



THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

Date Distributed: 1/25/2023

NATIONAL BOARD INSPECTION CODE SUBCOMMITTEE INSPECTION

MINUTES

Meeting of January 11, 2023
Charleston, SC

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They are not to be duplicated or quoted for other than committee use.*

The National Board of Boiler & Pressure Vessel Inspectors
1055 Crupper Avenue
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1. Call to Order

Chair, Mr. Jim Getter, called the Subcommittee (SC) Inspection meeting to order at 8:04 am EST.

2. Introduction of Members and Visitors

Secretary, Ms. Jodi Metzmaier, did a roll call of all SC members in person and online. The visitors in person stated their name and their company. Ms. Metzmaier then called on all visitors online, who then said their name and their company. All members and visitors are noted on the attendance sheet. (**Attachment 1**)

3. Check for a Quorum

4. With 21 of the 22 members in attendance at the SC Inspection meeting, both in person and online, a quorum was established.

5. Awards/Special Recognition

There were no Awards/Special Recognitions.

6. Announcements

Ms. Metzmaier gave the announcements to the Subcommittee. (**Attachment 2**)

Mr. Getter let the SC know that the National Board staff is doing an editorial review of each Part of the NBIC, and he asked if anyone was interested in reviewing the editorial changes/corrections for Part 2. **Brent Ray, James Calvert, and Brandon Wilson volunteered to review the editorial changes/corrections in Part 2.**

7. Adoption of the Agenda

A motion was made and seconded to adopt the agenda.

- Correction to Item 22-03: The people listed as “Submitted by” should be listed as the Task Group and the item was submitted by V. Scarcella.
- Add item 22-07
- Add item 22-08

The above items were corrected/added to the agenda and the motion was revised to adopt the revised agenda. The motion was seconded and unanimously approved.

8. Approval of the Minutes of the July 13, 2022, Meeting

A motion was made to approve the minutes from the July 2022 SC Inspection meeting. The motion was seconded and unanimously approved.

9. Review of Rosters

a. Membership Nominations

Mr. Chuck Becker (Manufacturers) and Mr. Lee Burton (National Board Certificate Holders) are interested in joining **Subgroup** Inspections.

A motion was made to accept both nominees to become members of the **Subgroup** Inspection. The motion was seconded and unanimously approved.

It was expressed that both members would also like to become members of the **Subcommittee** Inspection. Mr. Burton was not present at that meeting, and Mr. Becker left the room for discussion. The SC discussed the balance and number of members, and a motion was made to accept both nominees into SC Inspection. The motion was seconded and **unanimously approved.**

b. Membership Reappointments

- The following **Subgroup** members are up for reappointment: Mr. Jeff Petersen, Mr. Vincent Scarcella, and Mr. Tom Vandini.

All three members were unanimously reappointed in the SG meeting. A motion was made to reappoint all three members to SG. The motion was seconded and unanimously approved.

- The following **Subcommittee** members are up for reappointment: Mr. Darrell Graf, Mr. Jeff Petersen, Mr. Vincent Scarcella, and Mr. Tom Vandini.

All 4 members expressed they would like to be reappointed as members of the SC Inspection. A motion was made to reappoint all 4 members. The motion was seconded and unanimously approved.

c. Officer Appointments

None.

10. Open Items Related to Inspection

a. PRD – there are currently no open PRD items related to Part 2.

b. R&A

- i. **Item 21-53** – Post repair inspection of weld repairs to CSEF steels. (P. Gilston as PM)
Mr. Horbaczewski gave a progress report, stating item 22-06 was opened to address any necessary changes needed in Part 2 based on any changes made to Part 3 with this item.
- ii. **Item 21-67** – Add welding requirements to plugging firetubes. (P. Gilston as PM)
Mr. Horbaczewski gave a progress report, stating item 23-08 was opened to address any necessary changes needed in Part 2 based on any changes made to Part 3 with this item.
- iii. **Item 22-05** – Clarify NDE requirements as it pertains to OCC edition. (D. Kinney as PM).
Mr. Bolden gave a progress report, stating item 22-22 was opened to address any changes needed in Part 2 based on the changes made to part 3 with this item. He has a proposal that was presented to the SG, and it will be sent out to Letter Ballot for review and comment.

11. Interpretations.

Item Number: 22-40	NBIC Location: Part 2, 4.4.7.2	No Attachment
General Description: Allowable stresses for t(required) calculation		
Subgroup: Inspection		
Task Group: None assigned.		
Submitted by: Tom Chen		
Explanation of Need: For the purpose of setting up inspection plans, especially with older equipment, we are calculating t(required) per Part 2, para 4.4.7.2. However, we would like to know if it is permissible to use the higher allowable stresses in later editions of ASME BPV Code.		
January 2023 Meeting Action: Mr. Getter gave a progress report stating a task group was created in the SG meeting.		

12. Action Items

a. TG FRP Items

Item Number: NB16-1402	NBIC Location: Part 2, New Supplement	No Attachment
General Description: Life extension for high pressure FRP vessels above 20 years		
Subgroup: FRP Task Group: M. Gorman (PM)		
Update from April 2022 FRP Meeting: Mr. Gorman stated that this proposal has been on hold pending ASME action as well as the gathering of data to help inform the best procedures for life extension. Based on recent ASME Section X discussions and the collection of required data, he is prepared to finalize the proposal for this item. He and the item task group will have a proposal ready to share with the group at the October FRP meeting.		
January 2023 Meeting Action: PROGRESS REPORT: Update from Jonathan (January 2023) - The FRP TG is still working on a proposal. The PM was hoping to share some updates during the January meeting, but he is unable to do so for next week. He has a presentation planned for the July 2023 meeting, though. From what I understand, ASME has been doing some work on this subject, and the PM has been waiting for that to help inform the proposal. Their goal is to have things ready in time for the 2025 NBIC edition. The SC discussed the update and has requested that once the proposal is completed, or close to completion, that it get sent out to Letter Ballot for review and comment.		

b. TG Historical Items

Item Number: 20-26	NBIC Location: Part 2, S2	No Attachment
General Description: Concern for Historical Boiler Inspections Nationwide		
Subgroup: Historical Task Group: T. Dillon (PM), R. Underwood, L. Moedinger, M. Wahl, D. Rupert, K. Anderson, M. Sansone & J. Wolf		
Explanation of Need: Currently Jurisdictions are not uniform in adoption of how and when inspections are performed.		
January 2023 Meeting Action: Mr. Getter stated that this item was closed with no action in the TG Historical meeting. They will keep it on the agenda as a discussion item for updates. A motion was made to close this item with no action . The motion was seconded and unanimously approved .		

Item Number: 21-03	NBIC Location: Part 2, S2	Attachment 3
General Description: Inspection of through stays and diagonal stays (submitted by David Rose)		
Subgroup: Historical Task Group: D. Rose (PM), R. Bryce, R. Forbes, C. Jowett		
Explanation of Need: The code is silent on the inspection of through stays and diagonal stays. Additionally, new repair methods are available from ASME that can be incorporated.		
January 2023 Meeting Action: Mr. Rose reviewed the proposal which was unanimously approved through the Historical TG with the SC. A motion was made to accept the proposal as presented. The motion was seconded and unanimously approved .		

Item Number: 21-34	NBIC Location: Part 2, S2	Attachment 4
<p>General Description: Working Pressure Calculations for Curved Stayed Surfaces</p> <p>Subgroup: Historical Task Group: Mike Wahl (PM), R. Bryce, and T. Dillon</p> <p>Background: In January 2021, Dr. Bryce initiated the conversation with the group for this topic. He is proposing the group open an item to address working pressure calculations for curved stayed surfaces. After discussion, a task group was formed</p>		
<p>January 2023 Meeting Action: Mr. Rose reviewed the proposal which was unanimously approved through the Historical TG with the SC. A motion was made to accept the proposal as presented. The motion was seconded and unanimously approved.</p>		

c. TG Locomotive Items

There are currently no Locomotive items open for Part 2.

d. SG Inspection Items

Item Number: 20-57	NBIC Location: Part 2, 4.4.1 a)	No Attachment
<p>General Description: Evaluate revision to Part 2, 4.4 FFS Scope roles and responsibilities and API 579-1/ASME FFS-1</p> <p>Subgroup: Inspection Task Group: M. Horbaczewski (PM) and B. Ray. Submitted by: George Galanes</p> <p>Explanation of Need: Currently, there is confusion surrounding implementation of FFS for Part 2 inspection activities, where the FFS form is located and Part 3 activities regarding Part 3, 3.3.4.8 because it references Part 2 for FFS. In addition, we need to have a Part 2 Inspection member to be assigned to assist in the development of roles and responsibilities.</p>		
<p>January 2023 Meeting Action: Mr. Horbaczewski gave a progress report to the SC. He stated he will know by July 2023 if we will move forward with this item or close it.</p>		

Item Number: 21-25	NBIC Location: Part 2	No Attachment
<p>General Description: Autoclave/Quick Opening Device PP</p> <p>Subgroup: Inspection Task Group: V. Scarcella (PM), T. Bolden, M. Horbaczewski, J. Peterson, J. Clark, W. Hackworth, M.A. Shah, C. Becker. Submitted by: Kevin Hawes</p> <p>Explanation of Need: Upon our AIA (Intact) QRR I produced a Power point presentation on Autoclave inspections. Your NB team leader Gary Scribner suggested I forward this inspection presentation to the NB for review of content as mention of good reference material for next NBIC edition. I have attached a copy of this PP for your considerations.</p>		
<p>January 2023 Meeting Action: Mr. Newton stated to the SC that this item is being sent out to LB for review and comment to the SG.</p>		

Item Number: 21-47	NBIC Location: Part 2, 2.2.4 & 2.2.5	No Attachment
General Description: To provide better guidance as it relates to carbon monoxide		
Subgroup: Inspection		
Task Group: W. Hackworth (PM), V. Scarcella, D. Buechel, T. Barker, T. Bolden		
Explanation of Need: Need to provide more comprehensive items to be reviewed to guide the inspector on carbon monoxide and combustion air.		
January 2023 Meeting Action: Mr. Hackworth gave a progress report to the SC. He believes the TG will have a proposal for the July 2023 meeting.		

Item Number: 22-03	NBIC Location: Part 2	Attachment 5
General Description: Create example inspection list		
Subgroup: Inspection		
Task Group: V. Scarcella (PM), M. Sansone, M. Mooney, T. Bolden, and D. Buechel		
Submitted by: V. Scarcella		
Explanation of Need: Average high and low mean failure rate has a 10 point plus gap which needs to be closed. The Chief of LA, Donnie LeSage brought up the item in COQ but resigned Part 2 due to other duties.		
January 2023 Meeting Action: Mr. Scarcella presented the proposal which was passed through SG Inspection with one Abstention. A motion was made to approved the proposal as presented. The motion was seconded and passed with one abstention (Brent Ray).		

Mr. Eben Creaser (Chief Boiler Inspector of New Brunswick) and Mr. Beirne joined the SC meeting to discuss **PRD item 21-59**. The item was passed through the PRD SC. PRD SC asked the Inspection SC to review the item because the proposal would add wording to Part 2. When SC Inspection reviewed the proposal, they were not in agreeance of the new wording. The SC Inspection had an issue with using the word “may”, and believed the word should be “must”. Mr. Creaser discussed the reasoning behind the wording to the SC. Stating the proposed wording, using “may”, allows them to use other standards. After much discussion the PRD group will take the item back and make a few changes, including changing “may” to “must”, and will have a new proposal in July 2023.

Item Number: 22-06	NBIC Location: Part 2, 3.4.9 e)	No Attachment
General Description: Part 2 task group to review Part 3 Item 21-53		
Subgroup: Inspection		
Task Group: None assigned.		
Submitted by: D. Graf		
Explanation of Need: Part 2 task group to investigate further changes to Part 2/Part 3 that could be needed because of action item 21-53.		
January 2023 Meeting Action: Mr. Horbaczewski gave a progress report stating a task group was created in the SG meeting.		

Item Number: 22-22	NBIC Location: Part 2, 4.2	No Attachment
General Description: Changes and additions to align with part III with in service inspections		
Subgroup: Inspection		
Task Group: T. Bolden (PM), J. Clark, J. Petersen, M. Sansone, B. Ray, D. Graf, and J. Mangas		
Submitted By: V. Scarcella		
Background Information: Several areas where part III after repair in service inspections should be aligned with part II.		
January 2023 Meeting Action: Mr. Bolder gave a progress report stating the proposal is being sent out to LB for review and comment to the SG.		

13. New Items

Item Number: 22-26	NBIC Location: Part 2, 2.3.6.8	No Attachment
General Description: Addition of cast acrylic as a pressure vessel material		
Subgroup: Inspection		
Task Group: None assigned.		
Submitted by: J. Calvert		
Explanation of Need: Provide inspectors with the criteria necessary to competently inspect vessels like acrylic chromatography columns.		
January 2023 Meeting Action: Mr. Calvert gave a progress report stating a task group was created during the SG meeting and they will have a lot of work to do to before creating a proposal.		

Item Number: 22-37	NBIC Location: Part 2, S11.4.2.6	No Attachment
General Description: Retention requirements should those of the NBIC, not the construction code.		
Subgroup: Inspection		
Task Group: None assigned.		
Submitted by: L. Ponce		
Explanation of Need: The NBIC should not refer to the ASME Code but should refer to Part 3, Table 1.5.1 where record retention for repair/alteration activity and FFS are located. The scope para.S11.1 states in part, "This Supplement provides guidelines to be followed when a finite element analysis (FEA) is submitted as part of a quantitative engineering assessment for in-service equipment, or a repair or alteration for a pressure retaining item..."		
January 2023 Meeting Action: Mr. Getter reported to the SC that this item was closed with no action in the SG meeting. A motion was made to close this item with no action . The motion was seconded and unanimously approved .		

Item Number: 22-38	NBIC Location: Part 2, 4.6.1 & S11.3.2 b)	No Attachment
General Description: Correction to S11.3.2 b) and 4.6.1		
<p>Subgroup: Inspection Task Group: None assigned. Submitted by: L. Ponce</p>		
<p>Explanation of Need: The first part of this recommended correction is an incorrect reference in S.11.3.2 b). "4.6.1.2" does not exist and should be "4.6.1". The second part - Considering the statemen in paragraph S11.3.2 b), it seems the word 'review' in 4.6.1 should be in 'lieu' of instead of "rather". As it currently reads, 4.6.1 does not seem to provide 'justification for use of FEA rather than the rules in the code of construction' in S11.3.2 b).</p>		
<p>January 2023 Meeting Action: Mr. Getter reported to the SC that this item was closed with no action in the SG meeting. A motion was made to close this item with no action. The motion was seconded and unanimously approved.</p> <p>NOTE: This proposal also included an editorial change that will be done in house.</p>		

Item Number: 22-39	NBIC Location: Part 2, 4.4.8.7 g)	No Attachment
General Description: Recommended clarification of requirements for Evaluating Local Thin Areas		
<p>Subgroup: Inspection Task Group: None assigned. Submitted by: L. Ponce</p>		
<p>Explanation of Need: The existing text may lead to confusion due to a misplaced comma after 'specified' in the first sentence and no reference to what is being specified in the paragraph. The proposed text is a way to tie in the specified requirement in paragraph (f).</p>		
<p>January 2023 Meeting Action: Mr. Newton gave a progress report to the SC stating a TG was created during the SG meeting.</p>		

Item Number: 23-07	NBIC Location: Part 2, 2.2.4	Attachment 6
General Description: 2.2.4 updated to include not allowing combustibles		
<p>Subgroup: Inspection Task Group: None assigned. Submitted by: V. Newton</p>		
<p>Explanation of Need: Frequently see combustible materials stored in boilers rooms, specifically calling them out as not allowed would be helpful to Inspectors.</p>		
<p>January 2023 Meeting Action: Mr. Newton presented a proposal to the SC. After review of the proposal, a motion was made to accept the proposal as presented. The motion was seconded and unanimously approved.</p>		

Item Number: 23-08	NBIC Location: Part 2	No Attachment
<p>General Description: Part 2 task group to review Part 3 Item 21-67 Subgroup: Inspection Task Group: None assigned. Submitted by: D. Graf</p>		
<p>Explanation of Need: Part 2 task group to investigate further changes to Part 2/Part 3 that could be needed because of action item 21-67.</p>		
<p>January 2023 Meeting Action: Mr. Horbaczewski gave a progress report stating a task group was created in the SG meeting.</p>		

14. Future Meetings

- July 2023 – St. Louis, MO
- January 2024 – Charlotte, NC

Mr. Getter discussed the future meetings with the SC.

Mr. Brent Ray noted to the group that the next API meeting is in San Antonio January 23-25, 2024. He asked if anyone was interested in attending or giving a presentation related to NBIC and how they are connected.

15. Adjournment

A motion was made to adjourn the meeting at 10:07 am EST.

Respectfully submitted,



Jodi Metzmaier
Subcommittee Inspection Secretary

Subcommittee Inspection Attendees - January 2023

MEMBERS:	Interest Category	Registered For	In Person	Remote	Not In Attendance
Jim Getter - Chair	Manufacturers	In Person	x		
Mark Horbaczewski - Vice Chair	Users	In Person	x		
Jodi Metzmaier - Secretary	NBBI	In Person	x		
Tim Barker	Authorized Inspection Agencies		x		
Ernest Brantley	Authorized Inspection Agencies	In Person	x		
David Buechel	Authorized Inspection Agencies	In Person	x		
James Calvert	National Board Certificate Holders	In Person	x		
James Clark	Manufacturers	In Person	x		
Darrell Graf	National Board Certificate Holders		x		
William Hackworth	Authorized Inspection Agencies	Remote		x	
Jerry Jessick	Users	Remote		x	
John Mangas	General Interest	In Person	x		
Joe Morgan	Users				x
Venus Newton	Authorized Inspection Agencies	In Person	x		
Jeffrey Petersen	Users	In Person	x		
Pat Polick	Jurisdictional Authorities	In Person	x		
Brent Ray	Users	In Person	x		
James Roberts	Manufacturers	In Person	x		
David Rose	Users	Remote		x	
Jason Safarz	General Interest			x	
Matt Sansone	Jurisdictional Authorities			x	
Vincent Scarcella	Authorized Inspection Agencies	In Person	x		
Thomas Vandini	National Board Certificate Holders	In Person	x		

VISITORS:	Company/Title/Interest	Registered For	In Person	Remote
Chuck Becker	Quality Steel Corporation	In Person	x	
Tim Bolden	CAN	In Person	x	
Jeff Castle	Zurich	In Person	x	
Mark mooney	NBBI	In Person	x	
Luis Ponce	NBBI	In Person	x	
Melissa Wadkinson	Fulton Thermal Corp	In Person	x	
Mike Whitlock	Hartford Steam Boiler	In Person	x	
Brandon Wilson	DTS	In Person	x	
Benjamin Calderno	Liberty Mutual Insurance	In Person	x	
Craig Bierl	Chubb Insurance	Remote		x
John King	Chubb Insurance	Remote		x
Harrington Henry	Arise		x	
Beauguard	Los Alamos		x	
Bob Underwood	HSB		x	
David Warshall				x
Eben Creaser	Chief of New Brunswick		x	
Tom Beirne	NBBI		x	

Announcements

- Zoom Notes:
 - Make sure your actual name is on your zoom account.
 - Please add an “M” for Member, “V” for Visitor, or “S” for Staff at the end of your name.
Example: Jodi Metzmaier - S
 - Please stay muted during the meeting. If you would like to speak, please use the “raise hand” feature, and then you can unmute as you are called on.
- For the July meeting we will begin using MS Teams instead of Zoom.
- The National Board will be hosting a reception on Wednesday evening from 5:30pm to 7:30pm in the Colonial Ballroom at the hotel. We will also host a breakfast and lunch on Thursday. Breakfast will be served from 7:00am to 8:00am, and lunch will be served from 11:30am to 12:30pm. Both meals will be served at the hotel in the Colonial Ballroom. Members, visitors, and guests are all welcome.
- Please register now if you have not already done so.
- 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.
- We now have a review and comment Letter Ballot type. When we send out a LB for review and comment, the layout of the ballot will look different, as it will not have any voting options.
- Remember to add any attachments that you’d like to show during the meeting (proposals, reference documents, power point, etc.) to the cloud **prior to the meeting**.
 - If needed, we can go over how to do this.
 - ALL power point attachments/presentations **must be sent to Jonathan prior to the meeting** for approval.
- Always submit attachments in word format showing “strike through/underline”
 - Please contact me if you need any help with this.
- If you’d like to open a new Interpretation or Action item, this should be done on the National Board Business Center.
 - Anyone, member or not, can open a new item.
- As a reminder, anyone who would like to become a member of a group or committee:
 - Should attend at least 2 meetings prior to being put on the agenda for membership consideration. The nominee will be on the agenda for voting during their 3rd meeting.
 - The nominee must submit the formal request along with their resume to Jonathan **PRIOR TO** the meeting. nbicsecretary@nbbi.org
 - If needed, we can also create a ballot for voting on a new member between meetings. To do this, you will need to contact Jonathan.
- Thank you to everyone who registered online for this meeting. The online registration is very helpful for planning our reception, meals, the 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 also is a good way to make sure we have the most up-to-date contact information.

Item 21-03 Inspection of through stays and diagonal stays

David Rose

S2.10.4.1 STAYBOLTS

The maximum allowable working pressure for symmetrically spaced corroded staybolts will be calculated using the formula provided in either of the two following paragraphs or the accompanying tables. Equations calculate MAWP based on measuring the staybolt spacing on the stayed surface and the minimum diameter of the corroded staybolt.

Through stays shall be visually examined for damage or failure such as corrosion, sagging or cracks.

1. Sagging beyond 3x the original diameter of the stay shall be replaced.
2. Cracked through stays shall be replaced.
3. Corroded through stays shall be measured where accessible and if the measured diameter has been reduced by more than 20% of the original the through stay shall be replaced.

Alternatively, the acceptable loading may be calculated in accordance with the relevant sections of the 1971 ASME BPVC.

Diagonal braces shall be visually examined for damage or failure such as corrosion, deformation or cracks.

1. Cracks shall be cause for repair.
2. Deformation should be carefully monitored for changes indicating movement.
3. Corroded braces shall be measured where accessible and if the measured diameter has been reduced by more than 20% of the original or the cross-sectional area has been reduced by 30% the brace shall be replaced.

Alternatively, the acceptable loading may be calculated in accordance with the relevant sections of the 1971 ASME BPVC.

a) Iron Staybolt

Staybolts which are of iron or of unknown material shall be calculated using the following formula or Table S2.10.4.1-a. The table is based on a stress value of 7,500 psi (51.7 MPa) for staybolts. Refer to ASME Section 1, 1971 Edition, Table PG-23.3, for allowable loads for all staybolts.

FORMULA HERE

b) Steel Staybolts

Staybolts of known, steel material shall be calculated using the following formula or Table S2.10.4.1-b. The table is based on a stress value of 11,300 psi (78.0 MPa) for staybolts. Refer to ASME Section 1, 1971 Addenda for allowable loads for all staybolts.

FORMULA HERE

S2.10.4.1 STAYBOLTS

The maximum allowable working pressure for symmetrically spaced corroded staybolts will be calculated using the formula provided in either of the two following paragraphs or the accompanying tables. Equations calculate MAWP based on measuring the staybolt spacing on the stayed surface and the minimum diameter of the corroded staybolt.

a) Iron Staybolt

Staybolts which are of iron or of unknown material shall be calculated using the following formula or Table S2.10.4.1-a. The table is based on a stress value of 7,500 psi (51.7 MPa) for staybolts. Refer to ASME Section 1, 1971 Edition, Table PG-23.3, for allowable loads for all staybolts.

$$p = \frac{\pi \left[\frac{d}{2} \right]^2 s}{p^2} \quad S = 7,500 \text{ psi (51.7 MPa)}$$

b) Steel Staybolts

Staybolts of known, steel material shall be calculated using the following formula or Table S2.10.4.1-b. The table is based on a stress value of 11,300 psi (78.0 MPa) for staybolts. Refer to ASME Section 1, 1971 Addenda for allowable loads for all staybolts.

$$p = \frac{\pi \left[\frac{d}{2} \right]^2 s}{1.1xp^2} \quad S = 11,300 \text{ psi (78.0 MPa)}$$

c) For curved stayed surface subjected to external pressure, equations to calculate MAWP of staybolts on curved stayed surfaces shall use the longitudinal and circumferential pitches. Use (l × w) in place of p² in equations S2.10.4.1.a and S2.10.4.1.b.

S2.10.4.3 CURVED STAYED SURFACES SUBJECTED TO INTERNAL PRESSURE

The maximum allowable pressure for stayed curved plates and those parts, which require staying with stays or staybolts of uniform diameter, uniformly longitudinally spaced, shall be calculated using the following formula.

$$P = \frac{TS \times t \times E}{H \times FS}$$

where

$$E = \frac{p_l - d_s}{p_l}$$

p_l is longitudinal staybolt pitch

d_s is the outside diameter of the staybolt

If E is not known, then 80% may be used

TS = tensile strength; if not known then 55,000 shall be used

FS = 5 for curved stayed surfaces subjected to internal pressure

H for locomotive style boilers = height of crown sheet of firebox to wrapper sheet measured through the hole for the fusible plug

H for boilers with circular fireboxes = inside radius of the course of shell or drum

S2.10.4.4 CURVED STAYED SURFACES SUBJECTED TO EXTERNAL PRESSURE

The maximum allowable pressure for stayed curved plates and those parts, which require staying with stays or staybolts of uniform diameter, uniformly longitudinally spaced, and subjected to pressure on the convex side, shall be calculated using the following formula.

$$\begin{array}{l} \text{If } (d_o \leq 42 \text{ inches}) \\ \\ \text{If } (d_o > 42 \text{ inches}) \end{array} \quad P = P_s + \frac{8000t}{d_o}$$
$$P = P_s$$

where

P_s is stayed surface equation from S2.10.4 STAYED SURFACES

d_o is outside diameter of firetube, if tapered use the largest outside diameter

Item 22-03
 Scarcella
 December 6, 2022

PART 2, SUPPLEMENT 14
LOW PRESSURE BOILER EXTERNAL INSPECTION LIST

S14.1 SCOPE

Table S14.1 is a list for guidance of a general nature and does not cover all service conditions. This list does not include all jurisdictional requirements. Use of a checklist to perform in-service inspections is recommended (1.5.1).

TABLE S14.1

<u>NBIC Part 2 Section Reference</u>	<u>Inspection Component</u>
<u>2.2.3</u>	<u>General Conditions of the boiler room; lighting, ventilation, housekeeping, and general/personal safety/clearance tripping hazard</u>
<u>2.2.10.6c)</u>	<u>Verify combustion air is supplied to the boiler room</u>
<u>2.2.5</u>	<u>General condition/leakage of the boiler, and appurtenances; water, steam, fuel, flue and fuel train components</u>
<u>2.2.10.6d)</u>	<u>Remote Emergency stop button</u>
<u>1.5.2.a) 3)</u>	<u>Stamping/Code Construction</u>
<u>2.2.10.4</u>	<u>Verify gage glass reading/condition</u>
<u>2.2.10.4b) - d)</u>	<u>Pressure gage reading/condition</u>
<u>2.2.10.6l) 3)</u>	<u>Thermometer reading/condition</u>
<u>2.5.4</u>	<u>Relief valve installed properly</u>
<u>2.5.7</u>	<u>Relief valve testing</u>
<u>2.5.2</u>	<u>Relief valve set pressure and capacity</u>
<u>2.5.3</u>	<u>Relief valve condition</u>
<u>2.2.10.6e)</u>	<u>Witness test of low water/flow protection devices/rating</u>
<u>2.2.10.6l) 1) & 2)</u>	<u>Pressure and temperature controls installed</u>
<u>2.2.10.6b)</u>	<u>Verify controls and safety devices are tested and documented</u>
<u>2.2.11</u>	<u>Review logs and maintenance records</u>
<u>1.5.4</u>	<u>Explain and report violations and deficiencies</u>

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2.2.4 CONDITION OF BOILER ROOM OR BOILER LOCATION

The general condition of the boiler room or boiler location should be assessed using appropriate jurisdictional requirements and overall engineering practice. Items that are usually considered are lighting, adequacy of ventilation for habitability, combustion air, housekeeping, personal safety, storage of combustibles, and general safety considerations.