessel. Prior to making the final closure the installer shall inspect the interior of the vessel and its appurtenances for the presence of foreign debris.

c) Subject to the jurisdictional requirements, an operational pressure test may be performed on any components whose pressure test is not documented under the items' Manufacturer's Data Report. This pressure test should not exceed 90% of the lowest pressure relief device setpoint. The test data shall be recorded and the data made available as required. This operational test may be used as the final acceptance of the unit.

d) Prior to final acceptance, an operational test shall be performed on the completed installation. The test shall include operating controls, limit controls and safety devices. The test data shall be recorded and the data made available to the jurisdictional authorities as evidence that the installation complies with the provisions of the governing code(s) of construction.



**National Board of Boiler and Pressure Vessel Inspectors**  
**National Board Inspection Code**  
**Submission of Public Review Comment**  
**2019 Draft Edition**

PLEASE SUBMIT ONLY ONE COMMENT/RECOMMENDATION PER PAGE  
 Make additional copies as needed

**Comments Must be Received No Later Than: October 15, 2018**

*Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.*

Date: Sep. 10, 2018

Commenter Name: Alex Garbolevsky

Commenter Address: Hartford Steam Boiler  
One State St., 8th Flr., Hartford, CT 06102-5024

Commenter Phone: (860) 722-5098

Commenter Fax: none

Commenter Email: alex\_garbolevsky@hsb.com

Section/Subsection Referenced: NBIC Part 1, 1.6.3 (NB16-0905)

Comment/Recommendation: *Proposed Solution:*  New Text  Revise Text  Delete Text

Comment: Not all pressure vessels are fired or electrically heated. Would it be more appropriate to use "fired or electrically heated pressure vessels" rather than "pressure vessels" in this text?

Source:  Own Experience/Idea  Other Source/Article/Code/Standard \_\_\_\_\_

**Submit Form To:** Jonathan Ellis, NBIC Secretary, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, email: [jellis@nationalboard.org](mailto:jellis@nationalboard.org)

**NB Use Only**

Commenter No. Issued: \_\_\_\_\_ Project Committee Referred To: \_\_\_\_\_

Comment No. Issued: \_\_\_\_\_ \_\_\_\_\_

18-96

NB16-0905

## a) Proposed Revisions or Additions

Existing Text: **NBIC PART 1 2017 Approved Draft**

## 1.6.3

Two means of exit shall be provided for equipment rooms exceeding 500 sq. ft. (46.5 sq. m) of floor area and containing one or more boilers having a combined fuel capacity of 1,000,000 Btu/hr (293 kW) or more (or equivalent electrical heat input). Each elevation shall be provided with at least two means of exit, each to be remotely located from each other. A platform at top of a single boiler, **heater**, vessel is not considered an elevation.

## b) Statement of Need

Need is to bring a fired appliance such as a potable water heater into the combined fuel capacity for the equipment room.

## c) Proposed Changes

## 1.6.3

Two means of exit shall be provided for equipment rooms exceeding 500 sq. ft. (46.5 sq. m) of floor area and containing one or more boilers, **potable water heaters, thermal fluid heaters and pressure vessels** having a combined fuel capacity of 1,000,000 Btu/hr (293 kW) or more (or equivalent electrical heat input). Each elevation shall be provided with at least two means of exit, each to be remotely located from each other. A platform at **the** top of a single boiler, **potable water** heater, **thermal fluid heater and pressure** vessel is not considered an elevation.

**National Board of Boiler and Pressure Vessel Inspectors  
National Board Inspection Code  
Submission of Public Review Comment  
2019 Draft Edition**

PLEASE SUBMIT ONLY ONE COMMENT/RECOMMENDATION PER PAGE  
Make additional copies as needed

**Comments Must be Received No Later Than: October 15, 2018**

*Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.*

Date: Sep. 10, 2018

Commenter Name: Alex Garbolevsky

Commenter Address: Hartford Steam Boiler  
One State St., 8th Flr., Hartford, CT 06102-5024

Commenter Phone: (860) 722-5098

Commenter Fax: none

Commenter Email: alex\_garbolevsky@hsb.com

Section/Subsection Referenced: NBIC Part 1, 1.6.9 (NB16-0101)

Comment/Recommendation: *Proposed Solution:*  New Text  Revise Text  Delete Text

Comment: Does this also apply to "potable water heaters" and "thermal fluid heaters" which are not specifically mentioned?

Source:  Own Experience/Idea  Other Source/Article/Code/Standard \_\_\_\_\_

**Submit Form To:** Jonathan Ellis, NBIC Secretary, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, email: jellis@nationalboard.org

**NB Use Only**  
Commenter No. Issued: \_\_\_\_\_ Project Committee Referred To: \_\_\_\_\_  
Comment No. Issued: \_\_\_\_\_

Item Number: NB16-0101	NBIC Location: Part 1	No Attachment
<p><b>General Description:</b> Result of NB13-1101, address carbon monoxide sensors in equipment rooms</p> <p><b>Subgroup:</b> Installation</p> <p><b>Task Group:</b> E. Wiggins (PM), G. Halley, S. Konopacki, T. Creacy, T. Millette, B. Moore, P. Schuelke, R. Smith, M. Washington</p> <p><b>History:</b> The task group is working to develop a proposal to present to the committee in January 2018.</p>		

While the requirement of CO sensors in equipment rooms is generally covered by the NFPA, Fire Code, Local Building and Mechanical codes, I believe we would be remiss by not addressing this issue in the NBIC. It is my proposal to insert a new subsection and paragraph in **Part 1, Section 1, 1.6.8 Chimney or Stack** and before **1.6.9 Final Acceptance** to address CO sensors in equipment rooms.

#### 1.6.9 Carbon Monoxide (CO) Detector/Alarm

The owner or user shall install a carbon monoxide (CO) detector/alarm in equipment rooms where fuel fired boilers and/or fuel fired pressure vessels are located in accordance with the authority having Jurisdiction.