



*THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS*

NATIONAL BOARD INSPECTION CODE SUBCOMMITTEE PRESSURE RELIEF DEVICES

AGENDA

Meeting of July 12th, 2023
St. Louis, MO

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

The Chair will call the meeting to order at 8:00 a.m. Central Time. For those attending in person, the meeting will be held in Commissioner's Boardroom at the hotel.

2. Announcements

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

3. Awards/Special Recognition

Mr. Brandon Nutter and Mr. Thakor Patel – 10 Years as members of SC PRD

4. Adoption of the Agenda

5. Approval of Minutes from the January 11, 2023 Meeting

The minutes can be found on the NBIC Committee Information page under the Inspection Code tab on NBBI.org.

6. Review of the Roster

a. Nominations

- i. Mr. Ray Ceccarelli (AIA) is interested in becoming a member of Subgroup PRD.

b. Reappointments

- i. The following **Subgroup PRD** memberships are set to end prior to the January 2024 NBIC meeting: Mr. Kim Beise and Mr. Daniel Marek.
- ii. The following **Subcommittee PRD** memberships are set to end prior to the January 2024 NBIC meeting: Mr. Prakash Dhobi.

c. Resignations

d. Officer Selections

- i. Mr. Kim Beise's and Mr. Dan Marek's terms as Chair and Vice Chair of Subgroup PRD are set to end on July 30, 2023. The Subgroup will be nominating a new Chair and Vice Chair for the Subcommittee's approval.

7. Interpretation Requests

Item Number: 22-36	NBIC Location: Part 4, 4.2.2	Attachment Page 2
General Description: Use of Code Case 2787		
Task Group: None		
January 2023 Meeting Action: The proposed interpretation request was presented. A motion was made and seconded to accept the revised proposed question and reply. After discussion a vote was taken. The motion passed with 14 affirmative votes and 2 abstentions (Cox, Donalson).		

Item Number: 23-34	NBIC Location: Part 4, Supp. 6	Attachment Page 3
General Description: Sealing of Nuclear Class Relief Valves		
Task Group: None assigned.		
Explanation of Need: Provisions in NBIC Part 4 for "test only" activities do not provide direction for the periodic testing, adjustment and sealing of nuclear class valves. As the practice of involving the ANI is not described or sealing of a nuclear class valve without ANI witnessing is not explicitly prohibited the process of testing and sealing of nuclear class valves that were not repaired needs to be clarified.		
July 2023 Meeting Action:		

8. Action Items

Item Number: NB15-0305	NBIC Location: Part 4	No Attachment
General Description: Create Guidelines for Installation of Overpressure Protection by System Design.		
Task Group: B. Nutter, A. Renaldo, D. Marek (PM), D. DeMichael, J. Wolf, D. Schirmer		
January 2023 Meeting Action: A revised proposal incorporating comments from the previous letter ballot was presented as a progress report. This will be letter balloted to Subgroups Installation, Inspection, and PRD between meetings.		

Item Number: NB15-0307	NBIC Location: Part 4	Attachment Page 4
General Description: Create Guidelines for Repair of Pin Devices.		
Task Group: D. McHugh (PM), A. Renaldo, T. Tarbay, R. McCaffrey, Jay Simms, C. Beair, C. Chernisky		
January 2023 Meeting Action: This item will be letter balloted to Subgroup PRD between meetings.		

Item Number: NB15-0315	NBIC Location: Part 4, 2.5.6 and 2.6.6 and Part 1, 4.5.6 and 5.3.6	No Attachment
General Description: Review isolation Valve Requirements, and reword to allow installation of pressure relief devices in upstream piping.		
Task Group: D. DeMichael (PM), B. Nutter, A. Renaldo, D. Marek		
January 2023 Meeting Action: Work continues on this item. Part 4 text complete, will need to work on Part 1 text. Possible letter ballot to SG between meetings.		

Item Number: 19-83	NBIC Location: Part 4, Part 1	No attachment
General Description: Address alternate pressure relief valve mounting permitted by ASME CC2887-1.		
Task Group: D. Marek (PM), T. Patel, J. Ball		
January 2023 Meeting Action: A revised proposal incorporating comments from the previous letter ballot was presented as a progress report. This will be letter balloted to Subgroups Installation, Inspection, and PRD between meetings.		

Item Number: 20-85	NBIC Location: Part 4, 3.2.6, Part 2 2.5.8	Attachment Page 38
General Description: Add language to Part 4, 3.2.6 to define test intervals for thermal fluid heaters for PRD's		
Subgroup: PRD		
Task Group: B. Nutter (PM), T. Patel, D. Schirmer, J. Wolf		
Explanation of Need: Need to align Part 4 language with work done under Item 19-88.		
January 2023 Meeting Action: This item will be letter balloted to SG Inspection and PRD between meetings.		

Item Number: 21-08	NBIC Location: Part 4, S4.4	No attachment
General Description: Additional guidance for tank vent repairs		
Subgroup: PRD		
Task Group: D. DeMichael (PM), H. Cornett, B. Nutter, K. Beise, J. Grace		
Explanation of Need: The recently approved S4.4, "Weight Loaded Vents," (NB12-0901) provided new guidance for tank vent repairs. Several additional topics need to be addressed to enhance the guidance. These topics include: 1) Suggested test equipment and configuration for the prescribed tank vent testing. 2) Minimum requirements for replacement parts, 3) Guidance for painting tank vent components.		
January 2023 Meeting Action: Work continues on this item.		

Item Number: 21-36	NBIC Location: Part 4, 3.3.3.4 i)	No Attachment
General Description: Add Test Details to NBIC Part 4, 3.3.3.4 i) Valve Adjustment and Sealing		
Subgroup: PRD		
Task Group: D. Marek (PM), A. Cox, P. Dhobi, T. Patel		
Explanation of Need: There is no reference in the T/O requirements for Set Pressure Testing, use of proper Test Fluid or Seat Tightness unless and until a minor adjustment is required. This is surely the intent, but it is not clearly specified as it is in the current VR requirements.		
January 2023 Meeting Action: Work continues on this item.		

Item Number: 21-59	NBIC Location: Part 4, 3.2.6, Part 2, 2.5.8	No Attachment
<p>General Description: Deferral of inspection due dates (pressure relieving devices NBIC PART IV)</p> <p>Subgroup: PRD</p> <p>Task Group: T. Beirne (PM)</p> <p>Explanation of Need: Since the code has clearly recommended inspection frequency intervals for the different classes of pressure relief devices, it shall have the requirements related to the deferral of due dates. The inspection due date deferrals are usually not considered but in exceptional cases where operating plant may not be able to handover the device due to some practical limitations or the turnaround frequency of the plant is extended due to stakeholders' requirements etc. The owner is usually ensuring that a deferment is not posing any significant EHSS risk by proper risk analysis but a clarity from code on the minimum or maximum duration the device can be deferred will add a great value in decision making. There are some codes which have added deferment clauses such as API 510 but the NBIC is always having precedence in this subject and shall have statement added to its code.</p> <p>January 2023 Meeting Action: A motion was made and seconded to accept the proposal that was presented. After discussion a vote was taken and the motion unanimously passed. However, after the meeting adjourned Subcommittee Inspection was presented with this proposal and had comments that require revision. The proposal will be revised and letter balloted between meetings.</p>		

Item Number: 21-61	NBIC Location: Part 4, 3.3.4	Attachment Page 41
<p>General Description: Audit Requirements for the T/O holder</p> <p>Subgroup: PRD</p> <p>Task Group: A. Donaldson (PM), A. Cox, J. Simms, P. Dhobi, T. Tarbay, D. Marek</p> <p>Explanation of Need: Opened as a result of a Subgroup PRD ballot comment from item 21-05 (Shop audits for VR certificate holders). The comment recommended adding requirements specifically for organizations that are T/O only.</p> <p>January 2023 Meeting Action: This item will be letter balloted to SG PRD between meetings.</p> <p>Update: The attached proposal was approved by the Subgroup via letter ballot.</p>		

Item Number: 21-62	NBIC Location: Part 4, 4.8.5.4 i) 3)	No Attachment
<p>General Description: Verification of existing spring during repair activities</p> <p>Task Group: A. Donaldson (PM), B. Nutter, E. Creaser, P. Dhobi, T. Patel, J. Simms, J. Grace, D. Gonzales, T. Cardy</p> <p>Explanation of Need: This requirement has created an administrative requirement that potentially prevents a VR Stamp holder from applying the "VR" stamp to valves they have repaired. The requirement is negatively impacting owners, and jurisdictions that enforce the NBIC Part 4. This clause introduces a unique requirement in the BPV industry to confirm that code material in a Code stamped item be verified and traceable at all time after the item is ASME code stamped but the verification can only be provided by the manufacturer. Historically, any valve received or worked on that was sealed by a VR Stamp holder or in the case of an initial repair the ASME assembler was deemed to be Code compliant, and no further verification was needed recognizing the validity and continuity of the ASME and VR quality programs. It is clearly understood that if a spring, or any other critical part is deemed necessary to be replaced during a repair the manufactures verification is required and justifiable.</p> <p>January 2023 Meeting Action: A motion was made and seconded to accept the presented proposal. After discussion the motion was withdrawn and the item will be reworked in the task group.</p>		
Item Number: 22-08	NBIC Location: Part 4, 2.4.1.6 & 2.4.4.2; Part 1, 3.9.1.6 & 3.9.4.2	No Attachment
<p>General Description: Review and improve guidance for T&P valve installation relating to probe.</p> <p>Subgroup: PRD</p> <p>Task Group: D. Marek (PM), J. Ball, J. Wolf, T. Clark</p> <p>Explanation of Need: Existing text refers to location of valve connection and does not give guidance that the temperature probe needs to be located in the hottest water in the tank for the valve to actuate at the specified temperature.</p> <p>January 2023 Meeting Action: Work continues on this item</p>		
Item Number: 22-09	NBIC Location: Part 4, 4.6.1	No Attachment
<p>General Description: Add language to NBIC Part for valves manufactured to Code Case 2787</p> <p>Subgroup: PRD</p> <p>Task Group: A. Donaldson (PM), R. Donalson, B. Nutter, T. Tarbay, J. Simms</p> <p>Explanation of Need: There are no requirements to address valve repairs that were manufactured or assembled to Code Case 2787 (use of more than one certified capacity on the pressure relief valve or the nameplate).</p> <p>January 2023 Meeting Action: Work continues on this item</p>		

Item Number: 22-15	NBIC Location: Part 4, 2.4.5 and Part 1, 3.9.5	Attachment Page 44
<p>General Description: What is the meaning of "service limitations" as used in Part 4, 2.4.5?</p> <p>Subgroup: PRD</p> <p>Task Group: T. Beirne (PM), B. Nutter, T. Clark</p> <p>Explanation of Need: Part 4, 2.4.5 (also Part 1, 3.9.5) references "service limitations set forth in Part 1, 3.2, Definitions" when establishing pressure relief requirements for tanks and heat exchangers. Part 1, 3.2 points readers to the glossary. As "service limitations" is not itself defined within the glossary, and the term does not appear elsewhere in the code, what specific service limitations are being referenced?</p> <p>January 2023 Meeting Action: This item will be letter balloted to Subgroups Installation and PRD between meetings</p>		

Item Number: 22-16	NBIC Location: Part 4, 2.4.4 and Part 1, 3.9.4	Attachment Page 50
<p>General Description: Allow the use of pressure relief valves on potable water heaters.</p> <p>Subgroup: PRD</p> <p>Task Group: D. Sullivan (PM), J. Ball, T. Clark</p> <p>Explanation of Need: ASME Section IV, Part HLW-800.1 allows the use of pressure relief valves in place of temperature and pressure relief valves on potable water heaters. NBIC Parts 1 and 4 specifically require temperature and pressure relief valves, which is not consistent with the code of construction. Some manufacturers are shipping HLW stamped potable water heaters with pressure relief valves. Often the physical construction of these units is such that a temperature and pressure relief valve cannot be accommodated.</p> <p>January 2023 Meeting Action: This item will be letter balloted to Subgroups Installation and PRD between meetings</p>		

Item Number: 22-20	NBIC Location: Part 4, 4.7.4	No Attachment
<p>General Description: Inspection and testing of PRV's located above isolation valves.</p> <p>Subgroup: PRD</p> <p>Task Group: D. Marek (PM), K. Beise, J. Ball, E. Creaser, H. Cornett, A. Renaldo</p> <p>Explanation of Need: Add requirement to make sure the internals of a PRV inlet and outlet are inspected when it is tested, and require tests to be done with a pressure vessel with volume.</p> <p>January 2023 Meeting Action: Work continues on this item.</p>		

9. New Business

Item Number: 23-18	NBIC Location: Part 4, 4.2.2	Attachment Page 53
General Description: Revision and clarification of Part 4, 4.2.2 for use of ASME Code Cases		
Subgroup: PRD		
Task Group: A. Donaldson (PM)		
Explanation of Need: 4.2.2 requires revision to clarify how ASME Code Cases are applied in the repair and conversion of pressure relief devices. Revision is also necessary to remove the requirement that the NBIC Main Committee adopt individual ASME Code Cases before they may be used in Jurisdictions that have adopted them. The current wording does not allow conversion of a device to no-longer comply with an ASME Code Case.		
July 2023 Meeting Action:		

Item Number: 23-31	NBIC Location: Part 4, 3.2.5 d) 5) and Part 2, 2.5.7 d) 5)	Attachment Page 54
General Description: Testing of liquid service valves to be water or other suitable liquid		
Subgroup: PRD		
Task Group: None assigned.		
Explanation of Need: The intent is that liquid service valves be tested on liquid. The term fluid can mean either liquid or vapor.		
July 2023 Meeting Action:		

Item Number: 23-32	NBIC Location: Part 4, 3.3 and Supp. 6	No Attachment
General Description: Rules for T/O activities related to Nuclear Class Valves		
Subgroup: PRD		
Task Group: None assigned.		
Explanation of Need: Nuclear facilities that perform repair and T/O activities would by allowing them to use T/O for nuclear class valves that were serviced but not in need of repair but need to be set and sealed again.		
July 2023 Meeting Action:		

10. Presentations

None

11. Future Meetings

- January 8-1, 2024 – Charlotte, NC
- July 2024 – TBD

12. Adjournment

Respectfully Submitted,

Robert Viers
Secretary, Subgroup Pressure Relief Devices

 Subcommittee Pressure Relief Devices

Last Name	First Name	Interest Category	Role	Exp. Date	More
Renaldo	Adam	Users	Chair	01/30/2026	Details
Simms	Jay	Manufacturers	Vice Chair	01/30/2026	Details
Viers	Robert		Secretary	12/30/2099	Details
Beise	Kim	National Board Certificate Holders	Member	01/30/2026	Details
Cox	J. Alton	General Interest	Member	01/30/2025	Details
Creaser	Eben	Jurisdictional Authorities	Member	07/30/2025	Details
DeMichael	Denis	Users	Member	07/30/2024	Details
Dhobi	Prakash	National Board Certificate Holders	Member	07/30/2023	Details
Donaldson	Alfred	Manufacturers	Member	01/30/2026	Details
Marek	Daniel	General Interest	Member	01/30/2025	Details
McHugh	David	National Board Certificate Holders	Member	01/30/2026	Details
Nutter	Brandon	National Board Certificate Holders	Member	01/30/2025	Details
Patel	Thakor	Manufacturers	Member	01/30/2025	Details
Schirmer	Delton	Authorized Inspection Agencies	Member	01/30/2026	Details
Sullivan	David	Jurisdictional Authorities	Member	07/30/2025	Details
Wolf	Jon	Authorized Inspection Agencies	Member	01/30/2026	Details

PROPOSED INTERPRETATION

Item No. 22-36
Subject/Title Use of Code case 2787 in Repairs
Project Manager and Task Group
Source (Name/Email) Alfred Donaldson / alfred.donaldson@bakerhughes.com
Statement of Need Code Case 2787 was approved by ASME to allow a manufacturer to develop valves that will work on multimedia applications without any required adjustments. These valves may have different components and will have multiple certified capacities. As these valves are entering the marketplace, some customers are requesting that their existing valves get converted to the multimedia type valves. This request would allow the NBIC Committee to adopt the Code Case for us in the VR program in accordance with NBIC Part 4.2.2 and allow the VR holder to convert a valve to a multimedia design that has more than one certified capacity on the valve nameplate.
Background Information This is a Part 4 issue but the system only shows Part 1 & 2
Proposed Question Under the provisions of paragraph 4.2.2, is it permissible to apply Code Case 2787 and convert a pressure relief valve by adding more than one certified capacity on the pressure relief valve or nameplate?
Proposed Reply Proposed Reply: Yes, provided that the "VR" Certificate Holder verifies that: 1. All of the requirements of ASME Code Case 278 are met, and 2. That all of the requirements of the NBIC concerning conversions, and specifically paragraph 4.7.3 are met.
Committee's Question 1
Committee's Reply 1
Rationale
Committee's Question 2
Committee's Reply 2
Rationale

PROPOSED INTERPRETATION

Item No. 23-34
Subject/Title Sealing of Nuclear Class Relief Valves
Project Manager and Task Group
Source (Name/Email) Eben Creaser / eben.creaser@gnb.ca
Statement of Need Provisions in NBIC Part 4 for “test only” activities do not provide direction for the periodic testing, adjustment and sealing of nuclear class valves. As the practice of involving the ANI is not described or sealing of a nuclear class valve without ANI witnessing is not explicitly prohibited the process of testing and sealing of nuclear class valves that were not repaired needs to be clarified.
Background Information An owner user of a nuclear power plant having in-house repair program is mandated by the nuclear regulator to perform periodic set point verification and inspection of all relief valves both conventional and nuclear class. NBIC is not clear on the requirements for ANI involvement when a nuclear class valve has not been repaired but the seals were removed and the valve needs to be resealed.
Proposed Question When an ASME nuclear class valve has been removed from service to perform a periodic set point check and for the purposes of removal radiological contamination the seals on the valve need to be removed. Is it a requirement that the ANI is present for the testing and resealing of the valve if the valve was not disassembled, repaired, or adjusted.
Proposed Reply Yes
Committee's Question 1
Committee's Reply 1
Rationale
Committee's Question 2
Committee's Reply 2
Rationale

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ACCREDITATION PROGRAMS

The National Board administers four specific accreditation programs as shown below:

"R".....Repairs and Alterations to Pressure-Retaining Items (NB-415)

"VR".....Repairs to Pressure Relief Valves *and Pin Devices* (NB-514)

"NR".....Repair and Replacement Activities for Nuclear Items (NB-417)

"T/O".....Testing of Pressure Relief Valves (NB-528)

The administrative requirements for the accreditation for these accreditation programs can be viewed on the National Board Website at www.nationalboard.org.

The National Board also administers accredits four specific inspection agency programs as shown below:

New Construction

National Board Acceptance of Authorized Inspection Agencies (AIA) Accredited by the American Society of Mechanical Engineers (ASME) (NB-360)

PART 4, SECTION 1 PRESSURE RELIEF DEVICES — GENERAL AND ADMINISTRATIVE REQUIREMENTS

1.1 SCOPE

This Part provides guidelines and requirements for the installation, in-service inspection and testing, and repairs of pressure relief devices.

1.2 CONSTRUCTION STANDARDS FOR PRESSURE RELIEF DEVICES

- a) When the standard governing the original construction is the ASME Code, installation and repairs to pressure relief devices shall conform to the ASME Code section and edition most applicable to the work planned.
- b) If the pressure relief device was not constructed to the ASME Code, then installation, inspection and repair shall wherever possible reference the original code of construction most applicable to the work.
- c) If the pressure relief device was not constructed to any recognized construction code or standard, then installation, inspection, and repair shall reference a construction standard or specification most applicable to the work.
- d) Where this is not possible or practicable, it is permissible to use other codes, standards, or specifications, including the ASME Code, provided there is concurrence of the Inspector (if applicable) and the Jurisdiction where the pressure relief device is installed.

1.3 PRESSURE RELIEF DEVICES — DEFINITIONS

Refer to Section 9, *Glossary* for definitions relating to pressure relief devices.

1.3.1 ADDITIONAL DEFINITIONS RELATING TO PRESSURE RELIEF DEVICES

Unless otherwise specified in the NBIC, the definitions relating to pressure relief devices in Section 2 of ASME PTC-25 shall apply.

1.4 ACCREDITATION

- a) The National Board administers four specific accreditation programs:
 - “R” — Repairs and Alterations to Pressure-Retaining Items
 - “VR” — Repairs to Pressure Relief Valves and Pin Devices
 - “NR” — Repair and Replacement Activities for Nuclear Items
 - “T/O” — In-service Testing Only of Pressure Relief Valves
- b) Organizations performing repairs and in-service testing to pressure relief valves shall be accredited as described in this section, as appropriate for the scope of work to be performed.
- c) Organizations performing repairs and in-service testing to pressure relief valves outside the scope of the NBIC may be accredited and shall meet any additional requirements of the Jurisdiction where the work is performed.

1.4.1 ACCREDITATION PROCESS

- a) The National Board administers accreditation programs for authorization of organizations performing repairs and in-service testing to pressure relief valves and pin devices.
- b) Any organization may apply to the National Board to obtain a *Certificate of Authorization* for a requested scope of activities. A review shall be conducted to evaluate the organization's Quality System. The individual assigned to conduct the evaluation shall meet the qualification requirements prescribed by the National Board. Upon completion of the evaluation, any deficiencies within the organization's Quality System will be documented and a recommendation will be made to the National Board regarding issuance of a *Certificate of Authorization*.
- c) National Board procedures provide for the confidential review resulting in recommendations to issue or not issue a *Certificate of Authorization*.
- d) The accreditation program provides requirements for organizations performing repairs and in-service testing to pressure relief valves and pin devices. Depending upon the expected scope of activities at the time of review, organizations may be authorized to perform repairs and in-service testing either in the shop only, field only, or shop and field. Repair and in-service testing activities shall be limited to the scope of work authorized.
- e) Organizations desiring to renew or obtain a National Board *Certificate of Authorization* shall apply to the National Board using forms obtained from the National Board. Application for renewal shall be made prior to the expiration date of the *Certificate of Authorization*.
- f) When an organization has shops in more than one location, the organization shall submit separate applications for each shop. The organization may perform repairs in its shop or in the field, provided such operations are described in the organization's Quality System.

3.2.3 (Also Part 2, 2.5.4) INSPECTION REQUIREMENTS FOR INSTALLATION CONDITION

- a) Ensure all covers, caps, plugs, and/or lift lever wires utilized for shipping or transport are removed.
- b) Inlet piping shall be inspected to ensure it meets the requirements of the original code of construction. For pressure relief valves and pin devices certified for capacity, the inlet pipe shall be checked to ensure the inlet pipe size is not smaller than the device inlet size. This requirement is not applicable for flow resistance certified pin devices
- c) Discharge piping shall be inspected to ensure it meets the original code of construction. For pressure relief valves and pin devices certified for capacity, the discharge pipe shall be checked to ensure the discharge pipe size is not smaller than the device outlet size. This requirement is not applicable for flow resistance certified pin devices
- d) The ~~valve~~-drain piping shall be checked to ensure the piping is open.
- e) The discharge piping shall be checked to ensure it drains properly.
- f) The inlet and discharge piping shall be checked to ensure they are not binding or placing excessive stress on the pressure relief valve or pin device body, which can lead to distortion of the body and leakage or malfunction.
- g) The condition and adequacy of the pipe supports shall be inspected. Discharge piping should be supported independent of the device itself.
- h) The ~~valve~~-discharge and discharge pipe shall be checked for possible hazards to personnel.
- i) The installation shall be checked to ensure that there are no intervening isolation valves between the pressure source and the valve-pressure relief device inlet or between the valve-pressure relief device outlet and its point of discharge. Isolation valves may be permitted in some pressure vessel service. (See 2.5.6 e)), and Jurisdictional requirements. Isolation valves shall not be used for power boilers, heating boilers, or water heaters.
- j) A change-over valve, which is used to install two pressure relief devices on a single vessel location for the purpose of switching from one device to a spare device, is not considered a block valve if it is arranged such that there is no intermediate position that will isolate both pressure relief devices

- 8) Rupture disks are often used to isolate pressure relief valves from services where fouling or plugging of the valve inlet occurs. This tendency should be considered in establishing the inspection frequency.
- 9) Since rupture disks are non-reclosing devices, a visual inspection is the only inspection that can be performed. A rupture disk that is removed from its holder shall not be reinstalled unless recommended by the manufacturer. A rupture disk contained in an assembly that can be removed from a system without releasing the force maintaining the contact between the disk and holder, such as pre-torqued, welded, soldered, and some threaded assemblies, may be suitable for reinstallation after visual inspection. The manufacturer should be consulted for specific recommendations.
- 10) It is recommended that all rupture disks be periodically replaced to prevent unintended failure while in service due to deterioration of the device. Rupture disks should be carefully checked for damage prior to installation and handled by the disk edges, if possible. Any damage to the surface of the ruptured disk can affect the burst pressure.

3.2.5 (Also Part 2, 2.5.7) TESTING AND OPERATIONAL INSPECTION OF PRESSURE RELIEF DEVICES

- a) Pressure relief valves and pin devices shall be tested periodically to ensure that they are free to operate and will operate in accordance with the requirements of the original code of construction. Testing should include device set or opening pressure, reclosing pressure, where applicable, and seat leakage evaluation. Tolerances specified for these operating requirements in the original code of construction shall be used to determine the acceptability of test results.
- b) Testing may be accomplished by the owner on the unit where the valve is installed or at a qualified test facility. In many cases, testing on the unit may be impractical, especially if the service fluid is hazardous or toxic. Testing on the unit may involve the bypassing of operating controls and should only be performed by qualified individuals under carefully controlled conditions. It is recommended that a written procedure be available to conduct this testing.
 - 1) The Inspector should ensure that calibrated equipment has been used to perform this test and the results should be documented by the owner.
 - 2) If the testing was performed at a test facility, the record of this test should be reviewed to ensure the valve meets the requirements of the original code of construction. Valves which have been in toxic, flammable, or other hazardous services shall be carefully decontaminated before being tested. In particular, the closed bonnet of valves in these services may contain fluids that are not easily removed or neutralized. If a test cannot be safely performed, the valve shall be disassembled, cleaned, and decontaminated, repaired, and reset.
 - 3) If a valve has been removed for testing, the inlet and outlet connections should be checked for blockage by product buildup or corrosion.
- c) Valves may be tested using lift assist devices when testing at full pressure may cause damage to the valve being tested, or it is impractical to test at full pressure due to system design considerations. Lift assist devices apply an auxiliary load to the valve spindle or stem, and using the measured inlet pressure, applied load and other valve data allow the set pressure to be calculated. If a lift assist device is used to determine valve set pressure, the conditions of 4.6.3 shall be met. It should be noted that false set pressure readings may be obtained for valves which are leaking excessively or otherwise damaged.
- d) If valves are not tested on the system using the system fluid, the following test mediums shall be used:
 - 1) High pressure boiler pressure relief valves, high temperature hot-water boiler pressure relief valves, low pressure steam heating boilers: steam;
 - 2) Hot-water heating boiler pressure relief valves: steam, air, or water;

3.2.6 (Also Part 2, 2.5.8) RECOMMENDED INSPECTION AND TEST FREQUENCIES FOR PRESSURERELIEF DEVICES

Frequency of test and inspection of pressure relief devices for pressure vessel and piping service is greatly dependent on the nature of the contents, external environment, and operation of the system, therefore only general recommendations can be given. Inspection frequency should be based on previous inspection history. If, during inspection, ~~valves-devices~~ are found to be defective or damaged, intervals should be shortened until acceptable inspection results are obtained. Where test records and/or inspection history are not available, the following inspection and test frequencies are suggested:

3.2.6.1 ESTABLISHMENT OF INSPECTION AND TEST INTERVALS

Where a recommended test frequency is not listed, the valve-pressure relief device user and Inspector must determine and agree on a suitable interval for inspection and test. Some items to be considered in making this determination are:

- a) Jurisdictional requirements;
- b) Records of test data and inspections from similar processes and similar devices in operation at that facility;
- c) Recommendations from the device manufacturer. In particular, when the valve-pressure relief device includes non-metallic parts such as a diaphragm or soft seat, periodic replacement of those parts may be specified;
- d) Operating history of the system. Systems with frequent upsets where a valve-pressure relief device pressure has actuated require more frequent inspection;
- e) Results of visual inspection of the device and installation conditions. Signs of valve-pressure relief device leakage, corrosion or damaged parts all indicate more frequent operational inspections;
- f) ~~Installation of a valve in a system with a common discharge header. Valves~~ Pressure relief devices discharging into a common collection pipe may be affected by the discharge of other valves-devices by the corrosion of parts in the outlet portion of the valve-device or the buildup of products discharged from those valves-devices;
- g) Ability to coordinate with planned system shutdowns. The shutdown of a system for other maintenance or inspection activities is an ideal time for the operational inspection and test of a pressure relief device-valve;
- h) Critical nature of the system. Systems that are critical to plant operation or where the effects of the discharge of fluids from the system are particularly detrimental due to fire hazard, environmental damage, or toxicity concerns all call for more frequent inspection intervals to ensure devices are operating properly; and
- i) Where the effects of corrosion, blockage by system fluid, or ability of the valve-pressure relief device to operate under given service conditions are unknown (such as in a new process or installation), a relatively short inspection interval, not to exceed one year or the first planned shutdown, whichever is shorter, shall be established. At that time the device shall be visually inspected and tested. If unacceptable test results are obtained, the inspection interval shall be reduced by 50% until suitable results are obtained.

3.2.6.2 ESTABLISHMENT OF SERVICE INTERVALS

- a) The above intervals are guidelines for periodic inspection and testing. Typically, if there are no adverse findings, a pressure relief valve-device would be placed back in service until the next inspection. Any unacceptable conditions that are found by the inspection shall be corrected immediately by repair or replacement of the device. Many users will maintain spare pressure relief devices so the process or system is not affected by excessive downtime.

PART 4, SECTION 4

PRESSURE RELIEF DEVICES — REPAIR OF PRESSURE RELIEF VALVES AND PIN DEVICES~~VALVES~~

4.1 SCOPE

This section provides requirements and guidelines that apply to repairs to pressure relief valves and pin devices.

- a) Repairs may be required because of defects found during periodic inspection, testing, operation, or maintenance. Since pressure relief devices are provided for safety and the protection of personnel and property, repairs are often regulated by the Jurisdiction where the pressure relief device is installed. The Jurisdiction should be contacted for their specific requirements.
- b) This section describes some of the administrative requirements for the accreditation of repair organizations. Additional administrative requirements can be found in NB-514, *Accreditation of "VR" Repair Organizations*. Some Jurisdictions may independently administer a program of authorization for organizations to perform repairs within that Jurisdiction.
- c) Requirements for repairs and alterations to pressure-retaining items and repair and replacement activities for nuclear items can be found in NBIC Part 3.

4.2 GENERAL REQUIREMENTS

- a) Repair of a pressure relief valves or pin devices is considered to include the disassembly, replacement, re-machining, or cleaning of any critical part, lapping of a seat and disc, replace o-ring and seals reassembly, adjustment, testing, or any other operation that may affect the flow passage, capacity, function, or pressure-retaining integrity.
- b) Conversions, changes, or adjustments (excluding those as defined in 3.2.5.2 a) or Part 2 Paragraph 2.5.7.2.a)) affecting critical parts are also considered repairs. The scope of conversions may include changes in service fluid and changes such as bellows, soft seats, and other changes that may affect Type/Model number provided such changes are recorded on the document as required for a quality system and the repair nameplate. (See 4.7.1)
- c) The scope of repair activities shall not include changes in ASME Code status.

4.2.1 "VR" REPAIR

- a) When a repair is being performed under the administrative requirements for National Board Accreditation, a repair shall consist of the following operations as a minimum:
 - 1) Complete disassembly, cleaning, and inspection of parts, repair or replacement of parts found to be defective, reassembly, testing as required by 4.6, sealing and application of a repair nameplate. When completed, the pressure relief valve's or pin device's condition and performance shall be equivalent to the standards for new valves.
 - 2) The administrative requirements for National Board Accreditation apply only to valves that are marked with the ASME Certification Mark and the "V", "UV", "UD" (for pin devices) "HV", or "NV" Designator or the sup- planted ASME "V", "UV", "UD"(for pin devices) "HV" or "NV" Code symbol and have been capacity certified on the applicable fluid by the National Board.

4.2.2 CONSTRUCTION STANDARDS FOR PRESSURE RELIEF DEVICES

For pressure relief devices, the applicable new construction standard to be used for reference during repairs is the ASME Code. ASME Code Cases shall be used for repairs when they were used in the original

construction of the valve. ASME Code Cases may be used when they have been accepted for use by the NBIC Committee and the Jurisdiction where the pressure-retaining item is installed.

- a) For pressure relief devices, the Code Case number shall be noted on the repair document and, when required by the code case, stamped on the repair nameplate.
- b) The Jurisdiction where the pressure retaining item is installed shall be consulted for any unique requirements it may have established.

4.23 INSTALLATION OF PRESSURE RELIEF DEVICES

Installation of a pressure relief device by mechanical methods is not considered to be a repair, as long as no changes or adjustments are made to the device. Seals installed by the device manufacturer or repair organization shall not be removed when the device is installed.

When a pressure relief device is to be installed by welding on an existing pressure retaining item, the requirements of Part 3 of the NBIC for welded repairs shall be followed.

If a pressure relief valve or pin device must be disassembled or its adjustments changed as part of the installation process, the reassembly, resetting, retesting or other such activities shall be done by a qualified organization which meets the requirements of NBIC Part 4. For a new pressure relief valve or pin device, the original ~~valve~~-manufacturer shall perform this activity as required by the original code of construction.

The installation of a non-reclosing pressure relief device or the replaceable element of a non-reclosing pressure relief device such as a rupture disk or pin is not considered to be a repair. The manufacturer's procedures and instruction shall be followed for the installation of these devices.

4.24 INITIAL ADJUSTMENTS TO PRESSURE RELIEF VALVES AND PIN DEVICES

The initial installation testing and adjustments of a new pressure relief valve and pin device on a boiler or pressure vessel are not considered a repair if made by the manufacturer or assembler of the valve and pin device.

4.3 MATERIALS FOR PRESSURE RELIEF VALVE AND PIN DEVICE REPAIR

The materials used in making repairs shall conform to the requirements of the original code of construction. The "VR" Certificate Holder is responsible for verifying identification of existing materials from original data, drawings, or unit records and identification of the materials to be installed.

4.3.1 REPLACEMENT PARTS FOR PRESSURE RELIEF DEVICES

- a) Critical parts shall be fabricated by the pressure relief valve or pin device-manufacturer or to the manufacturer's specifications. Critical parts are those that may affect the valve flow passage, capacity, function, or pressure-retaining integrity.
- b) Critical parts not fabricated by the pressure relief valve or pin device manufacturer shall be supplied with material test certification for the material used to fabricate the part.
- c) Replacement critical parts receiving records shall be attached or be traceable to the pressure relief valve or pin device repair document (see 4.8.5.4 i)). These records shall conform to at least one of the following.
 - 1) Receiving records documenting the shipping origin of the part fabricated by the relief valve and pin device manufacturer (such as packing list) from the pressure relief valve and pin device-manufacturer or assembler of the pressure relief valve and pin device type.
 - 2) A document prepared by the "VR" Certificate Holder certifying that the replacement part used in the repair has the manufacturer's identification on the part or is otherwise labeled or tagged by the

manufacturer and meets the manufacturer's acceptance criteria (e.g., critical dimensions found in maintenance manual).

- 3) Receiving records for replacement critical parts obtained from a source other than the pressure relief valve or pin device valve manufacturer or assembler of the pressure relief valve or pin device valve type shall include a document that provides as a minimum:
 - a. The part manufacturer and part designation.
 - b. A certifying statement that either:
 1. The part was fabricated by the pressure relief valve and pin device valve manufacturer and meets the manufacturer's acceptance criteria (e.g., critical dimensions found in maintenance manual), or
 2. The part meets the manufacturer's specifications and was fabricated from material as identified by the attached material test report.
 - c. The signature of an authorized individual of the part source.
 - d. The name and address of the part source for whom the authorized individual is signing.
- d) Material for bolting shall meet the manufacturer's specification, but does not require material test certification if marked as required by the material specification.

4.4 WELDING FOR PRESSURE RELIEF VALVES AND PIN DEVICES

When welding is used as a repair technique during a pressure relief valve or pin device repair, the following requirements shall apply.

- a) Welding shall be performed in accordance with the requirements of the original code of construction used for the pressure relief valve or pin device.
- b) Cast iron and carbon or alloy steel having a carbon content of more than 0.35% shall not be welded.
- c) Defects in pressure relief valve and pin device parts such as cracks, pits, or corrosion that will be repaired by welding shall be completely removed before the weld repair of the part is performed. Removal of the defect shall be verified by suitable NDE as required.
- d) Consideration shall be given to the condition of the existing material, especially in the weld preparation area.

4.4.1 WELDING PROCEDURE SPECIFICATIONS

Welding shall be performed in accordance with Welding Procedure Specifications (WPS) qualified in accordance with the original code of construction. When this is not possible or practicable, the WPS may be qualified in accordance with Section IX of the ASME Code.

4.4.2 STANDARD WELDING PROCEDURE SPECIFICATIONS

A "VR" Certificate Holder may use one or more applicable Standard Welding Procedure Specifications shown in NBIC Part 3, 2.3.

4.4.3 PERFORMANCE QUALIFICATION

Welders or welding operators shall be qualified for the welding processes that are used. Such qualification shall be in accordance with the requirements of the original code of construction or Section IX of the ASME Code.

4.4.4 WELDING RECORDS

The "VR" Certificate Holder shall maintain a record of the results obtained in welding procedure qualifications, except for those qualifications for which the provisions of 4.4.2 are used, and of the results obtained in welding performance qualifications. These records shall be certified by the "VR" Certificate Holder and shall be available to the National Board.

4.4.5 WELDER'S IDENTIFICATION

The "VR" Certificate Holder shall establish a system for the assignment of a unique identification mark to each welder/welding operator qualified in accordance with the requirements of the NBIC. The "VR" Certificate Holder shall also establish a written procedure whereby welded joints can be identified as to the welder or welding operator who made them. This procedure shall use one or more of the following methods and shall be described in the quality control system written description. The welder's or welding operator's identification mark may be stamped (low stress stamp) adjacent to welded joints made by the individual, or the "VR" Certificate Holder may keep a documented record of welded joints and the welders or welding operators used in making the joints.

4.4.6 WELDER'S CONTINUITY

The performance qualification of a welder or welding operator shall be affected when one of the following conditions occur:

- a) When the welder or welding operator has not welded using a specific process during a period of six months or more, their qualifications for that process shall expire.
- b) When there is specific reason to question their ability to make welds that meet the specification, the qualification that supports the welding that is being performed shall be revoked. All other qualifications not questioned remain in effect.

4.4.7 WELD REPAIRS TO PRESSURE RELIEF VALVE AND PIN DEVICE PARTS BY AN "R" STAMP HOLDER

- a) The quality system manual may include controls for the "VR" Certificate Holder to have the pressure relief valve part repaired by a National Board "R" Certificate Holder, per this section provided the following documentation is provided to the "R" Certificate Holder:
 - 1) Code of construction, year built;
 - 2) Part identification;
 - 3) Part material specified; and
 - 4) "VR" Certificate Holder's unique identifier for traceability as required by the repair inspection program.
- b) Prior to performing weld repairs to pressure relief valve or pin device (PRV) parts, the "R" Certificate Holder shall receive repair information required by 4.4.7 a) from the "VR" Certificate Holder responsible for the pressure relief valve and pin device repair.
 - 1) Pressure relief valve and Pin Device PRV part weld repairs shall be performed under the "R" Certificate Holder's quality system; however, the requirements for in-process involvement of the Inspector (see Part 3, 2.2.2) may be waived. The requirement for stamping is waived.
 - 2) The process of identifying and controlling repairs shall be documented in the "R" Certificate Holder's quality system.

- 3) Pressure relief valve and Pin Device-PRV part repairs shall be documented on a Form R-1 with a statement under the "Remarks" section Pressure Relief Valve and Pin Device-PRV Part Repair. The owner's name and location of installation shall be that of the "VR" Certificate Holder. The information received from the "VR" Certificate Holder as required in 4.4.7 a) shall be noted under the "Description of Work" section.
- 4) Upon completion of the repair, the repaired part and completed Form R-1 shall be returned to the "VR" Certificate Holder responsible for completing the Pressure Relief Valve or Pin Device-PRV repair.

4.5 HEAT TREATMENT

4.5.1 PREHEATING

Preheating may be employed during welding to assist in completion of the welded joint in accordance with NBIC Part 3, 2.5.1. The need for and the temperature of preheat are dependent on a number of factors, such as chemical analysis, degree of restraint of the items being joined, material thickness, and mechanical properties. The welding procedure specification for the material being welded shall specify the preheat temperature requirements.

4.5.2 POSTWELD HEAT TREATMENT

Postweld heat treatment shall be performed as required by the original code of construction in accordance with a written procedure. The procedure shall contain the parameters for postweld heat treatment. A time and temperature report or temperature record shall be maintained to document the work performed.

4.6 PRESSURE RELIEF VALVE AN PIN DEVICE PERFORMANCE TESTING AND TESTING EQUIPMENT

Each pressure relief valve and pin device to which the "VR" repair symbol stamp is to be applied shall be subjected to the following tests by the repair Certificate Holder.

4.6.1 TEST MEDIUM AND TESTING EQUIPMENT

Valves marked for steam service, or having special internal parts for steam service, shall be tested on steam. Valves marked for air, gas, or vapor service shall be tested with air or gas. Valves marked for liquid service shall be tested with water or other suitable liquid. ASME Code, Section IV hot-water valves, shall be tested on water, steam, or air. Pin devices shall be tested in accordance the manufacturer's specified procedures and test media.

- a) Each pressure relief valve or pin device shall be tested to demonstrate the following:
 - 1) Set pressure (as defined by the ~~valve~~-manufacturer and as listed in NB-18, *Pressure Relief Device Certifications*);
 - 2) Response to blowdown, when required by the original code of construction;
 - 3) Seat tightness; and
 - 4) For pressure relief valves and pin devices designed to discharge to a closed system, the tightness of the secondary pressure zone shall be tested as required by the original code of construction.
- b) The equipment used for the performance testing prescribed above shall meet the following requirements:
 - 1) The performance testing equipment shall include a pressure vessel of adequate volume and

pressure source capacity to ensure compliance with 4.6.1 a) 1);

- 2) Prior to use, all performance testing equipment shall be qualified by the Certificate Holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment. This qualification may be accomplished by benchmark testing, comparisons to equipment used for verification testing as specified in the quality system, or comparisons to field performance. This qualification shall be documented. Documentation of this qualification shall be retained in accordance with Table 4.8.5.4 s). Documentation of this qualification shall include but not be limited to:
 - a. Schematic of the performance test equipment;
 - b. Size and pressure ranges of valves and pin devices to be tested and the test fluid to be used;
 - c. Dimensions of test vessels;
 - d. Accuracy of pressure measuring equipment;
 - e. Size and design type of valves used to control flow; and
 - f. Method of qualifying.
- 3) Prior to the implementation of any addition or modification to the testing equipment that would alter the contents of the document required in 4.6.1 b) 2), the Certificate Holder shall re-qualify the performance test equipment in accordance with 4.6.1 b) 2). If the equipment changed was used to satisfy the requirements of verification testing, the Certificate Holder shall notify the National Board and additional verification testing, in accordance with the quality system, may be required.

Commented [AC1]: You cannot TEST a Non-Reclosing PRD.
IS THIS GOING TO BE IN ACCORDANCE WITH ASME SEC VIII-1, UG-138(d)(4)?

Commented [CB2R1]: I hope I am not missing the point here - A non-reclosing "Buckling Pin" PRD can be manually closed and install a new pin for service or for VR testing.

Commented [CB3R1]:

4.6.2 OWNER-USER ASME CODE SECTION VIII STEAM TESTING

When ASME Code Section VIII valves are repaired by the owner for the owner's own use, valves for steam service may be tested on air for set pressure and, if possible, blowdown adjustment, provided the valve manufacturer's corrections for differential in set pressure between steam and air are applied to determine the test pressure as follows:

- a) The test pressure using air as the test medium shall be the product of the Manufacturer's correction factor for the differential between steam and air multiplied by the set pressure. If a cold differential test pressure is applicable due to superimposed back pressure and/or service temperature, then the manufacturer's correction factor shall be applied to the cold differential test pressure. The test pressure shall be recorded on the valve repair document described in 4.8.5.4 i).
- b) The correction factor between steam and air shall not be included in the cold differential test pressure marked on the valve repair nameplate per 4.7.2 b) 8).

4.6.3 LIFT ASSIST TESTING

- a) A device may be used to apply an auxiliary lifting load on the spring of a repaired valve to establish the set pressure in lieu of the tests required in 4.6.1 a) 1) when such testing at full pressure:
 - 1) May cause damage to the valve being tested; or
 - 2) Is impractical when system design considerations preclude testing at full pressure.
- b) While actual valve blowdown and valve performance characteristics cannot be verified using this testing technique, valve set pressure may be determined to an acceptable degree of accuracy if, as a minimum:
 - 1) Equipment utilized is calibrated as required in the quality system; including, but not limited to:
 - a. System pressure measurement equipment;
 - b. Lifting force measurement equipment; and

- c. Other measuring elements required by the device manufacturer.
- 2) the device and test procedures that have proved to give accurate results are used and followed;
- 3) A static inlet pressure is applied with the test medium specified in 4.6.1; and

- 4) Adjustments are made in accordance with the valve manufacturer's recommendations to ensure proper lift and blowdown.
- c) Prior to use, all lift assist devices shall be qualified by the Certificate Holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment used for verification testing as specified in the quality system or comparisons to field performance. This qualification shall be documented and provisions made to retain such documentation in accordance with Table 4.8.5.4 s). Documentation of this qualification shall include but not be limited to:
 - 1) A description of the lift assist device including model number, serial number and manufacturer;
 - 2) Size and pressure ranges of valves to be tested with the lift assist device and the test fluid to be used;

Note: Maximum set pressure is determined by available lift force and system pressure.

 - 3) Accuracy of pressure measuring equipment; and
 - 4) Method of qualifying.
- d) After initial qualification of the device the device shall be re-qualified if:
 - 1) Modifications or repairs to the device are made which would affect test results; or
 - 2) The manufacturer issues a mandatory recall or modification to the device which will affect test results.

Commented [AC4]: Insert space between "and" & "manufacturer."

4.6.4 PRESSURE TEST OF PARTS

- a) Parts used in repaired pressure relief valves and pin devices shall be pressure tested and documentation provided according to the following categories:
 - 1) Replacement Parts

The "VR" Certificate Holder is responsible for documentation that the appropriate pressure test has been completed as required by the original code of construction.
 - 2) Parts Repaired by Welding

These parts shall be subjected to a pressure test required by the original code of construction. The "VR" Certificate Holder shall be responsible for documentation of such test.
- b) Parts repaired by re-machining within part specifications, lapping, or polishing do not require a pressure test.

4.7 STAMPING REQUIREMENTS FOR PRESSURE RELIEF DEVICES

4.7.1 NAMEPLATES

Proper marking and identification of tested or repaired pressure relief valves and pin devices is critical to ensuring acceptance during subsequent inspections, and also provide for traceability and identification of any changes made to the pressure relief valve and pin device. All operations that require pressure relief valve's and pin device's seals to be replaced shall be identified by a nameplate as described in 4.7.2 or 4.7.4.


(19) 4.7.2 REPAIR NAMEPLATE

When a pressure relief valve and pin device is repaired, a metal repair nameplate stamped with the information required below shall be securely attached to the valve and pin device adjacent to the original manufacturer's stamping or nameplate. If not installed directly on the pressure relief valves and pin device the nameplate shall be securely attached to the valve and pin device independent of the external adjustment seals in a manner that does not interfere with valve and pin device operation and sealed in accordance with the quality system.

- a) Prior to attachment of the repair nameplate, the previous repair nameplate, if applicable, shall be removed from the repaired valve.
- b) As a minimum, the information on the pressure relief valve and pin device repair nameplate (see Figure 4.7.2-a) shall include:
 - 1) The name of the repair organization preceded by the words "repaired by";
 - 2) The "VR" repair symbol stamp and the "VR" certificate number;
 - 3) Unique identifier (e.g., repair serial number, shop order number, etc.);
 - 4) Date of repair;
 - 5) Set pressure;
 - 6) Capacity and capacity units (if changed from original nameplate due to set pressure or service fluid change)
 - 7) Type/Model number (if changed from original nameplate by a conversion. See 4.2); and
 - 8) When an adjustment is made to correct for service conditions of superimposed back pressure and/or temperature or the differential between popping pressure between steam and air (see 4.6.2), the information on the valve repair nameplate shall include the:
 - a. Cold Differential Test Pressure (CDTP); and
 - b. Superimposed Back Pressure (BP) (only when applicable).

FIGURE 4.7.2-a


REQUIRED MARKINGS FOR REPAIR OF ASME/NATIONAL BOARD "V," "UV," "UD" AND "HV"-STAMPED PRESSURE RELIEF VALVES AND PIN DEVICES

REPAIRED BY	_____	CERTIFICATE HOLDER
	_____	(1) TYPE/MODEL NUMBER
	_____	(1) SET PRESSURE CAPACITY
	_____	(1) (1) CDTP BP
	_____	REPAIR IDENTIFICATION
NATIONAL BOARD "VR" CERTIFICATE NUMBER	_____	DATE REPAIRED

Note: To be indicated only when changed.

FIGURE 4.7.2-b

REQUIRED MARKINGS FOR REPAIR OF NUCLEAR PRESSURE RELIEF VALVE AND PIN DEVICE

		_____
NATIONAL BOARD CERTIFICATE NOS.		CERTIFICATE HOLDER
_____		_____
		UNIQUE IDENTIFIER
_____	_____	_____
"NR"	"VR"	
SET PRESSURE		CAPACITY (IF CHANGE IN SET PRESSURE)

DATE OF REPAIR		

4.7.3 CHANGES TO ORIGINAL PRESSURE RELIEF VALVE AND PIN DEVICE NAMEPLATE INFORMATION

- a) If the set pressure is changed, the set pressure, capacity, and blowdown, if applicable, on the original nameplate or stamping shall be marked out but left legible. The new capacity shall be based on that for which the pressure relief valve or pin device was originally certified.
- b) If the service fluid is changed, the capacity, including units, on the original nameplate or stamping shall be marked out but left legible. The new capacity shall be based on that for which the pressure relief valve or pin device was originally certified, or if a conversion has been made, as described in 4.2 on the capacity certification for the pressure relief valve or pin device as converted. Similarly, the certified flow resistance for pin device shall be updated if effected by of change in service fluid.
- c) If the Type/Model number is changed, the Type/Model number on the original nameplate or stamping shall be marked out but left legible.
- d) If the blowdown is changed, the blowdown, if shown on the original nameplate or stamping, shall be marked out but left legible. The new blowdown may be based on the current ASME Code requirements.
- e) Repair organizations shall verify the Type/Model number, inlet size, set pressure, and capacity on the original nameplate or stamping that is not marked out. Incorrect information on the original manufacturer's nameplate or stamping shall be marked out but left legible. Corrected information shall be indicated on the repair nameplate and noted on the document as required by the quality system.

4.7.4 REPLACEMENT OF ILLEGIBLE OR MISSING NAMEPLATES

The VR Certificate Holder shall not perform repairs under the VR Program on any pressure relief valve (PRV) or pin device that cannot be positively identified by the manufacturer or through in-house sources. Such identification shall include the verification of the original ASME Stamping. Pressure relief valves or Pin Devices that have missing or illegible nameplates and can be positively identified shall be equipped with a nameplate marked "DUPLICATE", which contains all original nameplate data. The duplicate nameplate shall not bear the "NB" Mark or the ASME Certification Mark with the "V", "HV", or "UV" or "UD" Designator or the supplanted "V", "HV", or "UV" or "UD" Symbol. Instead, the nameplate shall be stamped "Sec. I", "Sec. IV", or "Sec. VIII", as applicable, to indicate the original stamping. Illegible nameplates, if applicable, shall not be removed.

4.8 ACCREDITATION OF “VR” REPAIR ORGANIZATIONS

4.8.1 SCOPE

- a) This section provides requirements that must be met for an organization to obtain a National Board *Certificate of Authorization* to use the “VR” Symbol Stamp for repair activities of pressure relief devices constructed in accordance with the requirements of the ASME Code.
- b) For administrative requirements to obtain or renew a National Board “VR” *Certificate of Authorization* and “VR” Symbol Stamp, refer to NB-514, *Accreditation of “VR” Repair Organizations*.

4.8.2 JURISDICTIONAL PARTICIPATION

The National Board member Jurisdiction in which the “VR” organization is located is encouraged to participate in the review and demonstration of the applicant’s quality system. The Jurisdiction may require participation in the review of the repair organization and the demonstration and acceptance of the repair organization’s quality system manual.

4.8.3 ISSUANCE AND RENEWAL OF THE “VR” CERTIFICATE OF AUTHORIZATION

4.8.3.1 GENERAL

Authorization to use the stamp bearing the official National Board “VR” symbol as shown in Figure 4.7.2-a, will be granted by the National Board pursuant to the provisions of the following administrative rules and procedures.

4.8.3.2 ISSUANCE OF CERTIFICATE

Repair organizations, manufacturers, assemblers, or users that make repairs to the ASME Code symbol stamped or marked pressure relief valves **and pin devices** and National Board capacity certified pressure relief valves **and pin devices** may apply to the National Board for a *Certificate of Authorization* to use the “VR” symbol.

4.8.4 USE OF THE “VR” CERTIFICATE OF AUTHORIZATION

4.8.4.1 TECHNICAL REQUIREMENTS

The administrative requirements of 4.8 for use of the “VR” stamp shall be used in conjunction with the technical requirements for valve repair as described in sections 4.1 through 4.7. Those requirements shall be mandatory when a “VR” repair is performed.

4.8.4.2 STAMP USE

Each “VR” symbol stamp shall be used only by the repair firm within the scope, limitations, and restrictions under which it was issued.

4.8.5 QUALITY SYSTEM

4.8.5.1 GENERAL

Each applicant for a new or renewed “VR” *Certificate of Authorization* shall have and maintain a quality system which shall establish that all of these rules and administrative procedures and applicable ASME Code requirements, including material control, fabrication, machining, welding, examination, setting, testing, inspection, sealing, and stamping will be met.

4.8.5.2 WRITTEN DESCRIPTION

A written description, in the English language, of the system the applicant will use shall be available for review and shall contain, as a minimum, the features set forth in 4.8.5.4. This description may be brief or voluminous, depending upon the projected scope of work, and shall be treated confidentially. In general, the quality system shall describe and explain what documents and procedures the repair firm will use to validate a valve repair.

4.8.5.3 MAINTENANCE OF CONTROLLED COPY

Each applicant to whom a “VR” *Certificate of Authorization* is issued shall maintain thereafter a controlled copy of the accepted quality system manual with the National Board. Except for changes that do not affect the quality system, revisions to the quality system manual shall not be implemented until such revisions are accepted by the National Board.

(19) 4.8.5.4 OUTLINE OF REQUIREMENTS FOR A QUALITY SYSTEM

The following establishes the minimum requirements of the written description of the quality system. It is required that each valve repair organization develop its own quality system that meets the requirements of its organization. For this reason it is not possible to develop one quality system that could apply to more than one organization. The written description shall include, as a minimum, the following features:

a) Title Page

The title page shall include the name and address of the company to which the National Board *Certificate of Authorization* is to be issued.

b) Revision Log

A revision log shall be included to ensure revision control of the quality system manual. The log should contain sufficient space for date, description and section of revision, company approval, and National Board acceptance.

c) Contents Page

The contents page shall list and reference, by paragraph and page number, the subjects and exhibits contained therein.

d) Statement of Authority and Responsibility

A statement of authority and responsibility shall be dated and signed by an officer of the company. It shall include:

- 1) A statement that the "VR" stamp shall be applied only to pressure relief valves and pin devices that meet both of the following conditions:
 - a. Are marked with the ASME Certification Mark and the "V", "UV", "HV", "UD" or "NV" Designator or the supplanted ASME "V", "UV", "HV", "UD" or "NV" Code symbol and have been capacity certified by the National Board; and

b.

Have been disassembled, inspected, and repaired by the Certificate Holder such that the pressure relief valves and pin devices condition and performance are equivalent to the standards for new pressure relief valves and pin devices.

- 2) The title of the individual responsible to ensure that the quality system is followed and who has authority and freedom to effect the responsibility;
- 3) A statement that if there is a disagreement in the implementation of the written quality system, the matter is to be referred to a higher authority in the company for resolution; and
- 4) The title of the individual authorized to approve revisions to the written quality system and the method by which such revisions are to be submitted to the National Board for acceptance before implementation.

e) Organization Chart

A chart showing the relationship between management, purchasing, repairing, inspection, and quality control personnel shall be included and shall reflect the actual organization in place.

f) Scope of Work

- 1) The scope of work section shall indicate the scope and type of valve repairs, including conversions the organization is capable of and intends to perform. The location of repairs (shop, shop and field, or field only), ASME Code Section(s) to which the repairs apply, the test medium (air, gas, liquid, or

steam, or combinations thereof), and special processes (machining, welding, postweld heat treatment, or nondestructive examination, or combinations thereof) shall be specifically addressed.

- 2) The types and sizes of valves to be repaired, pressure ranges and other limitations, such as engineering and test facilities, should also be addressed.

g) Drawings and Specification Control

The drawings and specification control system shall provide procedures assuring that the latest applicable drawings, specifications, and instructions required are used for valve repair, including conversions, inspection, and testing.

h) Material and Part Control

The material and part control section shall describe purchasing, receiving, storage, and issuing of parts.

- 1) The title of the individual responsible for the purchasing of all material shall be stated.
- 2) The title of the individual responsible for certification and other records as required shall be stated.
- 3) All incoming material and parts shall be checked for conformance with the purchase order and, where applicable, the material specifications or drawings. Indicate how material or part is identified and how identity is maintained by the quality system.

i) Repair and Inspection Program

The repair and inspection program section shall include reference to a document (such as a report, traveler, or checklist) that outlines the specific repair and inspection procedures used in the repair of pressure relief valves and pin devices. Repair procedures shall require verification that the critical parts meet the pressure relief valves and pin devices manufacturer's specification. Supplement 4 outlines recommended procedures covering some specific items. This document shall be retained in accordance with Table 4.8.5.4s).

- 1) Each pressure relief valves and pin devices or group of pressure relief valves and pin devices shall be accompanied by the document referred to above for processing through the plant. Each pressure relief valves and pin devices shall have a unique identifier (i.e., repair serial number, shop order number, etc.) appearing on the repair documentation and repair nameplate such that traceability is established.
- 2) The document referred to above shall describe the original nameplate information, including the ASME Code symbol stamping and the repair nameplate information, if applicable. In addition, it shall include material checks, replacement parts, conversion parts (or both), reference to items such as the welding procedure specifications (WPS), fit up, NDE technique, heat treatment, and pressure test methods to be used. Application of the "VR" stamp to the repair nameplate shall be recorded in this document. Specific conversions performed with the new Type/Model number shall be recorded on the document. There shall be a space for "signoffs" at each operation to verify that each step has been properly performed.
- 3) The system shall include a method of controlling the repair or replacement of critical pressure relief valves and pin devices parts. The method of identifying each spring shall be indicated on the repair document described in 4.8.5.4 i). Such identification shall be based on the Manufacturer's spring chart current at the time of the repair, except that the spring removed from the valve during the repair bearing different identification may be reinstalled provided the "VR" Certificate Holder has verified the spring is acceptable to the Manufacturer. Such verification shall be documented on the repair document described in 4.8.5.4 i).
- 4) The system shall also describe the controls used to ensure that any personnel engaged in the repair of pressure relief valves and pin devices are trained and qualified in accordance with this section.

j) Welding, NDE, and Heat Treatment (when applicable)

The quality system manual shall indicate the title of the person(s) responsible for and describe the system used in the selection, development, approval, and qualification of welding procedure specifications, and the qualification of welders and welding operators in accordance with the provisions of 4.4.

- 1) The quality system manual may include controls for the "VR" Certificate Holder to have the pressure relief valves and pin devices part repaired by a National Board "R" Certificate Holder, per 4.4.7.
- 2) The completed Form R-1 shall be noted on and attached to the "VR" Certificate Holder's document required in 4.8.5.4 i). Similarly, NDE and heat treatment techniques must be covered in the quality system manual. When outside services are used for NDE and heat treatment, the quality system manual shall describe the system whereby the use of such services meet the requirements of the applicable section of the ASME Code.

k) Pressure Relief valves and pin devices Testing, Setting, and Sealing

The system shall include provisions that each pressure relief valves and pin devices shall be tested, set, and all external adjustments sealed according to the requirements of the applicable ASME Code Section and the National Board. The seal shall identify the "VR" Certificate Holder making the repair. Abbreviations or initials shall be permitted, provided such identification is acceptable to the National Board.

l) Pressure relief valves and pin devices Repair Nameplates

An effective pressure relief valves and pin devices stamping system shall be established to ensure proper stamping of each pressure relief valves and pin devices as required by 4.7.2. The manual shall include a description of the nameplate or a drawing.

m) Calibration

- 1) The manual shall describe a system for the calibration of examination, measuring, and test equipment used in the performance of repairs. Documentation of these calibrations shall include the standard used and the results. Calibration records shall be retained in accordance with Table 4.8.5.4 s).
- 2) All calibration standards shall be calibrated against certified equipment having known valid relationships to nationally recognized standards.

n) Manual Control

The quality system shall include:

- 1) Measures to control the issuance of and revisions to the quality system manual;
- 2) Provisions for a review of the system in order to maintain the manual current with these rules and the applicable sections of the ASME Code;
- 3) The title(s) of the individual(s) responsible for control, revisions, and review of the manual;
- 4) Provision of a controlled copy of the written quality system manual to be submitted to the National Board; and
- 5) Revisions shall be submitted for acceptance by the National Board prior to being implemented.

o) Nonconformities

The system shall establish measures for the identification, documentation, evaluation, segregation, and disposition of nonconformities. A nonconformity is a condition of any material, item, product, or process in which one or more characteristics do not conform to the established requirements. These may include,

TABLE 4.8.5.4 s)

Reports, Records, or Documents for "VR" Certificate Holders	Instructions	Minimum Retention Period
Form "R" reports associated with a pressure relief valve that required welding as part of the repair	Record retention shall be in accordance with Part 3, Table 1.5.1	Refer to Part 3, Table 1.5.1
Record of repair or inspection	The repair and inspection program section shall include reference to a document (such as a report, traveler, or checklist) that outlines the specific repair and inspection procedures used in the repair of pressure relief valves <u>and pin devices</u>	5 years
Records related to equipment qualification and instrument calibration	Prior to use, all performance testing equipment shall be qualified by the certificate holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment. This qualification may be accomplished by benchmark testing, comparisons to equipment used for verification testing as specified in the quality system, or comparisons to field performance.	5 years after the subject piece of equipment or instrument is retired.
Record of lift assist device qualification	Prior to use, all lift assist devices shall be qualified by the certificate holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment used for verification testing as specified in the quality system or comparisons to field performance. This qualification shall be documented.	5 years after the lift assist device is retired.
Records of employee training and qualification	Each repair organization shall establish minimum qualification requirements for those positions within the organization as they directly relate to pressure relief valves <u>and pin devices</u> repair. Each repair organization shall document the evaluation and acceptance of an individual's qualification for the applicable position.	5 years after termination of employment.

4.8.6 FIELD REPAIR

Repair organizations may obtain a "VR" *Certificate of Authorization* for field repair, either as an extension to their in-shop/plant scope, or as a field-only scope, provided that:

- a) Qualified technicians in the employ of the Certificate Holder perform such repairs;
- b) An acceptable quality system covering field repairs, including field audits, is maintained; and
- c) Functions affecting the quality of the repaired valves are supervised from the address of record where the "VR" certification is issued.

4.8.6.1 AUDIT REQUIREMENTS

Upon issuance of a *Certificate of Authorization*, provided field repairs are performed, annual audits of the work carried out in the field shall be performed to ensure that the requirements of the Certificate Holder's quality system are met. The audit shall include, but not be limited to performance testing in accordance with 4.6 of valve(s) that were repaired in the field. The audits shall be documented.

4.8.6.2 USE OF OWNER OR USER PERSONNEL

For the repair of pressure relief valves and pin devices at an owner or user's facility for the owner or user's own use, the "VR" Certificate Holder may utilize owner or user personnel to assist Certificate Holder technician(s) in the performance of repairs provided:

- a) The use of such personnel is addressed in the "VR" Certificate Holder's quality system;
- b) The owner or user personnel are trained and qualified in accordance with Supplement 3;
- c) Owner or user personnel work under direct supervision and control of the "VR" Certificate Holder's technician(s) during any stage of the repair when they are utilized;
- d) The "VR" Certificate Holder shall have the authority to assign and remove owner or user personnel at its own discretion; and
- e) The names of the owner or user personnel utilized are recorded on the document as required for a quality system.

4.9 TRAINING AND QUALIFICATION OF PERSONNEL

4.9.1 CONTENTS OF TRAINING PROGRAM

The repair organization shall establish a documented in-house training program. This program shall establish training objectives and provide a method of evaluating training effectiveness. As a minimum, training objectives for knowledge level shall include:

- a) Applicable ASME Code and NBIC requirements;
- b) Responsibilities within the organization's quality system; and
- c) Knowledge of the technical aspects and mechanical skills for the applicable position held.

SUPPLEMENT 4

RECOMMENDED PROCEDURES FOR REPAIRING PRESSURE RELIEF VALVES

S4.1 INTRODUCTION

- a) It is essential that the repair organization establish basic, specific procedures for the repair of pressure relief valves and pin devices. The purpose of these recommended procedures is to provide the repair organization with guidelines for this important aspect of pressure relief valve and pin devices repair. It is realized that there are many types of pressure relief valves and pin devices and conditions under which they are repaired and, for this reason, the specific items in these recommended procedures may not apply, or they may be inadequate for each of those types or to the detailed repairs that may be required for each pressure relief valves and pin devices.
- b) Prior to removal, repair, or disassembly of a pressure relief valve and pin device ensure that all sources of pressure have been removed.
- c) S4.2 contains recommended procedures for the repair of spring-loaded pressure relief valves and pin devices and S4.3 contains recommended procedures for the repair of pilot operated types of pressure relief valves, S4.4 contains recommended procedures for the repair of pin devices. Information on packaging, shipping and transportation is included as S4.5.

S4.2 SPRING-LOADED PRESSURE RELIEF VALVES

- a) Visual inspection as received
 - 1) This information is to be recorded:
 - a. Record user (customer) identification number;
 - b. Complete original PRV nameplate data, previous repair nameplate data, plus any important information received from customer;
 - c. Check external adjustment seals for warranty repair;
 - d. Check bonnet for venting on bellows type valves; and
 - e. Check appearance for any unusual damage, missing, or misapplied parts.
 - 2) If sufficient damage or other unusual conditions are detected that may pose a safety risk during preliminary testing, then proceed directly to S4.2 c).
 - 3) Valves that are to be repaired in place proceed to S4.2 c) unless preliminary testing has been authorized by the owner.
- b) Preliminary test as received
 - 1) Information from the recommended preliminary performance test and subsequent disassembly and inspections will provide a basis for any repair interval change that should be necessary to ensure that the valve will function as intended.
 - 2) Determine set pressure or Cold Differential Test Pressure (CDTP) in accordance with manufacturer's recommendations and appropriate ASME Code Section. Do not allow test pressure to exceed 116% of set pressure unless otherwise specified by the owner. A minimum of three tests is usually required to obtain consistent results.
 - 3) If results do not correlate with field performance, then steps to duplicate field conditions (fluid and temperature) may be necessary.

- 4) Record preliminary test results and test bench identification data.

g) Nameplate

The repairer will place a repair nameplate on each repaired valve. The nameplate, as a minimum, shall meet the requirements of 4.7.1.

S4.4 Pin Devices:

Prior to removal of A pin device from a system for a repair or any disassembly, ensure that all sources of pressure have been removed from the pin device.

a) Visual inspection as received

1. This information is to be recorded:
 - a. Record user (customer) identification number.
 - b. Complete original pin device nameplate data, previous repair nameplate data, plus any important information received from customer.
 - c. Check tamper proof seals are intact.
 - d. Check bonnet top, columns and buckling pin screw for any damage or bending. Bent columns will result in a misalignment of the upper and lower pin holders and cause valve to malfunction and shall be removed from service.
2. Check appearance for any unusual damage, missing, or misapplied parts per manufacturers assembly drawing.
3. If sufficient damage or other unusual conditions are detected that may pose a safety risk during preliminary testing, then proceed directly to S4.4 c)
4. For Pin devices that are to be repaired in place, proceed to S4.4 c) unless preliminary testing has been requested by the owner.

b) Preliminary test as received

1. Information from the recommended preliminary performance test and subsequent disassembly and inspections will provide a basis for any repair interval change that should be necessary to ensure that the pin device will function as intended.
2. One of the following tests should be done on Pin Device.
 - a. Measure lift force to move plug from closed position to open position. This can be done with pull gage or by using pressure WITHOUT pin.. Repeat 3 times and record the data. Review with manufacturer's original data.
 - b. Reseat the plug fully into seat following manufacturer guidelines. Some manufacturers supply a tool for this purpose. This usually can be done by turning the adjuster Buckling Pin Screw on top by hand. If this cannot be done by hand, apply a torque wrench onto the pin adjuster hex and measure the torque required to fully seat. Compare the required torque to seat with manufacturer's original data.
 - c. Conduct one(1) set pressure tests using the manufacturer's pin designated for this specific valve. Do not allow test pressure to exceed 110% of set pressure unless otherwise specified by the owner.
3. If test results from S4.4b) 2 are outside the manufacturer's recommendation, and set pressure tests are outside the ASME limits or agreed upon tolerance as stated on tag, proceed to S4.4 c) Disassembly.
4. Record test results and test bench identification data.

c) Disassembly

1. Remove Buckling Pin Protective Cage(screen), if applicable

Commented [AC5]: *Is this for a PIN Device?*

Commented [AC6]: *Is this for a PIN Device?*

2. Prior to any disassembly, ensure that the plug is re-seated following manufacturer guidelines . Reseating may require torque wrench as specified in S4.4b)2.a Once seated, remove any gag or shipping pin if applicable.

Commented [AC7]: manufacturer

3. Remove the required seals on bonnet flange bolts, if applicable.

3.4. 4. Remove the bonnet flange bolts.

5. Remove the bonnet "Flange Assembly - with bonnet flange, columns, upper pin holder top and buckling pin adjuster screw". Lift the bonnet Flange Assembly straight up vertically using a strap on the upper pin holder top.
6. Remove the bonnet/plug assembly out of seat using thread or nut on top of plug assembly. Be careful not to damage top of plug assembly where buckling pin sets.
 - a. As the plug assembly is lifted out of body, handle the assembly carefully and lay it on clean surface. Be careful to not damage plug seat area during this step.
7. Remove the plug from the bonnet. Inspect all seals and replace per manufacturer's instructions. Check bonnet bore for cleanliness and for wear and scratches. In the event there is minor scratches you may polish this bore. Pay special attention as not to remove material from this bore as this is a critical dimension.
8. Remove plug seat, if applicable, in body and clean and replace seals per manufacturer's instructions.

d) Cleaning

1. Clean Adjusting screw or holding nut.
2. Thoroughly clean all small parts (Caution: do not use a cleaning method that will damage the parts.)
3. Do not clean in a chemical solution except under acceptable circumstances.
4. Protect seating surfaces and nameplates prior to cleaning.
5. Clean inside of valve body as needed.

e) Inspection

1. Check all parts for corrosion
2. Check nozzle for cracks (NDE as applicable) or unusual wear.
3. Check plug and stem assembly for cracks (NDE as applicable) or unusual wear.
4. Check bonnet guide for wear
5. Check adjusting screw or holding nut free of galling or damage.
6. Check flange gasket facings for wear and cuts.
7. Check pin bearing points for fit and engagement.

f. Assembly

1. Intall the Seat to the body.
2. Install the plug back into bonnet with new seals and ensure plug is moving freely per manufacturer's instructions. If moving freely install nut on the piston/plug and set aside for reinstalling the assembly back onto the valve body.
3. Install bonnet plug assembly back into the body carefully

4. Make sure the plug is inserted and fully seated into the plug seat and moving freely after installing the bonnet flange and tightening up the flange studs. This is where centering is very important to get the free movement of plug inside the plug seat per manufacturer's instructions
5. Use pressure for measuring the open pressure without pin. The manufacturer to supply the original manufacturer's load or pressure measurements

g. Testing

1. Test data shall be recorded. Testing will be done in accordance with manufacturer's recommendations and appropriate ASME Code section. To preclude unsafe and unstable pin device valve operations or erroneous performance test results, it is recommended that low volume testing equipment (e.g., gas cylinders with- out a test vessel, hand pumps, tubing) should be avoided.

h. Sealing

1. After final adjusting and acceptance by quality control inspection, all external adjustments shall be sealed with a safety seal providing a means of identification of the organization performing the repair.

i. Nameplate

1. The repairer will place a repair nameplate on each repaired pin device valve. The nameplate shall, as a minimum, meet the requirements of 4.7.1.

j. Installation of new pin

a. For pin devices with shipping pins, with zero pressure on the inlet or outlet, the shipping pin shall be removed and replaced with pin tagged and traceable to the manufacturer and matches the set pressure, service and pin device valve name plate information.

b. Install pins that are straight and without any deflection, visual defect or damage. c. Ensure Pin device piston assembly moves freely without excessive resistance or force.

d. Piston assemble will be reseated and pin installed per manufacturer recommendations.

S4.54 — PACKAGING, SHIPPING AND TRANSPORTATION OF PRESSURE RELIEF DEVICES

- a) The improper packaging, shipment, and transport of pressure relief devices can have detrimental effects on device operation. Pressure relief devices should be treated with the same precautions as instrumentation, with care taken to avoid rough handling or contamination prior to installation.
- b) The following practices are recommended:
 - 1) Pressure relief valves and applicable pin devices Valves should be securely fastened to pallets in the vertical position to avoid side loads on guiding surfaces except threaded and socket-weld pressure relief valves and pin device valves up to NPS 2 (DN 50) may be securely packaged and cushioned during transport.
 - 2) Pressure relief valves and pin devices inlet and outlet connection, drain connections, and bonnet vents should be protected during shipment and storage to avoid internal contamination of the valve. Ensure all covers and/or plugs are removed prior to installation.
 - 3) The pressure relief valves and pin devices should not be picked up or carried using the lifting lever. Lifting levers should be wired or secured so they cannot be moved while the valve is being shipped or stored. These wires shall be removed before the valve is placed in service.
 - 4) Pilot valve tubing should be protected during shipment and storage to avoid damage and/or

Commented [AC8]: *Is this in accordance with UG-138(d)(4)? Will the VR Shop need to do the multiple PIN Tests?*

Commented [CB9R8]: Yes

Commented [CB10R8]:

Commented [AC11]: *Is this for Pin Devices?*

Commented [CB12R11]: Yes, this is for Pin Devices. However, I do not understand the issue with low volume test equipment and how this can produce unsafe or unstable operations or erroneous performance results. These tests are done in the VR shop.

Commented [CB13R11]:

Commented [CB14R11]:

Commented [AC15]: *Is this for a Pin Device?*

Commented [CB16R15]: Yes

Commented [CB17R15]:

Commented [AC18]: *Is this in Lieu of actual testing of the Device? If so, I do NOT agree. There is NO test performed.*

Commented [CB19R18]: No, this installation instruction is for installing a new buckling pin for service. The term "piston assembly" is the term used for reseating the valve prior to installing a new pin for service. If the valve seat is dirty or the plug is not aligned properly, this will affect the operation of the PRD.

Commented [CB20R18]:

Commented [AC21]: *Is this for a PIN Device?*

Commented [CB22R21]: Yes

Commented [CB23R21]:

breakage.

- 5) **Pressure relief valves and pin devices** for special services, including but not limited to oxygen, chlorine, and hydrogen peroxide, should be packaged in accordance with appropriate standards and/or owner procurement requirements.

National Board Commissioned Inspector — An individual who holds a valid and current National Board Commission.

NBIC — The *National Board Inspection Code* published by The National Board of Boiler and Pressure Vessel Inspectors.

Nuclear Items — Items constructed in accordance with recognized standards to be used in nuclear power plants or fuel processing facilities.

Original Code of Construction — Documents promulgated by recognized national standards writing bodies that contain technical requirements for construction of pressure-retaining items or equivalent to which the pressure-retaining item was certified by the original manufacturer.

Overfire Air — Air admitted to the furnace above the grate surface /fuel bed. Used to complete the combustion of fine particles, in suspension. Also aids in reducing NOx formation.

Owner or User — As referenced in lower case letters means any person, firm, or corporation legally responsible for the safe operation of any pressure-retaining item.

Owner-User Inspection Organization — An owner or user of pressure-retaining items that maintains an established inspection program, whose organization and inspection procedures meet the requirements of the National Board rules and are acceptable to the Jurisdiction or Jurisdictional Authority wherein the owner or user is located.

Owner-User Inspector — An individual who holds a valid and current National Board Owner-User Commission.

Piecing — A repair method used to remove and replace a portion of piping or tubing material with a suitable material and installation procedure.

Pilot Operated Pressure Relief Valve — A pressure relief valve in which the disk is held closed by system pressure, and the holding pressure is controlled by a pilot valve actuated by system pressure.

Pin Device: A pin device is a nonreclosing pressure relief device actuated by inlet static or differential pressure and designed to function by the activation of a load bearing section of a pin that supports a pressure-containing member. A pin is the load bearing activation component of a pin device its crosssectional area is not limited to a circular shape. A pin device body is the structure that encloses the pressure-containing members.

Pin Device – Capacity Certified: Pin device certified in accordance with ASME BPVC Section XIII par 9.7.3 thru 9.7.6.

Pin Device – Flow Resistance certified: Pin device certified in accordance with ASME BPVC Section XIII par. 9.7.7

Plate Heat Exchanger (PHE) — An assembly of components consisting of heat transfer plates and their supporting frame. The frame provides structural support and pressure containment and may consist of fixed endplates, moveable endplates, an upper carrying bar and lower guide bar which provide plate alignment, and frame compression bolts.

Pneumatic Test — A pressure test which uses air or another compressible gas as the test medium.

Potable Water Heaters — A corrosion resistant appliance that includes the controls and safety devices to supply potable hot water at pressure not exceeding 160 psig (1,100 kPa) and temperature not in excess of 210°F (99°C).

Fired Storage Water Heater — A potable water heater in which water is heated by electricity, the combustion of solid, liquid, or gaseous fuels and stores water within the same appliance.

Indirect Fired Water Heater — A potable water heater in which water is heated by an internal coil or heat exchanger that receives its heat from an external source. Indirect fired water heaters provide water

shortened until acceptable inspection results are obtained. Where test records and/or inspection history are not available, the following inspection and test frequencies are suggested:

TABLE 3.2.6

(21)

Service	Inspection Type/Frequency
Power boilers less than 400 psi (2.76 MPa)	Lift lever test every six months, set pressure test annually or prior to planned boiler shutdown
Power boilers 400 psi (2.76 MPa) or greater	Set pressure test every three years or prior to planned boiler shutdown
High-temperature hot water boilers (See Note 1)	Set pressure test annually
Low-pressure steam heating boilers	Lift lever test quarterly, set pressure test annually prior to heating season
Organic Fluid Vaporizers	Remove, inspect, and set pressure test annually
Hot water heating boilers (See Note 2)	Lift lever test quarterly, set pressure test annually prior to heating season
Water heaters (See Note 3)	Lift lever test every two months, remove and inspect temperature probe for damage, buildup or corrosion every three years.
Pressure vessels/piping-steam service	Set pressure test annually
Pressure vessels/piping-air/clean, dry gas	Set pressure test every three years
Pressure vessels/piping-propane/refrigerant	Set pressure test every five years
Pressure relief valves in combination with rupture disks	Set pressure test every five years
All Others	Per inspection history

Note 1:

For safety reasons, removal and testing on a steam test bench is recommended. Such testing will avoid damaging the pressure relief valve by discharge of a steam water mixture, which could occur if the valve is tested in place.

Note 2:

The frequencies specified for the testing of pressure relief valves on boilers is primarily based on differences between high pressure boilers that are continuously manned, and lower pressure automatically controlled boilers that are not monitored by a boiler operator at all times. When any boiler experiences an overpressure condition such that the pressure relief valves actuate, the valves should be inspected for seat leakage and other damage as soon as possible and any deficiencies corrected.

Note 3:

The temperature probe shall be checked for the condition of the coating material and freedom of movement without detaching. If the probe pulls out or falls off during inspection, the valve shall be repaired or replaced. Due to the relatively low cost of temperature and pressure relief valves for this service, it is recommended that a defective valve be replaced with a new valve if a repair or resetting is indicated.

Thermal fluid heaters

| Remove, inspect, and set pressure test annually



acceptable inspection results are obtained. Where test records and/or inspection history are not available, the inspection frequencies in Table 2.5.8 are suggested.

(21) **TABLE 2.5.8**

Service	Inspection Frequency
Power boilers less than 400 psi (2.76 MPa)	Lift lever test every six months, set pressure test annually or prior to planned boiler shutdown
Power boilers 400 psi (2.76 MPa) or greater	Set pressure test every three years or prior to planned boiler shutdown
High-temperature hot water boilers (See Note 1)	Set pressure test annually
Low-pressure steam heating boilers	Lift lever test quarterly, set pressure test annually prior to heating season
Organic Fluid Vaporizers	Remove, inspect, and set pressure test annually
Hot water heating boilers (See Note 2)	Lift lever test quarterly, set pressure test annually prior to heating season
Water heaters (See Note 3)	Lift lever test every two months, remove and inspect temperature probe for damage, buildup or corrosion every three years.
Pressure vessels/piping-steam service	Set pressure test annually
Pressure vessels/piping-air/clean, dry gas	Set pressure test every three years
Pressure vessels/piping-propane/refrigerant	Set pressure test every five years
Pressure relief valves in combination with rupture disks	Set pressure test every five years
All others	Per inspection history

Note 1:

For safety reasons, removal and testing on a steam test bench is recommended. Such testing will avoid damaging the pressure relief valve by discharge of a steam water mixture, which could occur if the valve is tested in place.

Note 2:

The frequencies specified for the testing of pressure relief valves on boilers is primarily based on differences between high pressure boilers that are continuously manned, and lower pressure automatically controlled boilers that are not monitored by a boiler operator at all times. When any boiler experiences an overpressure condition such that the pressure relief valves actuate, the valves should be inspected for seat leakage and other damage as soon as possible and any deficiencies corrected.

Note 3:

The temperature probe shall be checked for the condition of the coating material and freedom of movement without detaching. If the probe pulls out or falls off during inspection, the valve shall be repaired or replaced. Due to the relatively low cost of temperature and pressure relief valves for this service, it is recommended that a defective valve be replaced with a new valve if a repair or resetting is indicated.

2.5.8.1 ESTABLISHMENT OF INSPECTION AND TEST INTERVALS

Where a recommended test frequency is not listed, the valve user and Inspector must determine and agree on a suitable interval for inspection and test. Some items to be considered in making this determination are:

- a) Jurisdictional requirements;

Thermal fluid heaters | Remove, inspect, and set pressure test annually

FOR REFERENCE ONLY (NOT PART OF THIS ACTION ITEM)

Excerpt from Item 19-88 (MC Approved)

Revision Date: January 6, 2021

2.2.12.7 THERMAL FLUID HEATERS

c) Inspection

- f. Pressure relief valves — Pressure relief valves shall be a closed bonnet design with no manual lift lever. Pressure relief valves shall be periodically tested by a VR or T/O Certificate Holder with a frequency in accordance with jurisdictional requirements or an initial frequency of 1 year or less. Testing intervals shall be evaluated and may be adjusted based on inspection history up to a maximum of 3 years. The pressure relief valve installation shall meet the requirements of NBIC Part 4, 2.3. Inspection and testing of the pressure relief valve shall meet the requirements of NBIC Part 4, 3.0.

3.3.3.4 OUTLINE OF REQUIREMENTS FOR A QUALITY SYSTEM

o) Field Testing

If field testing is included in the scope of work, the system shall address any differences or additions to the quality system required to properly control this activity, including the following:

~~1) Provisions for annual audits of field activities shall be included;~~

2)1) Provisions for use of owner-user measurement and test equipment, if applicable, shall be addressed.

TABLE 3.3.3.4 P)

Reports, Records, or Documents for "T/O" Certificate Holders	Instructions	Minimum Retention Period
a) Record of testing or inspection	The testing and inspection program section shall include reference to a document (such as a report, traveler, or checklist) that outlines the specific testing and inspection procedures used in the testing of pressure relief valves.	5 years
b) Records related to equipment qualification and instrument calibration	Prior to use, all performance testing equipment shall be qualified by the certificate holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment. This qualification may be accomplished by benchmark testing, comparisons to equipment used for verification testing as specified in the quality system, or comparisons to field performance.	5 years after the subject piece of equipment or instrument is retired.
c) Record of lift assist device qualification	Prior to use, all lift assist devices shall be qualified by the certificate holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment used for verification testing as specified in the quality system or comparisons to field performance. This qualification shall be documented.	5 years after the lift assist device is retired.
d) Records of employee training and qualification	Each testing organization shall establish minimum qualification requirements for those positions within the organization as they directly relate to pressure relief valve testing. Each testing organization shall document the	5 years after termination of employment.

	evaluation and acceptance of an individual's qualification for the applicable position.	
e) Records of audits of the Quality Program	The testing organization shall audit the Quality System on an annual basis. Audit results and exceptions shall be documented and any exclusions shall be noted.	5 Years

3.3.4 TESTING & ADJUSTMENT

- a) Each Pressure Relief Valve to be tested shall be inspected in accordance with Section 3.2.2.
- b) Pressure Relief Valves with missing or illegible nameplates shall not be tested under the T/O program and shall be referred to a "VR" Certificate Holder or replaced.
- c) Pressure Relief Valves shall be tested to confirm that the Set Pressure (defined as the average of at least three consecutive tests) is within the allowable tolerance specified by the applicable ASME Code Section and NBIC. Test Results, including Test Gauge Identification, shall be recorded on the document referred to above. Pressure Relief Valve seals shall not be removed unless required for adjustment or testing using a lift assist device.
- d) Testing organizations may obtain a "T/O" Certificate of Authorization for field testing, either as an extension to their in-shop/plant scope, or as a field-only scope, provided that the Quality System includes the following provisions:
 - 1) Qualified technicians in the employ of the certificate holder perform such testing;
 - 2) An acceptable quality system covering field testing, including field audits is maintained; and
 - 3) Functions affecting the quality of the tested valves are supervised from the address of record where the "T/O" certification is issued.

3.3.4.1 AUDIT REQUIREMENTS

~~Upon issuance of a Certificate of Authorization, provided field tests are performed, annual audits of the work carried out in the field shall be performed to ensure that the requirements of the certificate holder's quality system are met. The audit shall include, but not be limited to, performance testing, in accordance with paragraph 4.6, of valve(s) that were tested in the field. The audits shall be documented.~~

3.6 Annual Audits

Upon Issuance of a Certificate of Authorization, the testing organization shall audit the Quality System of the testing program on an annual basis. The quality manual shall define the auditing criteria, scope, frequency, and methods to ensure the requirements of the NBIC and Certificate Holder's Quality System are effectively implemented. The scope shall include but not be limited to:

- a) Specification Control 3.3.3.4 g)
- b) Inspection and Testing Program 3.3.3.4 h)
- c) Valve Adjustment and Sealing 3.3.3.4 i)

- d) Test Only Nameplates 3.3.3.4 j)
- e) Calibration 3.3.3.4 k)
- f) Manual Control/Procedures 3.3.3.4 l)
- g) Nonconformities 3.3.3.4 m)
- h) Testing Equipment 3.3.3.4 n)
- i) Field Testing 3.3.3.4 o)
- j) Records Retention 3.3.3.4 p)
- k) Competency, Training and Qualification of Personnel 3.4

Commented [DA1]: Note that the title of 3.4 is an approved change for the 2022 Edition

The audit results shall be documented. Mandatory items ~~outside~~ in the repair organization's scope ~~or items that have not been performed during the annual audit period shall be~~ documented as exceptions in the audit results.

ITEM 22-15 1/10/23

PART 4

2.4.5 PRESSURE RELIEF VALVES FOR TANKS AND HEAT EXCHANGERS

2.4.5.1 STEAM TO HOT-WATER SUPPLY

When a hot-water supply is heated indirectly by steam in a coil or pipe ~~within the service limitations set forth in Part 1, 3.2, Definitions~~, the pressure of the steam used shall not exceed the safe working pressure of the hot water tank, and a pressure relief valve at least NPS 1 (DN 25), set to relieve at or below the maximum allowable working pressure of the tank, shall be applied on the tank.

2.4.5.2 HIGH TEMPERATURE WATER TO WATER HEAT EXCHANGER

When high temperature water is circulated through the coils or tubes of a heat exchanger to warm water for space heating or hot-water supply, ~~within the service limitations set forth in Part 1, 3.2, Definitions~~, the heat exchanger shall be equipped with one or more National Board capacity certified pressure relief valves set to relieve at or below the maximum allowable working pressure of the heat exchanger, and of sufficient rated capacity to prevent the heat exchanger pressure from rising more than 10% above the maximum allowable working pressure of the vessel.

2.4.5.3 HIGH TEMPERATURE WATER TO STEAM HEAT EXCHANGER

When high temperature water is circulated through the coils or tubes of a heat exchanger to generate low pressure steam, ~~within the service limitations set forth in Part 1, 3.2, Definitions~~, the heat exchanger shall be equipped with one or more National Board capacity certified pressure relief valves set to relieve at a pressure not to exceed 15 psig (100 kPa), and of sufficient rated capacity to prevent the heat exchanger pressure from rising more than 5 psig (34 kPa) above the maximum allowable working pressure of the vessel. For heat exchangers requiring steam pressures greater than 15 psig (100 kPa), refer to NBIC Part 1, Section 2 or Section 4.

PART 1

3.9.5 PRESSURE RELIEF VALVES FOR TANKS AND HEAT EXCHANGERS

3.9.5.1 STEAM TO HOT-WATER SUPPLY

When a hot-water supply is heated indirectly by steam in a coil or pipe ~~within the service limitations set forth in Part 1, 3.2, Definitions~~, the pressure of the steam used shall not exceed the safe working pressure of the hot water tank, and a pressure relief valve at least NPS 1 (DN 25), set to relieve at or below the maximum allowable working pressure of the tank, shall be applied on the tank.

3.9.5.2 HIGH TEMPERATURE WATER TO WATER HEAT EXCHANGER

When high temperature water is circulated through the coils or tubes of a heat exchanger to warm water for space heating or hot-water supply, ~~within the service limitations set forth in Part 1, 3.2, Definitions~~, the heat exchanger shall be equipped with one or more National Board capacity certified pressure relief

valves set to relieve at or below the maximum allowable working pressure of the heat exchanger, and of sufficient rated capacity to prevent the heat exchanger pressure from rising more than 10% above the maximum allowable working pressure of the vessel.

3.9.5.3 HIGH TEMPERATURE WATER TO STEAM HEAT EXCHANGER

When high temperature water is circulated through the coils or tubes of a heat exchanger to generate low pressure steam, ~~within the service limitations set forth in Part 1, 3.2, Definitions,~~ the heat exchanger shall be equipped with one or more National Board capacity certified pressure relief valves set to relieve at a pressure not to exceed 15 psig (100 kPa), and of sufficient rated capacity to prevent the heat exchanger pressure from rising more than 5 psig (34 kPa) above the maximum allowable working pressure of the vessel. For heat exchangers requiring steam pressures greater than 15 psig (100 kPa), refer to NBIC Part 1, Section 2 or Section 4.

PART 1, SECTION 3 INSTALLATION — STEAM HEATING BOILERS, HOT-WATER HEATING BOILERS, HOT-WATER SUPPLY BOILERS, AND POTABLE WATER HEATERS

3.1 SCOPE

The scope of NBIC Part 1, Section 3 shall apply to those steam heating boilers, hot-water heating boilers, hot-water supply boilers, and potable water heaters as defined in NBIC Part 1, 3.2, *Definitions*. For installation of items that do not fall within the scope of this Section, refer to the applicable sections:

NBIC Part 1, Section 2 — *Power Boilers*

NBIC Part 1, Section 4 — *Pressure Vessels*

NBIC Part 1, Section 5 — *Piping*

3.2 DEFINITIONS

3.2.1 STEAM HEATING BOILERS

Steam heating boilers are steam boilers installed to operate at pressures not exceeding 15 psig (100 kPa).

3.2.2 HOT-WATER HEATING AND HOT-WATER SUPPLY BOILERS

Hot-water heating and hot-water supply boilers are hot water boilers installed to operate at pressures not exceeding 160 psig (1100 kPa) and/or temperatures not exceeding 250°F (121°C), at or near the boiler outlet.

3.2.3 POTABLE WATER HEATERS

A11 Water heaters are exempted from NBIC Part 1, Section 3 when none of the following limitations are exceeded:

- a) Heat input of 200,000 Btu/hr (59 kW);
- b) Water temperature of 210°F (99°C); and
- c) Nominal water containing capacity of 120 gal. (454 l), except that they shall be equipped with safety devices in accordance with the requirements of NBIC Part 1, 3.9.4.

PART 1, SECTION 3

INSTALLATION — STEAM HEATING BOILERS, HOT-WATER HEATING BOILERS, HOT-WATER SUPPLY BOILERS, AND POTABLE WATER HEATERS

3.1 SCOPE

This section provides requirements and guidelines for the installation of steam heating boilers, hot-water heating boilers, hot-water supply boilers, and potable water heaters.

3.2 DEFINITIONS

See in NBIC Part 1, Section 9, *Glossary*.

3.3 GENERAL REQUIREMENTS

3.3.1 SUPPORTS

See NBIC Part 1, Section 1.6.1, *Supports, Foundations and Settings*.

3.3.1.1 METHODS OF SUPPORT FOR STEAM HEATING, HOT-WATER HEATING, AND HOT-WATER SUPPLY BOILERS

a) Loadings

- 1) The design and attachment of lugs, hangers, saddles, and other supports shall take into account the stresses due to hydrostatic head of fully flooded equipment in determining the minimum thicknesses required. Additional stresses imposed by effects other than working pressure or static head that 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.
- 2) In applying the requirements of 1) above, provision shall be made for localized stresses due to concentrated support loads, temperature changes, and restraint against movement of the boiler due to pressure. 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.

b) Horizontal Return Firetube Boilers

- 1) Boilers over 72 in. (1,800 mm) in diameter. A horizontal-return tubular boiler over 72 in. (1,830 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.
- 2) Boilers 14 ft. (4.3 m) or over in length, or over 54 in. (1,370 mm) up to 72 in. (1,830 mm) in diameter: A horizontal-return tubular boiler over 54 in. (1,370 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 NBIC Part 1, Figure 3.3.1.1-a.
- 3) Boilers up to 54 in. (1,370 mm) in diameter
A horizontal-return boiler up to and including 54 in. (1,370 mm) in diameter shall be supported by the outside-suspension type of setting, or by not less than two steel brackets on each side. See NBIC Part 1, Figures 3.3.1.1-b.

Boiler — A boiler is a closed vessel in which water or other liquid is heated, steam or vapor generated, steam or vapor is superheated, or any combination thereof, under pressure for use external to itself, by the direct application of energy from the combustion of fuels or from electricity or solar energy. The term boiler also shall include the apparatus used to generate heat and all controls and safety devices associated with such apparatus or the closed vessel.

High-Temperature Water Boiler — A power boiler in which water is heated and operates at a pressure in excess of 160 psig (1.1 MPa) and/or temperature in excess of 250°F (121°C).

Hot-Water Heating Boiler — A hot water boiler installed to operate at pressures not exceeding 160 psig (1,100 kPa) and/or temperatures not exceeding 250°F (121°C), at or near the boiler outlet.

Hot-Water Supply Boiler — A boiler that furnishes hot water to be used externally to itself at a pressure less than or equal to 160 psig (1,100 kPa gage) or a temperature less than or equal to 250°F (120°C) at or near the boiler outlet.

Power Boiler — A boiler in which steam or other vapor is generated at a pressure in excess of 15 psig (100 kPa) for use external to itself. The term power boiler includes fired units for vaporizing liquids other than water, but does not include fired process heaters and systems. (See also High-Temperature Water Boiler).

Steam Heating Boiler — A steam boiler installed to operate at pressures not exceeding 15 psig (100 kPa).

Capacity Certification — The verification by the National Board that a particular valve design or model has successfully completed all capacity testing as required by the ASME Code.

Carbons Recycle — See Flyash Recycle.

CGA – Compressed Gas Association

Changeover Valve – A three-way stop (or diverter) valve with one inlet port and two outlet ports designed to isolate either one of the two outlet ports from the inlet port, but not both simultaneously during any mode of operation.

Chimney or Stack — A device or means for providing the venting or escape of combustion gases from the operating unit.

Confined Space — Work locations considered “confined” because their configurations hinder the activities of employees who must enter, work in and exit them. A confined space has limited or restricted means for entry or exit, and it is not designed for continuous employee occupancy. Confined spaces include, but are not limited to, underground vaults, tanks, storage bins, manholes, pits, silos, process vessels, and pipelines. Regulatory Organizations often use the term “permit-required confined space” (permit space) to describe a confined space that has one or more of the following characteristics: contains or has the potential to contain a hazardous atmosphere; contains a material that has the potential to engulf an entrant; has walls that converge inward or floors that slope downward and taper into a smaller area which could trap or asphyxiate an entrant; or contains any other recognized safety or health hazard, such as unguarded machinery, exposed live wires, or heat stress. Confined space entry requirements may differ in many locations and the Inspector is cautioned of the need to comply with local or site- specific confined space entry requirements.

Conversion

Pressure Relief Devices — The change of a pressure relief valve from one capacity-certified configuration to another by use of manufacturer’s instructions.

Units of Measure — Changing the numeric value of a parameter from one system of units to another.

National Board — The National Board of Boiler and Pressure Vessel Inspectors.

National Board Commissioned Inspector — An individual who holds a valid and current National Board Commission.

NBIC — The *National Board Inspection Code* published by The National Board of Boiler and Pressure Vessel Inspectors.

Nuclear Items — Items constructed in accordance with recognized standards to be used in nuclear power plants or fuel processing facilities.

Original Code of Construction — Documents promulgated by recognized national standards writing bodies that contain technical requirements for construction of pressure-retaining items or equivalent to which the pressure-retaining item was certified by the original manufacturer.

Overfire Air — Air admitted to the furnace above the grate surface /fuel bed. Used to complete the combustion of fine particles, in suspension. Also aids in reducing NOx formation.

Owner or User — As referenced in lower case letters means any person, firm, or corporation legally responsible for the safe operation of any pressure-retaining item.

Owner-User Inspection Organization — An owner or user of pressure-retaining items that maintains an established inspection program, whose organization and inspection procedures meet the requirements of the National Board rules and are acceptable to the Jurisdiction or Jurisdictional Authority wherein the owner or user is located.

Owner-User Inspector — An individual who holds a valid and current National Board Owner-User Commission.

Piecing — A repair method used to remove and replace a portion of piping or tubing material with a suitable material and installation procedure.

Pilot Operated Pressure Relief Valve — A pressure relief valve in which the disk is held closed by system pressure, and the holding pressure is controlled by a pilot valve actuated by system pressure.

Plate Heat Exchanger (PHE) — An assembly of components consisting of heat transfer plates and their supporting frame. The frame provides structural support and pressure containment and may consist of fixed endplates, moveable endplates, an upper carrying bar and lower guide bar which provide plate alignment, and frame compression bolts.

Pneumatic Test — A pressure test which uses air or another compressible gas as the test medium.

Potable Water Heaters — A corrosion resistant appliance that includes the controls and safety devices to supply potable hot water at pressure not exceeding 160 psig (1,100 kPa) and temperature not in excess of 210°F (99°C).

Fired Storage Water Heater — A potable water heater in which water is heated by electricity, the combustion of solid, liquid, or gaseous fuels and stores water within the same appliance.

Indirect Fired Water Heater — A potable water heater in which water is heated by an internal coil or heat exchanger that receives its heat from an external source. Indirect fired water heaters provide water directly to the system or store water within the same appliance.

Circulating Water Heater — A potable water heater which furnishes water directly to the system or to a separate storage tank. Circulating water heaters may be either natural or forced flow.

Potable Water Storage Tank — an unfired pressure vessel used to store potable hot water at temperatures not exceeding 210°F (99°C).

Part 4, 2.4.4 and Part 1, 3.9.4

Explanation of Need:

ASME Section IV, Part HLW-800.1 allows the use of pressure relief valves in place of temperature and pressure relief valves on potable water heaters. NBIC Parts 1 and 4 specifically require temperature and pressure relief valves, which is not consistent with the code of construction. Some manufacturers are shipping HLW stamped potable water heaters with pressure relief valves. Often the physical construction of these units is such that a temperature and pressure relief valve cannot be accommodated.

Suggested revisions to current text

Part 4

2.4.4 TEMPERATURE AND PRESSURE RELIEF VALVE REQUIREMENTS FOR POTABLE WATER HEATERS

- a) Each water heater shall have at least one National Board capacity-~~certified~~ temperature and pressure relief valve- or pressure relief valve. Note: Temperature and pressure relief valves are recommended because of the additional temperature relief function they provide, and other standards for this equipment may permit only temperature and pressure relief valves to be used. Low mass water heaters may use pressure relief valves due to space limitations and smaller amounts of stored energy. No temperature and pressure relief valve shall be smaller than NPS 3/4 (DN 20).
- b) The pressure setting shall be less than or equal to the maximum allowable working pressure of the water heater. However, if any of the other components in the hot-water supply system (~~such as e.g.~~, valves, pumps, expansion or storage tanks, or piping) have a ~~lesser-lower~~ working pressure rating than the water heater, the pressure setting for the temperature and pressure relief valve(s) shall be based upon the component with the lowest maximum allowable working pressure rating. If more than one temperature and pressure relief valve is used, the additional valve(s) may be set within a range not to exceed 110% above of the set pressure of the first valve.
- c) The required relieving capacity ~~in Btu/hr (W)~~ of the temperature and pressure relief valve in Btu/hr (W) shall not be less than the maximum allowable input unless the rated burner input capacity the water heater is marked on the water heater casing in a readily visible location~~with the rated burner input capacity of the water heater on the casing in a readily visible location~~, in which case the rated burner input capacity may be used as a basis for sizing the temperature and pressure relief valves. The relieving capacity for electric water heaters shall be 3500 Btu/hr (1.0 kW) per kW of input. In every case, the ~~following requirements shall be met. T~~temperature and pressure relief valve capacity for each water heater shall be such that, with the fuel burning equipment installed and operating at maximum capacity, the pressure cannot ~~rise more than~~ exceed 110% above of the maximum allowable working pressure.

Many temperature and pressure relief valves have a National Board capacity-~~certified~~

rating which was determined according to ASME Code requirements, and a lower Canadian Standards Association (CSA) rating value. Where the ASME Code is the only referenced code of construction the National Board capacity-certified rating may be used. If the water heater is not an ASME vessel, or the CSA rating is required by another standard, (such as a plumbing or building code,) then that rating shall be used.

- d) If operating conditions are changed or additional heating surface is installed, the temperature and pressure relief valve capacity shall be increased, if necessary, to meet the new conditions and shall be in accordance with the above provisions. In no case shall the increased input capacity exceed the maximum allowable input capacity. ~~The Any~~ additional valves required, ~~on account of~~ resulting from changed conditions, may be installed on the outlet piping provided ed there is no intervening valve.

Part 1

3.9.4 PRESSURE RELIEF VALVE REQUIREMENTS FOR POTABLE WATER HEATERS

- a) Each water heater shall have at least one National Board capacity-certified temperature and pressure relief valve or pressure relief valve. Note: Temperature and pressure relief valves are recommended because of the additional temperature relief function they provide, and other standards for this equipment may permit only temperature and pressure relief valves to be used. Low mass water heaters may use pressure relief valves due to space limitations and smaller amounts of stored energy. No temperature and pressure relief valve shall be smaller than NPS 3/4 (DN 20).
- b) The pressure setting shall be less than or equal to the maximum allowable working pressure of the water heater. However, if any of the other components in the hot-water supply system (~~such as e.g.~~, valves, pumps, expansion or storage tanks, or piping) have a ~~lower~~ lesser working pressure rating than the water heater, the pressure setting for the temperature and pressure relief valve(s) shall be based upon the component with the lowest maximum allowable working pressure rating. If more than one temperature and pressure relief valve is used, the additional valve(s) may be set within a range not to exceed 110% over of the set pressure of the first valve.
- c) The required relieving capacity ~~in Btu/hr (W)~~ of the temperature and pressure relief valve in Btu/hr (W) shall not be less than the maximum allowable input unless the rated burner input capacity the water heater is marked on the water heater casing in a readily visible location with the rated burner input capacity of the water heater on the casing in a readily visible location, in which case the rated burner input capacity may be used as a basis for sizing the temperature pressure relief valves. The relieving capacity for electric water heaters shall be 3,500 Btu/hr (1.0 kW) per kW of input. In every case, ~~the following requirements shall be met. T~~ temperature and pressure relief valve capacity for each water heater shall be such that, with the fuel burning equipment installed and operated at

maximum capacity, the pressure cannot ~~rise more than~~exceed 110% ~~above of~~ the maximum allowable working pressure.

Many temperature and pressure relief valves have a National Board capacity-certified rating which was determined according to ASME Code requirements, and a lower Canadian Standards Association (CSA) rating value. Where the ASME Code is the only referenced code of construction the National Board capacity-certified rating may be used. If the water heater is not an ASME vessel, or the CSA rating is required by another standard, ~~(such as a plumbing or building code.)~~ then that rating shall be used.

- d) If operating conditions are changed or additional heating surface is installed, the temperature and pressure relief valve capacity shall be increased, if necessary, to meet the new conditions and shall be in accordance with the above provisions. In no case shall the increased input capacity exceed the maximum allowable input capacity. ~~The~~ Any additional valves required, ~~on account of~~ resulting from changed conditions, may be installed on the outlet piping provided ed there is no intervening valve.

4.2.2 CONSTRUCTION STANDARDS FOR PRESSURE RELIEF DEVICES

For the repair of pressure relief devices, the following construction standards shall apply:

- a) The applicable new construction standard ~~to be~~ used for reference during repairs shall be the original code of construction.~~is the ASME Code.~~
- b) Applicable ASME Code Cases shall be used for reference during repairs when:
 - 1) The device complies with an ASME Code Case or, ~~they were used in the original construction of the valve.~~
 - 2) The device undergoes a conversion to comply with an ASME Code Case. ~~ASME Code Cases may be used when they have been accepted for use by the NBIC Committee and the Jurisdiction where the pressure-retaining item is installed.~~
- c) A device that complies with an ASME Code Case may be converted to comply with the original code of construction.
- d) For pressure relief devices repaired per 4.2.2 b)1 or converted per 4.2.2 b)2, the ASME Code Case number shall be noted on the repair document and, ~~when required by the code case,~~ stamped on the repair nameplate.
- e) For pressure relief devices converted per 4.2.2 c), the ASME Code Case number shall be noted on the repair document but shall not be stamped on the repair nameplate. References to that ASME Code case shall be marked out but left legible on the original nameplate.
- f) ~~b)~~ The Jurisdiction where the pressure retaining item is installed shall be consulted for any unique requirements it may have established including construction standards and ASME Code Cases.

PROPOSED REVISION OR ADDITION

Item No. A 23-31	
Subject/Title Testing of liquid service valves to be water or other suitable liquid	
NBIC Location Part: Pressure Relief Devices & Inspection; Section: 3 & 2; Paragraph: 3.2.5 d) 5) & 2.5.7 d) 5)	
Project Manager and Task Group	
Source (Name/Email) Thomas Beirne / tbeirne@nationalboard.org	
Statement of Need The intent is that liquid service valves be tested on liquid. The term fluid can mean either liquid or vapor.	
Background Information See statement of need.	
Existing Text Liquid service process pressure relief valves: water or other suitable fluid;	Proposed Text Liquid service process pressure relief valves: water or other suitable liquid;

VOTE:							
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date