



*THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS*

Date Distributed:

NATIONAL BOARD INSPECTION CODE SUBGROUP INSPECTION

AGENDA

Meeting of July 8, 2025

Cincinnati, OH

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

1. Call to Order

The meeting will be called to order at 8:00 a.m. Eastern Time, in Madisonville A on the 4th floor of the hotel.

2. Introduction of Members and Visitors

3. Check for a Quorum

4. Awards/Special Recognition

- Brent Ray – 5 years on SG Inspection

5. Announcements

- This meeting marks the end of Cycle B for the 2027 NBIC edition.
- The National Board will be hosting a reception on Wednesday evening from 5:30 p.m. to 7:30 p.m. at Ault Park, on the 4th floor of 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 Madisonville A/B, and lunch will be served from 11:30 a.m. to 12:30 p.m. in Madisonville A/B.
- Meeting schedules, meeting room layouts, and other helpful information can be found on the National Board website under the **NBIC** tab → NBIC Meeting Information.
- The NBIC Committee has transitioned from NB File Share to SharePoint. Remember to add any attachments that you'd like to show during the meeting (proposals, reference documents, powerpoints, etc.) to the NBIC SharePoint site (nationalboard.sharepoint.com/sites/NBIC) **prior to the meeting**.
 - Note that access to the NBIC SharePoint site is limited to committee members only.
 - ALL powerpoint attachments/presentations must be sent to the NBIC Secretary for approval prior to the meeting.
 - Contact Jonathan Ellis (nbicsecretary@nbbi.org) for any questions regarding NBIC SharePoint access.
- When possible, please submit proposals in Word format showing “strike through/underline.” Project Managers: please ensure any proposals containing text from previous NBIC editions are updated with text from the most current edition.
- If you'd like to request a new Interpretation or Action item, do so 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 setup, etc. It is also a good way to make sure we have the most up-to-date contact information. Please continue to use the online registration for each meeting.

6. Adoption of the Agenda

7. Approval of the Minutes of the January 2025 Meeting

The minutes from the January 2025 meeting can be found on the NBIC Committee information page on the National Board's website, nbbi.org.

8. Review of Rosters

a. Membership Nominations

Mr. Wil Griffith (AIA) and Mr. James Bell (Manufacturers) are interested in becoming members of the subgroup.

b. Membership Reappointments

The following Subgroup members are up for reappointment: Mr. Pat Polick and Mr. David Rose.

c. Officer Appointments - None

9. Open Items Related to Inspection

a. PRD

- i. **Item 24-91** – Require means to prevent safety valve discharge piping blockage for LCDSV (Part 4)

b. R&A

- i. **Item 21-53** – Post repair inspection of weld repairs to CSEF steels. (P. Gilston as PM)

- ii. **Item 24-18** – Definition of Controlled Fill (P. Gilston as PM)

NOTE: This is a definition that will be in all parts, and all parts must agree.

10. Interpretations

Item Number: 25-02	NBIC Location: 2023 NBIC, Part 2, 4.4.7.3 and 4.5.3 b)	Attachment Page 1
General Description: Overriding Part 2 Inspection Requirements with RBI Program		
Subgroup: Inspection		
Task Group: D. Graf (PM), J. Beauregard, J. Sowinski, J. Mangas, L. Burton, B. Ray		
Submitted by: Riley Collins		
Explanation of Need: There needs to be some clarity on whether an RBI program has the ability to override some of the inspection requirements listed in Part 2 as long as all jurisdictional requirements are met.		
January 2025 Meeting Action: After Review of the interpretation, the SG chose to create a TG.		

Item Number: 25-34	NBIC Location: 2023 NBIC, Part 2, 2.3.6.2 b) 2) a. 3.	Attachment Page 2
General Description: Interpretation request into the NBBI for the NB-23 2023 paragraph 2.3.6.2		
Subgroup: Inspection		
Task Group: None assigned.		
Submitted by: Ari Ben Swartz		
Explanation of Need: Numerous air receivers are found to be less than the required wall thickness.		
July 2025 Meeting Action:		

11. Action Items

Item Number: 23-81	NBIC Location: Part 2, 4.4.3 b)	No Attachment
General Description: Evaluate Inspector responsibilities relating to 4.4.3 FFS Subgroup: Inspection Task Group: M. Horbaczewski (PM), V. Scarcella, J. Clark, B. Ray, J. Ferreira, J. Sowinski Submitted by: R. Underwood Explanation of Need: Currently, 4.4.3-b states the Inspector shall review the condition assessment methodology and ensure the inspection data and documentation are in accordance with Section 4. This proposal would redefine the role and responsibility of the Inspector.		
January 2025 Meeting Action: Mr. Horbaczewski gave a progress report on this item. He would like to get more information on the item before moving forward with anything. The SG chose to come back to this item for further discussion. Mr. Horbaczewski invited Mr. Ferrera to speak to the SG. The item was reviewed again by the SG, and after a long discussion, it was decided that the TG will review their proposal further and then send a revised proposal to the SG for review and comment.		
Item Number: 24-03	NBIC Location: Part 2, Supplement 6	No Attachment
General Description: Revise "Inspector" terminology and requirements in Supplement 6 Subgroup: Inspection Task Group: R. Kennedy, and J. Smith (PM) Submitted by: R. Underwood Explanation of Need: Part 2 Supplement 6 should be revised to align with Part 3, Suppl 6 and the DOT. A few references are S6.4.2 a), S6.4.2 c), S6.4.4, S6.4.5, S6.4.6, and S6.4.6.1. However, this may not be an all-inclusive list.		
January 2025 Meeting Action: The PM was not present for the meeting to give a progress report. Other task members stated they have not had any movement on this item. Chair, Mr. Roberts assigned Mr. Jeremy Smith as the new PM of this item to try and get some movement.		

Item Number: 24-28	NBIC Location: Part 2, S9.9 b) 4)	No Attachment
General Description: Applying PWHT to previously "as welded" item Subgroup: Inspection Task Group: Brent Ray, Paul Davis, Phil Gilston Submitted by: J. Swezy Explanation of Need: The NBIC clearly lists the application of PWHT to a PRI that was not previously PWHT by the original Manufacturer as an example of an alteration. I agree with that statement and believe it is appropriate to consider this to be an alteration. I do not under why the NBIC considers this as an acceptable alteration but does not provide its users with any guidance as to how they should address its implementation. It seems very clear to me that applying PWHT to such welds is rarely detrimental when properly applied and should not reduce their strength or toughness. If anything, it should prove helpful rather than harmful under properly considered application. Good engineering practice mandates that a carbon steel vessel undergoing a change to wet H2S service should receive PWHT to provide an improved resistance to hydrogen cracking corrosion. Failing to do so would be irresponsible. The NBIC rules for a change of service even mention this as a factor to consider in Part 2, Table S-9.4.		
January 2025 Meeting Action: A task group was formed to work on this item. Note: on 1.14.25 at SG RA, George Galanes has pulled this item out of STG PT 2 / PT 3. George will interface with Part 2 once the wording has been finalized. This item to be removed prior to next meeting.		

Item Number: 24-37	NBIC Location: Part 2, 2.2.10	No Attachment
General Description: Add language in the event boiler can't be secured at the time of inspection Subgroup: Inspection Task Group: T. Bolden (PM), J. Smith, B. Steinhart, D. Fulford, J. King, W. Hackworth, B. Ross Submitted by: V. Scarcella Explanation of Need: In some circumstances boilers cannot be shut down and a dead man switch is not allowed.		
January 2025 Meeting Action: Mr. Bolden shared a proposal with the SG. The group had discussions on the proposal and chose to send the proposal to LB for review and comment.		

Item Number: 24-42	NBIC Location: Part 2, 2.4.1 and 2.4.4	No Attachment
General Description: Add language to NBIC Part 2 in regard to piping inspections Subgroup: Inspection Task Group: D. Graf (PM), K. Barkdoll, R. Kennedy, B. Wilson, J. Beauregard, W. Griffith, G. Kopp Submitted by: V. Scarcella Explanation of Need: Two fatal incidents resultant from radiator failure prompted an ask for these changes.		
January 2025 Meeting Action: Mr. Graf gave a progress report. He stated the TG should have something to propose at the July 2025 meeting.		

Item Number: 24-62	NBIC Location: Part 2, Section 2	No Attachment
General Description: Temporary Boiler Inspection Subgroup: Inspection Task Group: P. Pollick (PM), V. Newton, B. Ross, M. Horbaczewski, J. Mangus, J. Beauregard, M. Whitlock Submitted by: V. Scarcella Explanation of Need: No guidance for inspectors for temporary boiler inspections.		
January 2025 Meeting Action: Mr. Horbaczewski gave a progress report on this item. He presented a checklist that the city of Chicago uses for power boiler. Mr. Polick also spoke to the group with further information. The group had a short discussion, and the TG will continue to work on a proposal.		

Item Number: 24-75	NBIC Location: Part 2, Table 2.5.8	No Attachment
General Description: NBIC Part II Review table 2.5.8, suggest changes to align with NBIC Part 4 Subgroup: Inspection Task Group: J. Smith (PM), B. Steinhart, T. Bolden, L. Burton Submitted by: V. Scarcella Explanation of Need: Tim Baker and Tim Bolden raised needed changes to NBIC Part II in table 2.5.8, the table needs review and alignment with the table in Part 4 3.2.6		
January 2025 Meeting Action: The group discussed this item and decided to create a task group to come up with a proposal. Once a proposal is created and accepted by the Inspection SG, they will present the proposal to the PRD SG, and potentially move the item to their agenda.		

Item Number: 24-76	NBIC Location: Part 2, S7.9	No Attachment
General Description: Revision to Part 2, S7.9 Subgroup: Inspection Task Group: T. Vandini (PM), D. Graf, J. Clark, C. Moultrie, L. Burton, M. Whitlock, P. Polick, J. Roberts Submitted by: James Roberts Explanation of Need: Currently commercially refurbishers can inspect pressure vessels per NBIC S7.8.1 through S7.8.5 and place back into service without any statement this inspection was completed and by who.		
January 2025 Meeting Action: Mr. Roberts presented a proposal to the SG. After review and discussion of the proposal, the SG chose to create a TG for further review.		

Item Number: 24-84	NBIC Location: Part 2, 2.3.6.10 and 2.3.6.11	No Attachment
General Description: Vessels above 10,000 psi reevaluation of remaining life Subgroup: Inspection Task Group: V. Newton (PM), J. Mangas, V. Scarcella, D. Fulford, J. King Submitted by: Craig Bierl Explanation of Need: Inspectors need to be able to have a paper trail of the code integrity of these vessels. Changing the original data (in this case, designed cycle life) should ONLY be completed with the involvement of an authorized inspector and MUST be documented on a National Board form in order to be audited by the inservice inspector.		
January 2025 Meeting Action: Mr. Bierl joined the meeting to present and discuss his proposal. After discussion, the SG chose to create a TG.		

Item Number: 24-90	NBIC Location: Part 2, S12.7 d)	No Attachment
General Description: Require means to prevent safety valve discharge piping blockage for LCDSV (Part 2) Subgroup: Inspection Task Group: None assigned. Submitted by: Mark Edwards Explanation of Need: Adding verbiage to the NBIC Part 1, Part 2 and Part 4 to require a means to prevent foreign material introduction to the safety valve discharge pipe.		
January 2025 Meeting Action: The SG reviewed the proposal and had a discussion. They will hold off on any action until Part 4 has reviewed the proposal.		

Item Number: 24-100	NBIC Location: Part 2, Section 5	No Attachment
General Description: Add field to NB 6 & NB 7 from JRS Team Subgroup: Inspection Task Group: None assigned. Submitted by: V. Scarcella Explanation of Need: Repeatedly came up in investigations and in discussions that after reviewing an inspection form the reader has no idea if the object was operating.		
January 2025 Meeting Action: Mr. Scarcella and Mr. Mooney presented a proposal for this item. The SG reviewed and discussed the proposed changes, and a motion was made to accept the proposal as presented. The motion was seconded and unanimously approved. NOTE: During the January 2025 meeting, the Main Committee asked the task group to put this on hold while the National Board reviewed the disclaimer language.		

Item Number: 24-104	NBIC Location: Part 2, 2.1	No Attachment
General Description: Add language clarifying the limitation of inspections presented by design. Subgroup: Inspection Task Group: V. Scarcella (PM), T. Bolden, J. Sowinski, R. Kennedy, W. Griffith, B. Ross, B. Ray, M. Whitlock Submitted by: V. Scarcella Explanation of Need: Currently an inspector could be held responsible for conditions they could not reasonably access.		
January 2025 Meeting Action: Mr. Scarcella presented a proposal for this item to the SG. There was some discussion, and the SG chose to create a TG.		

Item Number: 24-105	NBIC Location: Part 2, 1.5.1	3
General Description: Need to restrict signatures to inspections for which the inspector was present Subgroup: Inspection Task Group: None assigned. Submitted by: V. Scarcella Explanation of Need: It has become practice in one jurisdiction for inspectors to sign inspection reports for apprentices.		
January 2025 Meeting Action: Mr. Scarcella presented a proposal to the SG. There were a few changes made to the proposal and a motion was made to accept the revised proposal. The motion passed with one negative.		

12. New Items

Item Number: 25-23	NBIC Location: Part 2, 3.4.8	Attachment Page 4
General Description: Add guidance for tube sag allowance Subgroup: Inspection Task Group: None assigned. Submitted by: V. Scarcella Explanation of Need: Inspectors were asking for clarification and better guidance. Item needs a working group to consider language.		
July 2025 Meeting Action:		

Item Number: 25-27	NBIC Location: Part 2, 2.3.6.2, 2.3.6.4, 4.4, S7.8	Attachment Page 5
General Description: Fitness-for-service coordination with API 579-1/ASME FFS-1 Subgroup: Inspection Task Group: None assigned. Submitted by: J. Hadley Explanation of Need: Alert users about situations where acceptance criteria in Part 2 may be less strict than API 579-1/ASME FFS-1.		
July 2025 Meeting Action:		

Item Number: 25-31	NBIC Location: Part 2, New Supplement	No Attachment
General Description: Add a supplement that lists the standard boiler and pressure vessel types Subgroup: Inspection Task Group: None assigned. Submitted by: V. Scarcella Explanation of Need: This would get states using the standard across the country both from a violation and object type.		
July 2025 Meeting Action:		

Item Number: 25-32	NBIC Location: Part 2, New Supplement	No Attachment
General Description: Referenced standards added supplement to NBIC Part II Subgroup: Inspection Task Group: None assigned. Submitted by: V. Scarcella Explanation of Need: Need working group to review and propose appropriate action.		
July 2025 Meeting Action:		

Item Number: 25-36	NBIC Location: Part 2, S8.2	Attachment Page 16
General Description: Relief valve differential percentage conflict. Subgroup: Inspection Task Group: None assigned. Submitted by: I. McGregor Explanation of Need: Clarification is needed to ensure a correct assessment of the recommended differential pressure percentage between the operating pressure and lifting pressure of the pressure relief valve. When making formal recommendations for corrective action due to high operating pressure differentials observed during inspections, the correct recommended value is needed to guide the adjustments necessary.		
July 2025 Meeting Action:		

Item Number: 25-37	NBIC Location: Part 2, Forms	Attachment Page 17
General Description: Minor changes to NBIC Part 2 forms Subgroup: Inspection Task Group: None assigned. Submitted by: V. Scarcella Explanation of Need: Minor changes to NBIC Part 2 forms		
July 2025 Meeting Action:		

13. Future Meetings

- January 12-15, 2026 – New Orleans, LA

14. Adjournment

Respectfully submitted,



Jodi Metzmaier, Subgroup Inspection Secretary



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

Subject:	Overriding Part 2 Inspection Requirements with RBI Program
NBIC Location:	2023 NBIC, Part 2, 4.4.7.3 and 4.5.3 b)
Statement of Need:	There needs to be some clarity on whether an RBI program has the ability to override some of the inspection requirements listed in Part 2 as long as all jurisdictional requirements are met.
Background Information:	NBIC Part 2, Section 4, Para. 4.5.3 specifically states that one of the benefits of having an RBI program is to identify items that do not require inspection or mitigation. However, NBIC Part 2, Section 4, Para. 4.4.7.3 states that PRIs in non-corrosive service are required to have thickness measurements taken.
Proposed Question:	If a company has an established RBI program and has deemed a PRI to be in non-corrosive service through an RBI assessment, can the company choose to omit the thickness measurements called out in Part 2, Section 4, Para. 4.4.7.3 as long as all jurisdictional requirements are met?
Proposed Reply:	Yes.
Committee's Question:	<Question(s) the committee will interpret. Can be the same wording as the proposed question>
Committee's Reply:	<Yes or no response>
Rationale:	<Additional clarification for response>



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

Subject:	Interpretation request into the NBBI for the NB-23 2023 paragraph 2.3.6.2
NBIC Location:	2025 NBIC Part 2, 2.3.6.2 b) 2) a. 3.
Statement of Need:	Numerous air receivers are found to be less than the required wall thickness.
Background Information:	https://www.dir.ca.gov/dosh/pressure.html CAL-OSHA Circular Letter PV-2017-1 It is permissible to take a 10% reduction of the nameplate or data report thick § 462. Field Inspections and Reports. (a) (1) Thickness determinations indicating significant reduction in the material thickness over a general area (National Board Inspection Code Par. U-107 may be used as a guide) shall be shown on the inspection report as well as the calculations for the reduction in the allowable working pressure.
Proposed Question:	If there is general uniform wall thinning where the thinnest point is not less than 75% of the required wall thickness, is the required average wall thickness required to be at least the minimum required wall thickness?
Proposed Reply:	No.
Committee's Question:	<Question(s) the committee will interpret. Can be the same wording as the proposed question>
Committee's Reply:	<Yes or no response>
Rationale:	<Additional clarification for response>



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

Subject:	Need to restrict signatures to inspections for which the inspector was present
NBIC Location:	Part 2, 1.5.1
Statement of Need:	It has become practice in one jurisdiction for inspectors to sign inspection reports for apprentices.
Background Information:	

Proposed Text:

The inspector is required to be present during the inspection and should only sign documents pertaining to inspections at which they were in attendance.

PART 2, SECTION 1

INSPECTION — GENERAL REQUIREMENTS FOR INSERVICE INSPECTION OF PRESSURE-RETAINING ITEMS

1.5.1 INSERVICE INSPECTION ACTIVITIES

Any defect or deficiency in the condition, operating, and maintenance practices of a boiler, pressure vessel, piping system, and pressure relief devices noted by the Inspector shall be discussed with the owner or user at the time of inspection and recommendations made for the correction of such defect or deficiency shall be documented. Use of a checklist to perform inservice inspections is recommended. The inspector shall be present during the inspection and shall only sign documents pertaining to inspections which they performed.



**THE NATIONAL BOARD
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Subject:	Add guidance for tube sag allowance
NBIC Location:	Part 2, 3.4.8a)
Statement of Need:	Inspectors were asking for clarification and better guidance. Item needs a working group to consider language.
Background Information:	This item was submitted on behalf of Patrick McGiveron, an inspector working for Chief Clark.

Proposed Text:

3.4.8 OVERHEATING

- a) Overheating is one of the most serious causes of deterioration. Deformation and possible rupture of pressure parts may result.
- b) Attention should be given to surfaces that have either been exposed to fire or to operating temperatures that exceed their design limit. It should be observed whether any part has become deformed due to bulging or blistering. If a bulge or blister reduces the integrity of the component or when evidence of leakage is noted coming from those defects, proper repairs must be made.



THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

Subject:	Fitness-for-service coordination with API 579-1/ASME FFS-1
NBIC Location:	Part 2, Sections: 2.3.6.2 Compressed Air, 2.3.6.4 Liquid Ammonia, 4.4.7.2 Method for Estimating Inspection Intervals, 4.4.8 Evaluating Inspection Intervals, S7.8 Acceptance Criteria [for LPG]
Statement of Need:	Alert users about situations where acceptance criteria in Part 2 may be less strict than API 579-1/ASME FFS-1.
Background Information:	Portions of closed Item 23-17 didn't make it into the 2025 edition and also don't seem to have been folded into a broader effort on fitness for service, as of the January 2025 meeting.

Proposed Text:

2.3.6.2 COMPRESSED AIR VESSELS

- a) Compressed air vessels include receivers, separators, filters, and coolers. Considerations of concern include temperature variances, pressure limitations, vibration, and condensation. Drain connections should be verified to be free of any foreign material that may cause plugging.
- b) Inspection shall consist of the following:
 - 1) Welds — Inspect all welds for cracking or gouging, corrosion, and erosion. Particular attention should be given to the welds that attach brackets supporting the compressor. These welds may fail due to vibration;
 - 2) Shells/Heads — Externally, inspect the base material for environmental deterioration and impacts from objects. Hot spots and bulges are signs of overheating and should be noted and evaluated for acceptability. Particular attention should be paid to the lower half of the vessel for corrosion and leakage. For vessels with manways or inspection openings, an internal inspection should be performed for corrosion, erosion, pitting, excessive deposit buildup, and leakage around inspection openings. UT thickness testing may be used where internal inspection access is limited or to determine actual thickness when corrosion is suspected;
 - a. UT Acceptance Criteria. These may not meet API 579-1/ASME FFS-1, including near welds, supports, structural discontinuities, for less than 0.1-inch vessel-wall remaining, if brittle fracture is a concern, or possibly other circumstances.
 1. For line or crevice corrosion, the depth of the corrosion shall not exceed 25% of the required wall thickness.

2. Isolated pits may be disregarded provided that their depth is not more than 50% of the required thickness of the pressure vessel wall (exclusive of any corrosion allowance), provided the total area of the pits does not exceed 7 sq. in. (4,500 sq. mm) within any 8 in. (200 mm) diameter circle, and provided the sum of their dimensions along any straight line within that circle does not exceed 2 in. (50 mm).
 3. For a corroded area of considerable size, the thickness along the most critical plane of such area may be averaged over a length not exceeding 10 in. (250 mm). The thickness at the thinnest point shall not be less than 75% of the required wall thickness, and the average thickness shall meet API 579-1/ASME FFS-1.
- b. If the corrosion exceeds any of the above criteria, the following options are available to the owner/user.
1. The owner/user may conduct a complete UT survey of the vessel to verify remaining vessel wall thickness.
 2. The vessel shall be removed from service until the vessel is repaired by an “R”-~~stamp holder~~ Certificate Holder.
 3. The vessel shall be removed from service until it can be de-rated to a lower MAWP subject to review and approval by the Jurisdiction.
 4. A fitness-for service analysis is performed by a qualified organization.
 5. The vessel is permanently removed from service.
- 3) Fittings and Attachments — Inspect all fittings and attachments for alignment, support, deterioration, damage, and leakage around threaded joints. Any internal attachments such as supports, brackets, or rings shall be visually examined for wear, corrosion, erosion, and cracks;
- 4) Operation — Check the vessel nameplate to determine the maximum allowed working pressure and temperature of the vessel. Ensure the set pressure of the safety valve does not exceed that allowed on the vessel nameplate and determine that the capacity of the safety valve is greater than the capacity of the compressor. Ensure there is a functioning manual or automatic condensate drain; and
- 5) Quick-Closure Attachments — Filter-type vessels usually have one quick-type closure head for making filter changes, see NBIC Part 2, 2.3.6.5.

2.3.6.4 LIQUID AMMONIA VESSELS

Vessels in liquid ammonia service are susceptible to stress corrosion cracking (SCC) [(see NBIC Part 2, 3.3.2 b)] in areas of high stress. High-strength and coarse-grained materials seem to be more at risk of SCC than are fine-grained or more moderate strength materials, although no commonly used steels appear to be immune to the problem. Postweld heat treatment of new or weld-repaired vessels or cold formed heads is beneficial in reducing the incidence of SCC. The presence of 0.2% minimum water in the liquid ammonia also inhibits SCC. Any leak should be thoroughly investigated and the necessary corrective action initiated.

a) Internal inspection

- 1) Where existing openings permit, perform a visual internal inspection of the vessel. Look for any obvious cracks (very advanced SCC) and note areas that are subject to high stress such as welds, welded repairs, head-to-shell transitions, sharp interior corners, and interior surfaces opposite external attachments or supports.
- 2) Fittings, such as liquid level gage floats and excess flow valves, should be removed or otherwise protected from power buffing or light sandblasting when preparing the interior surface of the vessels for inspection.
- 3) Vessels in services where liquid ammonia is used as a reactant or is being preheated/vaporized should be inspected for localized corrosion in the reaction or vaporizing zones.

b) Examination and detection of SCC

- 1) All interior welds and highly stressed areas should be examined by the Wet Fluorescent Magnetic Particle Testing method (WFMT) using an A/C yoke for magnetization. Note that weld cracks are often transverse in orientation. It is extremely important to ensure that the NDE method used will disclose cracks in any orientation.
- 2) If cracks are discovered, a calculation shall be made to determine what depth of grinding may be carried out for crack removal (without encroaching on the minimum thickness required by the original code of construction).
- 3) Where possible, crack removal by grinding is the preferred method of repair. Since the stresses at the crack tips are quite high, even very fine cracking shall be eliminated.
- 4) Where crack depth is such that removal requires welded repair, a weld procedure shall be employed that will minimize HAZ hardening and residual stresses. Welded repairs, regardless of the depth of the repair, shall be postweld heat treated. The use of alternative welding methods in lieu of PWHT is permitted. Any repairs required and associated postweld heat treatment shall be completed in accordance with NBIC Part 3.
- 5) Re-inspection by WFMT after welded repair shall be done to ensure complete crack removal.
- 6) It is not intended to inhibit or limit the use of other NDE evaluation methods. It is recognized that acoustic emission and fracture mechanics are acceptable techniques for assessing structural integrity of vessels. Analysis by fracture mechanics may be used to assess the structural integrity of vessels when complete removal of all ammonia stress cracks is not practical. If alternative methods are used, the above recommendation that all cracks be removed, even fine cracks, may not apply. In addition to NDE and repair of liquid ammonia vessels that are susceptible to SCC, it is acceptable to use fitness for service evaluation methods to determine acceptability of a pressure-retaining item to perform its intended function. These methods shall be consistent with NBIC Part 2, 4.4, *Methods To Assess Damage Mechanisms And Inspection Frequency For Pressure-Retaining Items*.

c) Inspection of parts and appurtenances

- 1) If valves or fittings are in place, check to ensure that these are complete and functional. Parts made of copper, zinc, silver, or alloys of these metals are unsuitable for ammonia service and shall be replaced with parts fabricated of steel or other suitable materials.
 - 2) Check that globe valves are installed with the direction of flow away from the vessel.
 - 3) Observe that excess flow valves are properly installed and in good repair.
 - 4) Check that hydrostatic relief valves are installed in the system piping where required.
 - 5) Piping shall be observed to be a minimum of Schedule 80 if threaded and Schedule 40 if welded. Seamless or ERW piping is acceptable. Type F piping shall not be used for ammonia service.
 - 6) Fittings shall be forged or Class 300 malleable iron. Seal welding is permitted only with forged fittings.
 - 7) The Inspector shall note the pressure indicated by the gage and compare it with other gages on the same system. If the pressure gage is not mounted on the vessel itself, it should be ascertained that the gage is installed on the system in such a manner that it correctly indicates actual pressure in the vessel.
 - 8) The Inspector shall note the liquid level in the vessel by observing the liquid level gage or other liquid level indicating device.
- d) Inspection of pressure relief devices
- 1) See NBIC Part 2, 2.5 for the inspection of pressure relief devices used to prevent the overpressure of liquid ammonia vessels. Pressure relief devices in ammonia service shall not be tested in place using system pressure. Bench testing or replacement is required, depending on the type of pressure relief device used.
 - 2) The Inspector shall note the replacement date marked on vessel safety valves and piping system hydrostatic relief valves requiring replacement every five years.
- e) External inspection of insulated vessels
- 1) Insulated pressure vessels can suffer from aggressive external corrosion that is often found beneath moist insulation. The Inspector should closely examine the external insulation scaling surfaces for cold spots, bulges, rust stains, or any unusual conditions in previous repair areas. Bulging or distorted insulation on refrigerated vessels may indicate the formation of ice patches between the vessel shell and insulation due to trapped moisture. Careful observation is also required where the temperatures of insulated vessels cycle continually through the freezing temperature range.
 - 2) The lower half and the bottom portions of insulated vessels should receive special focus, as condensation or moisture may gravitate down the vessel shell and soak into the insulation, keeping it moist for long periods of time. Penetration locations in the insulation or fireproofing, such as saddle supports, sphere support legs, nozzles, or fittings should be examined closely for potential moisture ingress paths. When moisture penetrates the insulation, the insulation may actually work in reverse, holding moisture in the insulation and/or near the vessel shell.

- 3) Insulated vessels that are run on an intermittent basis or that have been out of service require close scrutiny. In general, a visual inspection of the vessel's insulated surfaces should be conducted once per year.
 - 4) The most common and superior method to inspect for suspected corrosion under insulation (CUI) damage is to completely or partially remove the insulation for visual inspection. The method most commonly utilized to inspect for CUI without insulation removal is by x-ray and isotope radiography (film or digital) or by real-time radiography, utilizing imaging scopes and surface profilers. The real time imaging tools will work well if the vessel geometry and insulation thickness allows. Other less common methods to detect CUI include specialized electromagnetic methods (pulsed eddy current and electromagnetic waves) and long range ultrasonic techniques (guided waves).
 - 5) There are also several methods to detect moisture soaked insulation, which is often the beginning for potential CUI damage. Moisture probe detectors, neutron backscatter, and thermography are tools that can be used for CUI moisture screening.
 - 6) Proper surface treatment (coating) of the vessel external shell and maintaining weather-tight external insulation are the keys to prevention of CUI damage.
- f) Acceptance criteria. These may not meet API 579-1/ASME FFS-1, including near welds, supports, structural discontinuities, for less than 0.1-inch vessel-wall remaining, if brittle fracture is a concern, or possibly other circumstances.

The following are the acceptance criteria for liquid ammonia vessels. Vessels showing indications or imperfections exceeding the conditions noted below are considered unacceptable.

1) Cracks

Cracks in the pressure vessel boundary (e.g., heads, shells, welds) are unacceptable. When a crack is identified, the vessel shall be removed from service until the crack is repaired by an "R" ~~Stamp holder~~ Certificate Holder or the vessel permanently removed from service. (See NBIC Part 3, *Repairs and Alterations*.)

2) Dents

When dents are identified that exceed the limits set forth below, the vessel shall be removed from service until the dents are repaired by an "R" ~~Stamp holder~~ Certificate Holder, a fitness for service analysis is performed, or the vessel permanently retired from service.

a. Dents in Shells

The maximum mean dent diameter in shells shall not exceed 10% of the shell diameter, and the maximum depth of the dent shall not exceed 10% of the mean dent diameter. The mean dent diameter is defined as the average of the maximum dent diameter and the minimum dent diameter. If any portion of the dent is closer to a weld than 5% of the shell diameter, the dent shall be treated as a dent in a weld area, as shown in b. below.

b. Dents in Welds

The maximum mean dent diameter on welds (i.e., part of the deformation includes a weld) shall not exceed 10% of the shell diameter. The maximum depth shall not exceed 5% of the mean dent diameter.

c. Dents in Heads

The maximum mean dent diameter on heads shall not exceed 10% of the shell diameter. The maximum depth shall not exceed 5% of the mean dent diameter. The use of a template may be required to measure dents on heads.

3) Bulges

When bulges are identified that exceed the limits set forth below, the vessel shall be removed from service until the bulges are repaired by an "R" ~~Stamp holder~~ Certificate Holder or a fitness for service analysis is performed, the vessel may also be permanently retired from service.

a. Bulges in Shells

If a bulge is suspected, the circumference shall be measured at the suspect location and at several places remote from the suspect location. The variation between measurements shall not exceed 1%.

b. ~~Dents~~Bulges in Heads [Already approved for 2025 edition.]

If a bulge is suspected, the radius of the curvature shall be measured by the use of templates. At any point the radius of curvature shall not exceed 1.25% of the diameter for the specified shape of the head.

4) Cuts or Gouges

When a cut or gouge exceeds 25% of the original wall thickness of the vessel, the vessel shall be removed from service until it is repaired by an "R" ~~Stamp Holder~~ Certificate Holder or a fitness-for-service analysis is performed. The vessel may also be permanently retired from service.

5) Corrosion

a. For line or crevice corrosion, the depth of the corrosion shall not exceed 25% of the original wall thickness.

b. Isolated pits may be disregarded provided that their depth is not more than 50% of the required thickness of the pressure vessel wall (exclusive of any corrosion allowance), provided the total area of the pits does not exceed 7 sq. in. (4,500 sq. mm) within any 8 in. (200 mm) diameter circle, and provided the sum of their dimensions along any straight line within that circle does not exceed 2 in. (50 mm).

c. For a corroded area of considerable size, the thickness along the most critical plane of such area may be averaged over a length not exceeding 10 in. (250 mm). The thickness at the thinnest point shall not be less than 75% of the required wall thickness, and the average thickness shall meet API 579-1/ASME FFS-1. When general corrosion is identified that

exceeds the limits set forth in this paragraph, the pressure vessel shall be removed from service until it is repaired by an “R” ~~Stamp holder~~ Certificate Holder or a fitness-for-service analysis is performed, or the vessel may be permanently retired from service.

4.4.7.2 METHOD FOR ESTIMATING INSPECTION INTERVALS FOR EXPOSURE TO CORROSION

- a) When the pressure-retaining item is exposed to service temperatures below the creep range, and the corrosion rate controls the remaining wall thickness of the pressure-retaining item, the inspection interval shall be calculated by the formula below or by other industry methods as accepted by the Jurisdiction.

$$\text{remaining life} = \frac{(t_{\text{actual}} - t_{\text{required}})}{\text{corrosion rate}}$$

(years)

t_{actual} = thickness in inches (mm) measured at the time of inspection for the limiting section used in the determination of t_{required} .

t_{required} = minimum allowable thickness in inches (mm) for the limiting section of the pressure-retaining item or zone. It shall be the greater of the following:

- 1) The calculated thickness, exclusive of the corrosion allowance, required for the pressure relieving device set pressure, static head, or other loading and design temperature; or
- 2) The minimum thickness permitted by the provision of the applicable section of the original code of construction.

Corrosion Rate = inches (mm) per year of metal removal as a result of corrosion.

- b) Any suitable nondestructive examination method may be used to obtain thickness measurements, provided the instruments employed are calibrated in accordance with the manufacturer’s specification or an acceptable national standard.
- 1) If suitably located existing openings are available, measurements may be taken through the openings.
 - 2) When it is impossible to determine thickness by nondestructive means, a hole may be drilled through the metal wall and thickness gage measurements taken.
- c) For new pressure-retaining items or PRIs for which service conditions are being changed, one of the following methods shall be employed to determine the probable rate of corrosion from which the remaining wall thickness, at the time of the next inspection, can be estimated:
- 1) The corrosion rate as established by data for pressure-retaining items in the same or similar service; or
 - 2) If the probable corrosion rate cannot be determined by the above method, on-stream thickness determinations shall be made after approximately 1,000 hours of service. Subsequent sets of thickness measurements shall be taken after additional similar intervals until the corrosion rate is established.

d) Corrosion-Resistant Lining

When part or all of the pressure-retaining items have a corrosion-resistant lining, the interval between inspections of those sections so protected may be based on recorded experience with the same type of lining in similar service, but shall not exceed ten years, unless sufficient data has been provided to establish an alternative inspection interval. If there is no experience on which to base the interval between inspections, performance of the liner shall be monitored by a suitable means, such as the use of removable corrosion probes of the same material as the lining, ultrasonic examination, or radiography. To check the effectiveness of an internal insulation liner, metal temperatures may be obtained by surveying the pressure-retaining item with temperature measuring or indicating devices.

e) Two or More Zones

When a pressure-retaining item has two or more zones of pressure or temperature and the required thickness, corrosion allowance, or corrosion rate differ so much that the foregoing provisions give significant differences in maximum periods between inspections for the respective zones (e.g., the upper and lower portions of some fractionating towers), the period between inspections may be established individually for each zone on the basis of the condition applicable thereto, instead of being established for the entire vessel on the basis of the zone requiring the more frequent inspection.

f) Above-Ground Pressure Vessels

All pressure vessels above ground shall be given an external examination after operating the lesser of five years, or one quarter of remaining life, preferably while in operation. Alternative intervals resulting in longer periods may be assigned provided the requirements of this section have been followed. Inspection shall include determining the condition of the exterior insulation, the supports, and the general alignment of the vessel on its supports. Pressure vessels that are known to have a remaining life of over ten years or that are prevented from being exposed to external corrosion (such as being installed in a cold box in which the atmosphere is purged with an inert gas, or by the temperature being maintained sufficiently low or sufficiently high to preclude the presence of water), need not have the insulation removed for the external inspection. However, the condition of the insulating system and/or the outer jacketing, such as the cold box shell, shall be observed periodically and repaired if necessary.

g) Interrupted Service

- 1) The periods for inspection referred to above assume that the pressure-retaining item is in continuous operation, interrupted only by normal shutdown intervals. If a pressure-retaining item is out of service for an extended interval, the effect of the environmental conditions during such an interval shall be considered.
- 2) If the pressure-retaining item was improperly stored, exposed to a detrimental environment or the condition is suspect, it shall be given an inspection before being placed into service.
- 3) The date of next inspection, which was established at the previous inspection, shall be revised if damage occurred during the period of interrupted service.

h) Circumferential Stresses

For an area affected by a general corrosion in which the circumferential stresses govern the MAWP, the least thicknesses along the most critical plane of such area may be averaged over a length not exceeding:

- 1) The lesser of one-half the pressure vessel diameter, or 20 in. (500 mm) for vessels with inside diameters of 60 in. (1.5 m) or less; or
- 2) The lesser of one-third the pressure vessel diameter, or 40 in. (1 m), for vessels with inside diameters greater than 60 in. (1.5 m), except that if the area contains an opening, the distance within which thicknesses may be averaged on either side of such opening shall not extend beyond the limits of reinforcement as defined in the applicable section of the ASME Code for ASME Stamped vessels and for other vessels in their applicable codes of construction.

i) Longitudinal Stresses

If because of wind loads or other factors the longitudinal stresses would be of importance, the least thicknesses in a length of arc in the most critical plane perpendicular to the axis of the pressure vessel may be averaged for computation of the longitudinal stresses. The thicknesses used for determining corrosion rates at the respective locations shall be the most critical value of average thickness. The potential for buckling shall also be considered.

j) Local Metal Loss

These acceptance criteria may not meet API 579-1/ASME FFS-1, including near welds, supports, structural discontinuities, for less than 0.1-inch vessel-wall remaining, if brittle fracture is a concern, or possibly other circumstances.

Corrosion pitting shall be evaluated in accordance with NBIC Part 2, 4.4.8.7. Widely scattered corrosion pits may be left in the pressure-retaining item in accordance with the following requirements:

- 1) Their depth is not more than one-half the required thickness of the pressure-retaining item wall (exclusive of corrosion allowance);
- 2) The total area of the pits does not exceed 7 sq. in. (4,500 sq mm) within any 50 sq. inches (32,000 sq. mm); and
- 3) The sum of their dimensions (depth and width) along any straight line within this area does not exceed 2 in. (50 mm).

k) Weld Joint Efficiency Factor

When the surface at a weld having a joint efficiency factor of other than one is corroded as well as surfaces remote from the weld, an independent calculation using the appropriate weld joint efficiency factor shall be made to determine if the thickness at the weld or remote from the weld governs the maximum allowable working pressure. For the purpose of this calculation, the surface at a weld includes 1 in. (25 mm) on either side of the weld, or two times the minimum thickness on either side of the weld, whichever is greater its heat-affected zone and also includes at least a weld band, centered on the weld, that has width of 2 in. (50.8 mm) or twice the furnished plate thickness,

whichever is greater. For components with closely spaced openings and for background, see API 579-1/ASME FFS-1, Annex 2C.2.5 (2021 or later edition).

l) Formed Heads

- 1) When evaluating the remaining service life for ellipsoidal, hemispherical, torispherical or toriconical shaped heads, the minimum thickness may be calculated by:
 - a. Formulas used in original construction; or
 - b. Where the head contains more than one radii of curvature, the appropriate strength formula for a given radius.
- 2) When either integral or non-integral attachments exist in the area of a knuckle radius, the fatigue and strain effects that these attachments create shall also be considered.

m) Adjustments in Corrosion Rate

If, upon measuring the wall thickness at any inspection, it is found that an inaccurate rate of corrosion has been assumed, the corrosion rate to be used for determining the inspection frequency shall be adjusted to conform with the actual rate found.

n) Riveted Construction

For a pressure-retaining item with riveted joints, in which the strength of one or more of the joints is a governing factor in establishing the maximum allowable working pressure, consideration shall be given as to whether, and to what extent, corrosion will change the possible modes of failure through such joints. Also, even though no additional thickness may have originally been provided for corrosion allowance at such joints, credit may be taken for the corrosion allowance inherent in the joint design.

4.4.8 EVALUATING INSPECTION INTERVALS OF PRESSURE-RETAINING ITEMS EXPOSED TO INSERVICE FAILURE MECHANISMS

Pressure-retaining items are subject to a variety of inservice failure mechanisms that are not associated with corrosion. The following provides a summary of evaluation processes that may require a technical evaluation to assess resultant inspection intervals.

Some acceptance criteria in this section may not meet API 579-1/ASME FFS-1, including near welds, supports, structural discontinuities, for less than 0.1-inch vessel-wall remaining, if brittle fracture is a concern, or possibly other circumstances.

S7.8 ACCEPTANCE CRITERIA

The acceptance criteria for LPG pressure vessels is based on successfully passing inspections without showing conditions beyond the limits shown below. These acceptance criteria may not meet API 579-1/ASME FFS-1, including near welds, supports, structural discontinuities, for less than 0.1-inch vessel-wall remaining, if brittle fracture is a concern, or possibly other circumstances.

...

S7.8.2 DENTS

a) Shells

The maximum mean dent diameter in shells shall not exceed 5% of the shell diameter, and the maximum depth of the dent shall not exceed 5% of the mean dent diameter. The mean dent diameter is defined as the average of the maximum dent diameter and the minimum dent diameter. If any portion of the dent is closer to a weld than 5% of the shell diameter, the dent shall be treated as a dent in a weld area, see b) below.

b) Welds

The maximum mean dent diameter on welds (i.e., part of the deformation includes a weld) shall not exceed ~~10%~~ 5% of the shell diameter. The maximum depth shall not exceed 5% of the mean dent diameter.

c) Head

The maximum mean dent diameter on heads shall not exceed ~~10%~~ 5% of the shell diameter. The maximum depth shall not exceed 5% of the mean dent diameter. The use of a template may be required to measure dents on heads.

[Explanation for reviewers (not proposed text):

Allowed dent diameter near welds and in heads (higher risk locations) should not be twice the 5% allowed for shells, in paragraph (a) above.

Alternative: replace these acceptance criteria with a reference to API 579-1/ASME FFS-1.]

...

S7.8.4 CUTS OR GOUGES

When a cut or a gouge exceeds 25% of the original wall thickness of the pressure vessel, the pressure vessel shall be removed from service until it is repaired by a qualified repair organization or permanently removed from service.

...



THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

Subject:	Relief valve differential percentage conflict.
NBIC Location:	Part 2, S8.2
Statement of Need:	Clarification is needed to ensure a correct assessment of the recommended differential pressure percentage between the operating pressure and lifting pressure of the pressure relief valve. When making formal recommendations for corrective action due to high operating pressure differentials observed during inspections, the correct recommended value is needed to guide the adjustments necessary.
Background Information:	HWH boilers observed in the field sometimes operate in excess of this differential and close to the relief valve setpoint. The conflict in example b) shows a 20 percent differential, not the apparently intended 25 percent in the introductory paragraph.

Proposed Text:

S8.2 HOT-WATER HEATING BOILERS

For hot-water heating boilers, the recommended pressure differential between the pressure relief valve set pressure and the boiler operating pressure should be at least 10 psi (70 kPa), or 25% of the boiler operating pressure, whichever is greater. Two examples follow:

- a) If the pressure relief valve of a hot-water heating boiler is set to open at 30 psi (200 kPa), the boiler operating pressure should not exceed 20 psi (140 kPa).
- b) If the pressure relief valve of a hot water heating boiler is set to open at 100 psi (700 kPa), the boiler operating pressure should not exceed ~~75~~80 psi (~~550~~ 515 kPa). Section IV of the ASME Code does not require that pressure relief valves used on hot water heating boilers have a specified blowdown. Therefore, to help ensure that the pressure relief valve will close tightly after opening and when the boiler pressure is reduced to the normal operating pressure, the pressure at which the valve closes should be well above the operating pressure of the boiler.

FORM NB-4
NEW BUSINESS OR DISCONTINUANCE
USED BY AUTHORIZED INSPECTION AGENCIES

To: _____
JURISDICTION

1. DATE OF SERVICE _____

2. Notice of: ☐ New business
☐ Discontinuance or cancellation
☐ Refusal to inspect

3. Effective date _____

4. Type of object: ☐ High pressure boiler
☐ Low pressure boiler
☐ Pressure vessel

5. OBJECT	6. OWNER'S NO.	7. JURISDICTION NO.	8. NATIONAL BOARD NO.	9. NAME OF MANUFACTURER
-----------	----------------	---------------------	-----------------------	-------------------------

10. NAME OF OWNER _____

11. NAME OF OWNER INCLUDING COUNTY _____

12. LOCATION OF OBJECT INCLUDING COUNTY _____

13. USER OF OBJECT (IF SAME AS OWNER SHOW "SAME") _____

14. DATE OF LAST CERTIFICATE INSPECT., IF ANY	15. CERTIFICATE ISSUED ☐ Yes ☐ No	16. REASON FOR DISCONTINUANCE OR CANCELLATION ☐ Phys. Condition ☐ Out of use ☐ Other
---	--	--

17. REMARKS (USE REVERSE SIDE)

INSPECTORS NARRATIVE

18. BY: _____
INSPECTION AGENCY REP. BRANCH OFFICE

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, OH 43229

NB-4 Rev. 2

FORM NB-5 BOILER OR PRESSURE VESSEL DATA REPORT

FIRST INTERNAL INSPECTION

Standard Form for Jurisdictions Operating Under the ASME Code

1	DATE INSPECTED MO DAY YEAR	CERT EXP DATE MO YEAR	CERTIFICATE POSTED ☐ Yes ☐ No	OWNER NO.	JURISDICTION NUMBER	NAT'L BD NO. ☐	OTHER NO. ☐
2	OWNER				NATURE OF BUSINESS	KIND OF INSPECTION ☐ Int ☐ Ext	CERTIFICATE INSPECTION ☐ Yes ☐ No
3	OWNER'S STREET ADDRESS NUMBER				OWNER'S CITY	STATE	ZIP
4	USER'S NAME - OBJECT LOCATION				SPECIFIC LOCATION IN PLANT	OBJECT LOCATION - COUNTY	
5	USER'S STREET ADDRESS NUMBER				USER'S CITY	STATE	ZIP
6	CERTIFICATE COMPANY NAME				CERTIFICATE COMPANY CONTACT NAME	EMAIL	
7	CERTIFICATE COMPANY ADDRESS				CERTIFICATE COMPANY CITY	STATE	ZIP
8	TYPE ☐ FT ☐ WT ☐ CI ☐ AIR TANK ☐ WATER TANK Other _____				YEAR BUILT	MANUFACTURER	YEAR INST ☐ New ☐ Secondhand
9	USE ☐ Power ☐ Process ☐ Steam Htg ☐ HWH ☐ HWS ☐ Storage ☐ Heat Exchange ☐ Other _____				FUEL (BOILER)	METHOD OF FIRING (BOILER)	PRESSURE GAGE TESTED ☐ Yes ☐ No
10	PRESSURE This Inspection _____ Prev. Inspection _____			SAFETY-RELIEF VALVES Set at _____		EXPLAIN IF PRESSURE CHANGED	
11	IS CONDITION OF OBJECT SUCH THAT A CERTIFICATE MAY BE ISSUED? ☐ Yes ☐ No (If no, explain fully on back of form - listing code violation)					PRESSURE TEST ☐ Yes _____ psi Date _____ ☐ No	
12	SHELL No. _____	DIAMETER ☐ ID ☐ OD in. _____	OVERALL LENGTH ft. _____ in. _____	THICKNESS in. _____	TOTAL HTG SURFACE (BOILER) Sq. Ft. _____		MATERIAL ASME Spec Nos _____
13	ALLOWABLE STRESS psi _____	BUTT STRAP Thks _____ in. ☐ Single ☐ Double	HEADERS - WT BOILERS Thickness _____ in.		TYPE ☐ Box ☐ Sinuous ☐ Wtr Wall ☐ Other _____		
14	TYPE LONGITUDINAL SEAM ☐ Lap ☐ Butt ☐ Welded ☐ Brazed ☐ Riveted		RIVETED Dia Hole _____ in.		PITCH in. X _____ in. X _____ in.	SEAM EFF %	
15	HEAD THICKNESS in. _____	HEAD TYPE ☐ Plus ☐ Minus ☐ Flat ☐ Quick Opening	RADIUS DISH in. _____	ELLIP RATIO No. _____	BOLTING Dia. _____ in. Material _____		
16	TUBE SHEET THICKNESS in. _____	TUBES No. _____ Dia. _____ in. Length _____ ft. _____ in.			PITCH (WT BLRS) in. X _____ in. X _____ in.	LIGAMENT EFF %	
17	FIRE TUBE BOILERS		DISTANCE UPPER TUBES TO SHELL Front _____ in. Rear _____ in.		STAYED AREA FRONT HEAD	Above Tubes _____ Below Tubes _____	
18	STAYS ABOVE TUBES Front No. _____ Rear No. _____		TYPE ☐ Head to Head ☐ Diagonal ☐ Welded ☐ Weldless		AREA OF STAYS Front _____ Rear _____		
19	STAYS BELOW TUBES Front No. _____ Rear No. _____		TYPE ☐ Head to Head ☐ Diagonal ☐ Welded ☐ Weldless		AREA OF STAYS Front _____ Rear _____		
20	FURNACE - TYPE Adamson (No. Sect. _____) ☐ Corrugated ☐ Plain ☐ Other _____			THICKNESS in. _____	TOTAL LENGTH ft. _____ in. _____	TYPE LONG. SEAM ☐ Welded ☐ Riveted ☐ Seamless	
21	STAYBOLTS - TYPE Threaded _____ Welded _____ Hollow _____ Drilled (Size Hole _____ in.)			DIAMETER in. _____	PITCH in. X _____ in. X _____ in.	NET AREA sq. in. _____	
22	SAFETY-RELIEF VALVES No. _____ Size _____		TOTAL CAPACITY _____ Cfm _____ Lb/Hr _____ Btu/Hr		OUTLETS No. _____ Size _____	PROPERLY DRAINED ☐ Yes ☐ No (If no, explain on back of form)	
23	STOP VALVES ☐ Yes ☐ No	ON STEAM LINE ☐ Yes ☐ No	ON RETURN LINES ☐ Yes ☐ No	OTHER CONNECTIONS ☐ Yes ☐ No	STEAM LINES PROPERLY DRAINED ☐ Yes ☐ No (If no, explain on back of form)		
24	FEED PIPE Size _____ in.	FEED APPLIANCES No. _____	TYPE DRIVE ☐ Steam ☐ Motor		CHECK VALVES ☐ Yes ☐ No	FEED LINE ☐ Yes ☐ No	RETURN LINE ☐ Yes ☐ No
25	WATER GAGE GLASS No. _____	TRY COCKS No. _____	BLOWOFF PIPE Size _____ in. Location _____		INSPECTION OPENINGS COMPLY WITH CODE ☐ Yes ☐ No (If no, explain on back of form)		
26	CAST-IRON BOILERS Length _____ in. Width _____ in. Height _____ in.			SECTIONS No. _____	DOES WELDING ON STEAM, FEED BLOWOFF AND OTHER PIPING COMPLY WITH CODE? ☐ Yes ☐ No (If no, explain on back of form)		
27	SHOW ALL CODE STAMPING ON BACK OF FORM. Give details (use sketch) for special objects NOT covered above - such as double wall vessels, etc.				DOES ALL MATERIAL OTHER THAN AS INDICATED ABOVE COMPLY WITH CODE? ☐ Yes ☐ No (If no, explain on back of form)		
28	NAME AND TITLE OF PERSON TO WHOM REQUIREMENTS WERE EXPLAINED:						
29	I HEREBY CERTIFY THIS IS A TRUE REPORT OF MY INSPECTION Signature of Inspector _____			IDENT NO. _____	EMPLOYED BY _____		IDENT NO. _____

Complete When Not Registered National Board

OTHER CONDITIONS AND REQUIREMENTS

INSPECTORS NARRATIVE

CODE STAMPING

(BACK)

FORM NB-6 BOILER-FIRED PRESSURE VESSEL REPORT OF INSPECTION

Standard Form for Jurisdictions Operating Under the ASME Code

1. DATE INSPECTED: _____ CERTIFICATE EXPIRATION DATE: _____ CERTIFICATE POSTED: ☐ YES ☐ NO
(Month/Day/Year) (Month/Day/Year)
- USER NUMBER: _____ NAT'L BD NUMBER ☐ OR SERIAL # (IF CAST IRON) ☐ _____
- FIRST INSPECTION: YES ☐ NO ☐ JURISDICTION NUMBER: _____
- NATIONAL BOARD NUMBER: _____ OTHER NUMBER: _____
2. EQUIPMENT LOCATION NAME: _____
- EQUIPMENT LOCATION ADDRESS: _____
(Equipment Location Street) (Equipment Location City)
- _____
(Equipment Location State) (Equipment Location Zip Code)
- NATURE OF BUSINESS: _____
- KIND OF INSPECTION: ☐ INTERNAL ☐ EXTERNAL CERTIFICATE RENEWAL: ☐ YES ☐ NO
3. CERTIFICATE BUSINESS NAME: _____
- CERTIFICATE CONTACT: _____
(NAME) (Email)
- CERTIFICATE MAILING ADDRESS: _____
(Certificate Mailing Street) (Certificate Mailing City)
- _____
(Certificate Mailing State) (Certificate Mailing Zip Code)
4. INVOICE BUSINESS: _____
(Name)
- CERTIFICATE INVOICE CONTACT: _____
(Name) (Email)
- INVOICE ADDRESS: _____
(Invoice Address Street) (Invoice Address City)
- _____
(Invoice Address State) (Certificate Mailing Zip Code)
5. TYPE: ☐ FT ☐ WT ☐ CI ☐ OTHER: _____ ASME/OTHER CODE: _____
- MANUFACTURER: _____ YEAR BUILT: _____
- MANHOLE ☐ HANDHOLE ☐ NEITHER ☐ CERTIFICATE DURATION (MONTHS): _____
6. USE: ☐ POWER ☐ PROCESS ☐ STEAM HEATING ☐ HWH ☐ HWS ☐ OTHER
- FUEL TYPE: _____ METHOD OF FIRING: _____
- LOCATION IN PLANT: _____

7. LOW WATER CUTOFF INSTALLED: YES ☐ NO ☐ TESTED: YES ☐ NO ☐

HIGH LIMIT TEMP/PRESSURE INSTALLED: YES ☐ NO ☐ WAS BOILER FIRED: YES ☐ NO ☐

COMBUSTION CONTROLS: CSD-1 ☐ NFPA ☐ OTHER ☐ _____

COMBUSTION AIR VERIFIED: YES ☐ NO ☐

8. ARE THERE ANY KNOWN OUTSTANDING (OPEN) VIOLATIONS FOR THIS EQUIPMENT? ☐ YES ☐ NO (IF YES, EXPLAIN FULLY UNDER ADVERSE CONDITIONS FOUND)

LOG/RECORD REVIEW: YES ☐ NO ☐

PRESSURE TEST: ☐ YES PSI: _____ DATE: _____ ☐ NO

9. STAMPED MAWP: _____ MINIMUM PRD REQUIRED CAPACITY: _____

NUMBER OF PRD'S: _____ TOTAL CAPACITY: _____

SET PRESSURE: _____ CAPACITY: _____

SET PRESSURE: _____ CAPACITY: _____

SET PRESSURE: _____ CAPACITY: _____

10. ~~INSPECTOR COMMENTS:~~ (Verify any repairs were completed by a qualified repair company, and when applicable, the proper repair/alterations forms are completed.)

INSPECTORS NARRATIVE

11. ADVERSE CONDITIONS FOUND:

CONDITIONS TO BE ADDRESSED

12. REQUIREMENTS: _____

13. PERSON TO WHOM REQUIREMENTS WERE EXPLAINED: _____ (Name) _____ (Title)

(Email)

(Phone Number)

14. I HEREBY CERTIFY THIS IS A TRUE REPORT OF MY INSPECTION:

NB COMMISSION NUMBER: _____ EMPLOYED BY: _____

IDENTIFICATION NUMBER: _____ SIGNATURE OF INSPECTOR: _____

FORM NB-7 PRESSURE VESSELS
REPORT OF INSPECTION
Standard Form for Jurisdictions Operating Under the ASME Code

1. DATE INSPECTED: _____ CERTIFICATE EXPIRATION DATE: _____ CERTIFICATE POSTED: ☐ YES ☐ NO
(Month/Day/Year) m/d/yyyy (Month/Day/Year) m/d/yyyy
- USER NUMBER: _____ JURISDICTION NUMBER: _____
- NATIONAL BOARD NUMBER: ☐ OR SERIAL NUMBER: (IF CAST IRON) ☐ _____
- FIRST INSPECTION: YES ☐ NO ☐
2. EQUIPMENT LOCATION NAME: _____
- NATURE OF BUSINESS: _____
- KIND OF INSPECTION: ☐ INTERNAL ☐ EXTERNAL CERTIFICATE RENEWAL: ☐ YES ☐ NO
3. EQUIPMENT LOCATION ADDRESS: _____
(Equipment Location Street) (Equipment Location City)
- _____
(Equipment Location State) (Equipment Location Zip Code)
4. CERTIFICATE BUSINESS NAME: _____
- CERTIFICATE CONTACT: _____
(NAME) (Email)
5. CERTIFICATE MAILING ADDRESS: _____
(Certificate Mailing Street) (Certificate Mailing City)
- _____
(Certificate Mailing State) (Certificate Mailing Zip Code)
6. INVOICE BUSINESS: _____
(Name)
- CERTIFICATE INVOICE CONTACT: _____
(Name) (Email)
7. INVOICE ADDRESS: _____
(Invoice Address Street) (Invoice Address City)
- _____
(Invoice Address State) (Certificate Mailing Zip Code)
8. TYPE: AIRTANK ☐ WATER TANK ☐ OTHER: ☐ _____ ASME/OTHER CODE: _____
- MANUFACTURER: _____ YEAR BUILT: _____
- MANHOLE ☐ HANDHOLE ☐ NEITHER ☐ CERTIFICATE DURATION (MONTHS): _____
9. USE: ☐ STORAGE ☐ PROCESS ☐ HEAT EXCHANGE ☐ OTHER: _____
- HORIZONTAL ☐ VERTICAL ☐ LENGTH: _____ DIAMETER: _____

10. STAMPED MAWP: _____ MINIMUM PRD REQUIRED CAPACITY:

NUMBER OF PRD'S: _____ TOTAL CAPACITY: _____

SET PRESSURE: _____ CAPACITY: _____

SET PRESSURE: _____ CAPACITY: _____

SET PRESSURE: _____ CAPACITY: _____

OVERPRESSURE PROTECTION BY SYSTEM DESIGN: ☐ SIZE (ft³ or Gallons):

11. ARE THERE ANY KNOWN OUTSTANDING (OPEN) VIOLATIONS FOR THIS EQUIPMENT? ☐ YES ☐ NO (IF YES, EXPLAIN FULLY UNDER ADVERSE CONDITIONS FOUND)

PRESSURE TEST: YES ☐ PSI _____ Date _____ NO ☐
(m/d/yyyy)

INSPECTORS NARRATIVE

12. ~~INSPECTORS COMMENTS:~~ (Verify any repairs were completed by a qualified repair company, and when applicable, the proper repair/alterations forms are completed.)

13. ~~ADVERSE CONDITIONS FOUND:~~ **CONDITIONS TO BE ADDRESSED**

14. REQUIREMENTS:

15. PERSON TO WHOM REQUIREMENTS WERE EXPLAINED: _____
(Name) (Title)

(Email)

(Phone Number)

16. I HEREBY CERTIFY THIS IS A TRUE REPORT OF MY INSPECTION:

NB COMMISSION NUMBER: _____ EMPLOYED BY: _____

IDENTIFICATION NUMBER: _____ SIGNATURE OF INSPECTOR: _____