Date Distributed: February 20, 2009

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD INSPECTION CODE COMMITTEE

MINUTES

Meeting of January 22, 2009
Austin, Texas

These minutes are subject to approval and are for committee use only. They are not to be duplicated or quoted for other than committee use

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

1. Call to Order - 8:00 a.m.

Chairman Terry Parks called the meeting to order at 8 a.m.

2. Introduction of Members/Visitors

3. Announcements

a. Invitation to the Chief Inspector of Texas

Mr. Anthony Jones was present at the meeting. He welcomed everyone to Texas.

b. Mr. David Douin, National Board Executive Director

Mr. Douin gave a brief outline about what to expect at the next meeting of the NBIC. The week will be shortened to allow travel on Monday. The subgroups will meet on Tuesday and the Subcommittees will meet on Wednesday. The NBIC Main Committee will continue to meet on Thursday.

c. Others

Mr. Douin spoke briefly about Mr. Donald Tanner and a moment of silence was observed in his honor. Mr. Parks then spoke about Mr. George Bynog and a moment of silence was held in his honor.

4. Adoption of the Agenda

There was a motion to adopt the agenda as presented. The motion was unanimously approved.

5. Approval of the Minutes of July 2008 Meeting

There was a motion to approve the July minutes as presented. The motion was unanimously approved.

6. Review of Rosters/Resignations/Nominations/Reappointments (Attachment 1)

a. Changes to rosters

b. Resignations

c. Nominations for Subgroups/Subcommittees, NBIC Committee members

1. Main Committee

   Mr. Norman Newhouse was unanimously approved for appointment to the Subgroup on Fiber Reinforced Pressure Vessels pending approval of the Chairman of the Board of Trustees.

2. Subcommittee on Installation

   Mr. Harold Tyndall was unanimously approved for appointment to the Subcommittee on Installation pending approval of the Chairman of the Board of Trustees.

3. Subcommittee on Inspection

   Mr. Timothy Barker was unanimously approved for appointment to the Subcommittee on Inspection pending approval of the Chairman of the Board of Trustees.

4. Subcommittee on Repairs and Alterations

   Mr. Wayne Jones was unanimously approved for appointment to the Subcommittee on Repairs and Alterations pending approval of the Chairman of the Board of Trustees. Mr. Brian Boseo was unanimously approved for appointment to the Subgroups Repair and Alterations Specific and General pending approval of the Chairman of the Board of Trustees. Mr. Brian Morelock was unanimously approved for appointment to the Subgroup on Repairs and Alterations General pending approval of the Chairman of the Board of Trustees.

   Mr. Jim Sekely has resigned as Chairman of the Subgroup on Repairs and Alterations Specific. He will continue to contribute to the subgroup as a member.

   Mr. Jim Pillow was unanimously approved for appointment to the position Chairman for the Subgroup on Repairs and Alterations Specific pending approval of the Chairman of the NBIC Committee.

   Mr. Wayne Jones was unanimously approved for appointment to the position of Vice-chairman pending the approval of the NBIC Committee Chairman.

5. Subcommittee on Pressure Relief Devices

   Mr. Alton Cox has changed employers. By procedure, he is terminated from the Subcommittee. However, his new employer fully supports his remaining on the Subcommittee. Mr. Cox was unanimously approved for appointment to the Subcommittee on PRD pending approval of the Chairman of the Board of Trustees.

d. Reappointments

   Mr. Jack Given was unanimously approved for reappointment to the NBIC Main Committee pending approval of the Chairman of the Board of Trustees.

7. Report of Subcommittees(Attachment 2)

a. SC on Inspection

Charge: Responsible for developing new rules, revising, interpreting and maintaining existing rules which address administrative and technical requirements for inspection of pressure retaining items. This subcommittee also directs, supports, reviews and approves any items forwarded by each subgroup functioning under this subcommittee.

Membership: Don Cook (Chair), Steve Bacon, Bill Barbato, Domenic Canonico, Jim Getter, Phillip Martin, Greg McRae, David Parrish, Bob Reetz , John Richardson, Jim Riley, Mike Schwartzwalder, Ron Shapiro, Stan Staniszewski, Randy Wacker and Bill Smith (Secretary).

D. Cook is reported on the following:

1) Inquiries

There were no inquiries submitted for this Subcommittee.

2) Public Review Comments for 2009 Addendum Cycle A

PR09-0201 ***Part 2, 2.2.12.8*** This may be a new action item. In paragraph a) I suggest changing BTUs to the units of measure independent term "thermal energy". This will make the statement independent of U.S. Customary or metric units.

A motion was made to accept this comment for a new business item, NB09-0303. The motion was unanimously approved. A task group of V. Newton (Lead), M. Schwartzwalder and B. Moore has been assigned.

PR09-0202 ***Part 2 , 2.2.12.3 e)*** The proposed new text is not completely accurate. The inclusion of "fuel and ash" is only correct for solid fuel fired boilers, some heavy oil fired boilers, and chemical recovery boilers. Typically at the high point of the boiler where the described nipples are located, it is flyash, slag, or unburned carbon that is deposited on the tubes. The only "fuel" is the unburned char or carbon that is not consumed in combustion.

A motion was made to accept this comment for a new business item, NB09-0304. The motion was unanimously approved. A task group of M. Schwartzwalder (Lead), V. Newton, M. Clark and B. Moore has been assigned.

3) Action Items

NB07-0905 ***Part 2, 4.3.1-4.3.3 SC Inspection*** Review these sections for completeness and consistency in pressure testing. Mr. Cook suggested forming a task group from all three parts. A task group of B. Barbato (Lead), R. Shapiro, D. Parrish, R. Aben and J. Yagen has been assigned.

This item was taken as a progress report. The assigned task group will continue to work on this item.

NB07-0906 ***Part 2, Glossary*** This action item is the result of the need to expand the Glossary with the growth of the NBIC. A task group of S. Bacon (Lead) and D. Cook has been assigned. (See attachment 2, pg. 1)

A definition of "confined space" was presented. A motion was made to accept the definition. The motion was unanimously approved.

NB07-0907 ***Part 2, S4.5 SG on FRP*** This action item is the result of a comment made by John Hoh during the course of the restructure. Review section concerning the omission of AIA for in-service inspections.

There was a motion to close this item with no action taken. The inspector referenced in Part 2 S4.5 is the employee of the certificate holder signified by the lowercase "i" and therefore the AIA is not relevant. The motion was unanimously approved.

NB07-0909 ***Part 2, 2.3.6.4 SG Inspection General*** Review section Liquid Ammonia Vessels. A

task group of R. Reetz (Lead), S. Staniszewski, G. McRae, V. Newton and M. Schwartzwalder has been assigned.

This item was taken as a progress report. The task group will continue to work on this item.

NB07-0910 ***Part 2, S6 SG Inspection Specific*** Review DOT supplement. A task group of S. Staniszewski (Lead), G. McRae and J. Riley has been assigned. This specific Supplement should be reviewed by the task group for completeness and accuracy.

This item was taken as a progress report. Mr. Staniszewski reported that the Federal Government is planning to release a standard on rule making under docket # PHMSA 2005-21351 in June of 2009.

NB07-0912 ***Part 2, SG Inspection Specific Inspection Guides Section 5*** Review the National Board Inspection Guides for Cast Iron Boilers, Pressure Relief Devices, Water Level Controls & Devices and Operating Controls.

This item was taken as a progress report. Three out of the four components have been approved by the Subcommittee. The guide for Pressure Relief Devices has not yet been reviewed. The task group of J. Richardson and R. Wacker will continue to work on this. The Subcommittee on PRD will be given an opportunity to review this section as well

NB07-1006 ***Part 2, S1.4.2.1 l) SG on Locomotive Boilers*** The SG on Locomotives recommends adding a new paragraph and sketch illustrating rivet head wastage for rivets in tension.

Mr. Reetz reported with a handout . There was a motion made to accept the sketch and wording as shown. The motion was unanimously approved. (See attachment 2, pg. 2)

NB07-1013 ***Part 2 SG on Locomotive Boilers*** All the figures (Part 3 S1) from Part 3 should be included in Part 2 as well as in Part 3.

This item was taken as a progress report. The Subgroup on LB will be consulted on this item for more direction.

NB08-0321 ***Part 2, 1.5 SG on Inspection Specific*** In paragraph 1.5 Inspection Activities, add verbiage to address change of service for a pressure vessel. These requirements should caution inspectors, owners, and jurisdictional authorities of the inherent dangers involved when changing service. A new supplement or new Subject under 2.3.6, Description and Concerns of Specific Types of Pressure Vessels, should be added to address the specific requirements for inspection of pressure vessels that have been converted from one service to another. A task group of all three parts of the NBIC has been formed under the leadership of Bob Wielgoszinski. Task group members from Inspection are G. McRae, B. Reetz, R. Wacker, D. Cook, and J. Getter. It was noted that some wording exists in Part 2 1.5.2 (a, 2.3.5.4 b) 5 and 2.3.2 b) that deals with service conditions.

This item was taken as a progress report. The task group from all three parts of the NBIC is comprised of R. Wielgoszinski , G. McRae, R. Wacker, D. Cook, J. Getter, J. Yagen, R. Snyder, G. Scribner, B. Schulte and P. Edwards.

NB08-0701 ***Part 2, S7 SG on Inspection Specific*** Add a requirement for change of service from above ground to below ground installation of LPG tanks. We also need requirements for how to inspect these tanks. A task group of G. McRae (Lead), G. Galanes, J. Getter, M. Huffman, V. Mullins, J. Reed, D. Cook, J. Richardson and V. Newton has been assigned.

This item was taken as a progress report. This item will be discussed in conjunction with NB08-0321.

NB08-0702 ***Part 2, S7 SG on Inspection Specific*** The maximum corrosion allowance for a LPG tank should be 10% of the minimum thickness required. A task group of G. McRae (Lead), G. Galanes, J. Getter, M. Huffman, V. Mullins, J. Reed, D. Cook, J. Richardson and V. Newton has been assigned.

This item was taken as a progress report. The task group will discuss this item at the April 2009 meeting of the Pressure Vessel Manufacturer's Association.

NB08-0703 ***Part 2, S7SG on Inspection Specific*** Investigate the feasibility of marking or stamping a re-rated name plate on a LPG tank that is being altered from an above ground tank to a below ground tank. A task group of G. McRae(Lead), G. Galanes, J. Getter, M. Huffman, V. Mullins, J. Reed, D. Cook, J. Richardson, and V. Newton has been assigned.

This item was taken as a progress report. This item will also be discussed with action item NB08-0321.

NB08-1904 ***Part 2, S6 SG on Insp. Spec.*** Condition of internal structures (pipes, baffles) is an important inspection problem. Loose structures inside tanks destroy internal PRDs. A task group of S. Staniszewski, G. McRae and J. Riley has been assigned.

This item was taken as a progress report. Mr. Staniszewski reported that this item would be contained within the DOT supplement of Part 2.

b. Subcommittee on Repairs and Alterations (Attachment 3)

Charge: Responsible for developing new rules, revising, interpreting and maintaining existing rules which address administrative and technical requirements for repairing or altering pressure retaining items. This Subcommittee also directs, supports, reviews, and approves any items forwarded by each subgroup functioning under this Subcommittee.

Membership: George Galanes (Chair), Paul Edwards, Jack Given, Jim Larson, Frank Pavlovicz, Jim Pillow, Bryan Schulte, Jim Sekely, Mike Webb and John Hoh (Secretary).

George Galanes reported on the following:

1) Inquiries

There were no inquiries submitted for this Subcommittee.

2) Public Review Comments for 2009 Addendum Cycle A

PR09-0102 ***Part 3, 5.7.2*** Insert the word "each".

A motion was made to accept this change and incorporate it into the addendum. The motion was

unanimously approved.

PR09-0301 ***Part 3, 2.5.3 e)*** This text was previously included in the 2004 edition of the NBIC. This particular requirement for nondestructively examining the prepared area of a repair was not brought over during the reformatting of the 2007 edition. It was overlooked. Now that it has been recognized as being required, it should be included as errata and not a revision. An erratum makes this requirement effective with the 2007 edition. A revision will not make this mandatory until the 2009 addendum is published.

A motion was made to accept this comment as errata. The motion was unanimously approved.

3) Action Items

NB05-0122 ***Part 3, 3.3.4 SG on R and A General*** Address requirements for temporary repairs. A task group of G. Galanes, B. Aben and J. Larson has been assigned. A letter ballot was sent to the SC regarding this item. The letter ballot passed. At the July 2008 meeting it was decided to take the item back for more work. Mr. Galanes created a new document with input from the Jurisdictions at their technical meeting in October 2008. The SC will review this newest proposal and present this to the Main Committee.

There was a motion made to letter ballot this item to the NBIC Main Committee. The motion was unanimously approved. The letter ballot will remain open for 4 weeks. If the ballot passes this item will become a part of the 2009 Addendum Cycle B. (See attachment 3, pgs.1-10)

NB05-1201 ***Part 3, 3.4.3 SG on R and A General*** Clarification for alteration. Change in steaming capacity. A letter ballot was sent to the SC. The letter ballot had negative comments that needed to be resolved before the item was sent to the Main Committee. Attached is what was presented at the July meeting. A task group of M. Webb has been assigned.

Mr. Mike Webb presented a handout with proposed wording. There was a motion to accept the proposed wording. The motion was unanimously approved. (See attachment 3, pgs. 11-15)

NB07-1901 ***Part 3*** Suggest including a supplement in Part 3 regarding the repair and alteration of vessels used in LP Gas service. A task group of M. Huffman has been assigned.

Mr. Mike Huffman reported that this action item would be letter balloted to the Subcommittee on Repairs and Alterations. If the ballot passes through the Subcommittee it will then be sent to the NBIC Main Committee for their consideration.

NB08-0304 ***Part 3 Forms 5.13.1 SG on R and A Specific*** The instruction guide for "R" Forms needs to be improved. The form also needs to have the ability to expand to accommodate people filling it out completely. A task group of R. Pulliam (Lead), M. Webb and W. Jones has been assigned.

This action item was taken as a progress report. The assigned task group will continue to work on this item.

NB08-0313 ***Part 3 SC on R and A*** The publication of ASME Section VIII Div. II rewrite brought significant changes. There is a need for the NBIC Committee to look at these changes and change the NBIC as appropriate. A task group of J. Pillow (Lead), P. Edwards and W. Jones

has been assigned.

Mr. James Pillow reported with a handout of proposed wording. There was a motion to accept the proposed wording. The motion was unanimously approved. (See attachment 3, pgs. 16-26)

NB08-0322 ***Part 3 3.2 SG on R and A General*** Add a new paragraph to 3.2 General Requirements for Repairs and Alterations to address change of service for a pressure vessel. These requirements should caution inspectors, owners, repair organizations and jurisdictional authorities of the inherent dangers involved when changing service. A new supplement should be added to address the specific requirements for repairs and alterations of pressure vessels that have been converted from one service to another. A task group of all three parts of the NBIC has been formed under the leadership of Bob Wielgoszinski. Task group members from R and A are P. Edwards and B. Schulte.

This item was taken as a progress report. The task group of all three parts of the NBIC will continue to work on this item.

NB08-1301 ***Part 3, 4.4.1) e) & 4.4.2 c) SG on R and A General*** This action item is a result of PR08-0306. Prohibiting VT as the only means to evaluate repairs and alterations will now mandate some form of NDE or pressure test be performed on load bearing attachments of pressure test be performed on load bearing attachments and weld buildups and if a Jurisdiction does not reference or subscribe to routine repairs, an Inspector will now have to witness the pressure test for non-load bearing structural attachments in all cases. This will create a very costly repair in many cases for no apparent gain. A task group of M. Webb, J. Larson and R. Wielgoszinski has been assigned.

This action item was taken as a progress report. There are plans to letter ballot the subgroup on R and A General before the next meeting.

NB08-1601 ***Part 3 S1.1.3.1 d) SG on LB*** The SG on Locomotive boilers suggests adding the wording, "Maximum allowable tensile stress on staybolts shall be 7,500 psi." Also move the table located in S2.7.1 back to S1.3.1. Add to this table an application entitled "Threaded Staybolts" SA-31 grade A; SA-675 with a tensile strength of 47,000 psi to 65,000 psi.

Mr. Reetz reported with a handout with proposed wording. A motion was made to accept the proposed wording. The motion was unanimously approved.(See attachment 3, pg. 27)

NB08-2001 ***Part 3, 2.2.2 & Table 2.3 SG on R and A General*** Add to Table 2.3 all previously accepted SWPS as in this example: B2.1-1-027:1995, include a footnote to the title of 2.2.2. A task group of P. Edwards (Lead) and B. Schulte has been assigned.

Mr. Paul Edwards reported with a handout with proposed wording. A motion was made to approve the changes presented in the handout. The motion was unanimously approved. (See attachment 3, pgs. 27-31)

NB09-0401 ***Part 3 Table 2.5.3*** Delete this table and use ASME Section IX TemperBead Procedure Qualification Requirements. This action item is a result of a request received by G. Galanes.

Mr. Galanes reported with a handout of proposed wording. A motion was made to accept the wording. The motion was unanimously approved. (See attachment 3, pgs. 32-36)

NB09-0701 ***Part 3 Figure 3.3.4.3 c)*** Revise wording in sketch demonstrating external weld metal buildup terms to include a definition of "r". This action item is the result of a request received by B. Wielgoszinski.

Mr. Wielgoszinski reported with a handout of proposed wording. There was a motion to accept the proposed wording. The motion was unanimously approved. (See attachment 3, pg. 37)

c. Subcommittee on Pressure Relief Devices (Attachment 4)

Charge: To develop new rules, revise, interpret and maintain existing rules which address administrative and technical requirements for installation, inspection and repairs of pressure relief devices.

Membership: Frank Hart (Chair), Marianne Brodeur, Alton Cox, Denis DeMichael, Robert Donalson, Kevin Fitzsimmons, Glyn Humphrey, Thakor Patel, Raymond McCaffrey and Joe Ball (Secretary).

F. Hart reported on the following:

1) Inquiries

There were no inquiries submitted for this Subcommittee.

2) Public Review Comments for 2009 Addendum Cycle A

PR09-0101 ***Part 2 Supplement 8*** The information contained in former Appendix F is not for a "specific pressure retaining item" as described in the scope of Part 2 Section 6. To be consistent with the format of Part 2, suggest inserting former Appendix F at the end of Part 2, Section 2.5 as Section 2.5.9. This action will keep the "general" information on pressure relief devices within Section 2.5 of Part 2.

There was a motion to accept this comment in principle with no change to the NBIC. The motion was unanimously approved.

3) Action Items

NB04-0302 ***Part 3, 5.9.6.3 SC on PRD*** This is a result of inquiry IN4-0201. This item was opened to address clarification of stamping and safety valve verification within the NBIC.

There was a motion to close this item with no action taken. The Subcommittee felt that they could close this item as long as the Main Committee did not make any changes to the Repair and Alteration action item NB05-1201 which was closely related to NB04-0302. The motion was unanimously approved.

NB06-0101 ***Part 3 S7.5 (b) SC on PRD*** This item concerns a proposed revision to paragraph Part 3 S7.5 b) of the NBIC to revise requirements relating to the source of specifications for replacement parts. A proposal was made to the SC on R and A and it failed. It was sent back to the task group for more work. A task group of M. Brodeur (Lead), A. Tannis, S. Cammerisi, B. Nutter, A. Syed, J. Richardson, T. Patel, K. Simmons and R. McCaffrey is assigned.

This item was taken as a progress report. The SC will letter ballot this item prior to the next meeting.

NB07-1206 ***Part 1, 3.9.1.5, 5 SC on PRD*** Address valve loading. Add wording that states that discharge piping is not to apply loading to the pressure relief valve. The task group was also assigned to make sure the topic of loading of pressure relief devices was covered for boilers, heating boilers, pressure vessels, and piping as appropriate, although the initial request concerned heating boilers. A task group of R. Donalson, K. Simmons, G. Humphrey and J. Ball has been assigned.

This item was taken as a progress report. The Subcommittee plans on letter balloting this item before the next meeting.

NB07-1207 ***Part 1, 5.3.6 SC on PRD*** Add sections regarding bolting and flanges and wording to support. A task group of T. Patel, R. McCaffrey and J. Ball has been assigned.

Mr. Hart reported with a handout of proposed wording. There was a motion to accept the wording. The motion was unanimously approved. (See attachment 4, pg. 1)

NB07-1301 ***Part 3, 3.2.2 SC on PRD*** Quality control systems for replacement parts. This item addresses requirements for the manufacturing and quality control for replacement parts to be used for pressure relief valve. A task group of A. Cox (Lead), D. DeMichael, T. Patel, K. Simmons and K. Fitzsimmons has been assigned.

This item was taken as a progress report. The task group will continue to work on this item.

NB07-2204 ***Part 1, 3.9.1.5 a) SC on PRD*** This action item is a result of PR07-0514. Consider adding informative text to cover reaction forces as part of the reason for locating elbows close to safety valves. The task group of R. Donalson (Lead), G. Humphrey and K. Simmons has been assigned.

Mr. Hart reported with a handout of proposed wording. There was a motion to approve the wording. The motion was unanimously approved. (See attachment 4, pg. 2)

NB08-0901 ***Part 2 , 2.2.12.3 SC on PRD*** This action item is a result of PR08-0304. What does solid piping mean?

Mr. Hart reported with a handout of proposed wording. There was a motion to approve the wording. The motion was unanimously approved. (See attachment 4, pg. 3)

NB08-1802 ***Part 2, 2.5.7 SC on PRD*** This action item is a result of IN7-0102. This action has been opened to review requirements for "Try lever" testing in Part 2, paragraph 2.5.7 e), and frequencies for this testing in 2.5.8 A task group of K. Fitzsimmons (Lead), R. McCaffrey, and G. Humphrey has been assigned to work on this item. It was noted that a Jurisdictional representative would be requested to serve as a task group member.

There was a motion to close this item with no action taken. The task group and Subcommittee felt that no change was necessary. The motion was unanimously approved.

NB09-0302 Part 2, 2.5.6 b) 3) This action item is a result of PR08-0905. "In addition to the caution to remove the lifting lever wire, a caution should also be added prohibiting picking up and carrying the pressure relief device using the lever handle.

Mr. Hart reported with a handout of proposed wording. There was a motion to accept the

proposed wording. The motion was unanimously approved. (See attachment 4, pg. 4)

d. SC on Installation (Attachment 5)

Charge: Responsible for developing new rules, revising, interpreting and maintaining existing rules which address administrative and technical requirements for installing pressure retaining items. This Subcommittee also directs, supports, reviews and approves any items forwarded by each subgroup functioning under this Subcommittee.

Membership: Michael Richards (Chair), Paul Bourgeois, Geoff Halley, Craig Hopkins, Stan Konopacki, Brian Moore, Allan Platt, Gary Scribner, Raymond Snyder, Ron Sulzer Neil Titer, Jim Yagen, James McGimpsey (Secretary).

J. Yagen reported on the following:

1) Inquiries

There were no inquiries submitted for this Subcommittee.

2) Public Review Comments for 2009 Addendum Cycle A

There were no public review comments submitted for this Subcommittee.

3) Action Items

NB06-0306 ***Part 1, 3.8.3.1 SG on Boilers*** Address combustion controls for fired boilers. Reference action item NB02-2502. Brian Moore reported that CSD-1 and Section IV are working jointly on controls and safety devices. There were plans to publish in 2008. A task group of B. Moore has been assigned.

This action item was taken as a progress report. Mr. Moore reported that there are plans to publish at the end of April 2009.

NB07-1202 ***Part 1, 2.7.3-2.7.5 SG on Boilers*** Research should be done to address if the terminology is the same with "should" and "may". See the introduction for definitions of terminology. A task group of B. Moore and R. Sulzer has been assigned.

There was a motion made to close this item with no action taken. The Subcommittee determined that these terms were interpretable. The motion was unanimously approved.

NB07-1205 ***Part1, 3.7.5.1 SG on Boilers*** Determine if stop valves are optional. A task group of S. Konopacki has been assigned.

Mr. Yagen reported with a handout of proposed wording. A motion was made to accept the wording. The motion was unanimously approved. (See attachment 5, pg. 1)

NB07-1208 ***Part 1 Glossary (SG Boilers and PVP)*** Expand on the glossary for Part 1 Installation. A task group of C. Hopkins, P. Bourgeois, B. Moore and R. Snyder has been assigned. (No attachment)

This action item was taken as a progress report. The Subcommittee plans to keep this item open for additional work and include updating the index as well.

NB07-2201 ***Part 1, Glossary SG on Boilers*** This action item is a result of PR07-0509. Resolve undefined terms within the Glossary. This item was given as a progress report in error at the last two NBIC meetings. The committee should take action to close this item as it is being addressed under NB07-1208.

There was a motion to close this action item. This information is already covered under NB07-1208. The motion was unanimously approved.

NB07-2203 ***Part 1, S2.3b) Tables SG on V & P*** This action item is a result of PR07-0515. These tables should be provided in metric. A task group of B. Moore has been assigned.

Mr. Moore reported with a handout that shows the tables with the metric conversions. There was a motion to accept these conversions. The motion was unanimously approved. (See attachment 5, pgs. 2-5)

NB08-0319 ***Part 1, 3.7.9.1 SG on V & P*** Remove "Potable Water Heaters" as it is covered under 3.7.9.2. A task group of J. Yagen has been assigned.

Mr. Yagen reported with a handout of proposed wording. There was a motion to accept the proposed wording. The motion was unanimously approved. (See attachment 5, pgs. 6-8)

NB08-0320 ***Part 1.4.3 SC Installation*** This action item is a result of a request from the Federal Railroad Administration. Add a new paragraph in 4.3 General Requirements to address change of service for a pressure vessel. These requirements should caution installers, inspectors, owners, and jurisdictional authorities of the inherent dangers involved when changing service. A new supplement should be added to address the specific requirements for installation of pressure vessels that are being converted from one service to another. A task group has been formed from all three parts of the NBIC led by Bob Wielgoszinski.

This item was taken as a progress report. The task group from all three parts will continue to work on this item.

NB08-2101 ***Part 1 Installation SG on Boilers*** CSD-1 does not address solid fuel firing and it would be appropriate for the NBIC to look into it. A task group of G. Halley (Lead), M. Richards, D. Pranghoffer and B. Moore has been assigned.

This item was taken as a progress report. The task group will continue to work on this item.

NB09-0101 ***Part 1 3.8.1.5 SG on Boilers*** This action item is a result of PR08-0601 and PR08-0702. The commenters' want to re-examine the language that states , "In addition to the requirements in a) and b) above, a secondary low water cut off with manual reset shall be provided on each automatically fired steam or vapor-system boiler with a combined fuel input of 400,000 Btu/hr." They feel it conflicts with CSD-1. (See attachment 5, pgs. 112 - 113)

Mr. Yagen reported with a handout of proposed wording. There was a motion to accept the proposed wording. The motion was approved with one negative vote from Mr. Allan Platt. (See attachment 5, pgs. 9-10)

NB09-0201 ***Part 1, 2.4.SG on Boilers*** This action item is a result of PR08-0701. The commenter thinks the text should be revised to address placement of quick opening valves to meet the requirements of B31.1 which states, "With a quick opening valve closest to the Boiler."

Mr. Yagen reported with a handout of proposed wording. There was a motion to approve the proposed wording. The motion was unanimously approved. (See attachment 5, pgs. 11-12)

NB09-0202 ***Part 1, 3.8.2.3 SG on V&P*** This action item is a result of PR08-0703. "Commonly connected boilers without intervening valves." This statement conflicts with Section IV HG 710.3 requiring stop valves in multiple boiler installations.

Mr. Yagen reported with a handout of proposed wording. There was a motion to approve the proposed wording. The motion was approved with one negative vote from Mr. Allan Platt. (See attachment 5, pgs. 13-15)

NB09-0203 ***Part 1 3.8.2.4 a) and c) SG on Boiler***s This action item is a result of PR08-0704. "With input greater than 400,000 BTU/hr" should be removed from both paragraphs. Paragraph c) needs to address flow of temperature sensing devices.

Mr. Yagen reported with a handout of proposed wording. There was a motion to approve the proposed wording. The motion was approved with one negative vote from Mr. Allan Platt. (See attachment 5, pgs. 16-17)

NB09-0301 ***Part 1 3.8.1.4 SG on V&P*** This action item is a result of PR08-0902. The commenter suggests putting system in front of water to be consistent with ASME Section IV and CSD-1.

There was a motion to close this action item as this issue is covered under NB09-0202. The motion was unanimously approved.

NB09-0501 ***Part 1*** Add the appropriate rules to Part 1 to ensure that Installation rules address the same requirements for pressure vessels and controls as will later be required for Inservice Inspection.

This item was taken as a progress report. A task group of G. Scribner (Lead), R. Snyder and J. Yagen has been assigned.

NB09-0601 ***Part 1 2.2 SG on Boilers*** This action item is a result of PR07-2102 which led to NB07-1212. Please reference these documents. Expand the definition of power boilers.

This item was taken as a progress report. A task group of A. Platt (Lead), G. Scribner, P. Bourgeois and R. Sulzer has been assigned.

NB09-0801 ***Part 1 2.8.1) SG on Boilers*** This paragraph conflicts with PFT-47.1. The commenter suggests we revise it to agree with Section I.

This item was taken as a progress report. A task group of P. Bourgeois and B. Ferrell has been assigned.

9. Liaison Activities (Attachment 6)

- **a.** ASME – Mr. Paul Edwards gave a brief report on ASME activities.
- **b.** AWS – Mr. Jim Sekely reported with a handout of the latest AWS decisions that will affect the NBIC.

10. New Business

11. Future Meetings

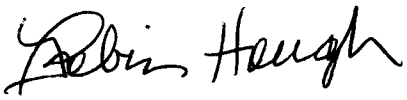
The following meetings have been scheduled:

July 2009, Columbus, Ohio
January 2010, Austin, Texas

12. Adjournment

There was a motion to adjourn the meeting. The motion was unanimously approved. The meeting was adjourned at 12:00.

Respectfully submitted,



Robin Hough
Secretary, NBIC Committee
:rh
H:\ROBIN-Active Documents\Committees\NBIC\Minutes\January 2009\Minutes NBIC 0109.doc

ATTACHMENT 1

Attendance List NBIC Committee

Meeting Date: January 22, 2009

Steven E. Bacon Inspector Supervisor Conoco Phillips Ferndale Refinery 3901 Unick Road PO Box 8 Ferndale, WA 98248 Ph: 360-384-8238 Fax: 360-384-8422 E-mail: steven.e.bacon@conocophillips.com	Attended: Yes ☑ No ☐ *Initial*	**Domenic A. Canonico** Canonico & Assoc. 35 Old Riding Way Signal Mountain, TN 37377 Ph: 423-886-7730 Fax: 423-886-7730 E-mail: canonicod@bellsouth.net	Attended: Yes ☐ No ☐ *Initial*
Jack Given Bureau Chief Department of Labor Boiler Safety Bureau 1101 Mail Service Center Raleigh, NC 27699-1101 Ph: 919-807-2774 Fax: 919-807-2762 E-mail: jack.given@nclabor.com	Attended: Yes ☐ No ☐ *Initial*	**Paul D. Edwards** Manager, Construction QC Stone & Webster, Inc. 100 Technology Center Drive Stoughton, MA 02072 Ph: 617-589-5690 Fax: 617-589-1792 E-mail: paul.edwards@shawgrp.com	Attended: Yes ☒ No ☐ *Initial*
Robin Hough NBIC Coordinator The National Board of B&PVI 1055 Crupper Ave. Columbus, OH 43229 Ph; 614-888-8320 Fax: 614-847-1828 Email: rheilman@nationalboard.org	Attended: Yes ☑ No ☐ *Initial*	**George W. Galanes, PE** Manager, Metallurgy and QA Midwest Generation EME, LLC Joliet Station/Chicago Annex 1800 Channahon Road Joliet, IL 60436-8539 Ph: 815-207-5897 Fax: 312-788-5218 E-mail: ggalanes@MWGen.com	Attended: Yes ☒ No ☐ *Initial*
Ron C. Sulzer The Babcock & Wilcox Company 5955 Grovewood Drive Mentor, OH 44060 Cell: 440-228-6000 Ph: 440-257-3267 E-mail: crsulzer@sbcglobal.net	Attended: Yes ☐ No ☐ *Initial*	**Craig Hopkins** Seattle Boiler Works 500 South Myrtle Street Seattle, WA 98108 Ph: 206-762-0737 Fax: 206-762-3516 E-mail: chopkins@seattleboiler.com	Attended: Yes ☐ No ☐ *Initial*
Robert V. Wielgoszinski Hartford Steam Boiler I & I of CT. One State Street Hartford, CT 06103 Ph: 860-722-5064 Fax: 860-722-5705 E-mail: Robert_wielgoszinski@hsbct.com	Attended: Yes ☑ No ☐ *Initial*	**Terry Parks** The National Board 1055 Crupper Avenue Columbus, OH 43229-1183 Ph: 614-888-8320 Fax: 614-847-1828 E-mail: tparks@nationalboard.org	Attended: Yes ☑ No ☐ *Initial*

Attendance List NBIC Committee

Meeting Date: January 22, 2009

Don Cook Principal Safety Engineer Dept. of Industrial Relations Div. of Industrial Safety & Health 1515 Clay Street, Suite 1302 Oakland, CA 94612-1302 Ph: 510-622-3050 Fax: 510-622-3063 E-mail: dcook@hq.dir.ca.gov	Attended: Yes ☑ No ☐ *Initial*	**Robert Aben** State of Michigan P.O. Box 22504 Lansing, MI 48909 Ph: 517-241-9334 Fax: 517-241-6301 E-mail: rjaben@michigan.gov	Attended: Yes ☑ No ☐ *Initial*
H. Neal Titer MIRANT Mid-Atlantic Systems Engineering 1400 North Royal Street Alexandria, VA 22314 Ph: 703-838-7810 Fax: 703-838-8287 E-mail: neal.titer@mirant.com	Attended: Yes ☑ No ☐ *Initial*	**H. Michael Richards** Southern Company 42 Inverness Center Pkwy. Birmingham, AL 35242 Ph: 205-992-7111 Fax: 205-992-0361 E-mail: hmrichar@southernco.com	Attended: Yes ☐ No ☐ *Initial*
John Richardson Consultant - Dresser, Inc. 980 Richardson Road Colfax, LA 71417 Ph: 318-627-5504 Fax: 318-627-2969 E-mail: jwrichar@aol.com	Attended: Yes ☑ No ☐ *Initial*	**James Sekely** Wayne Crouse, Inc. 716 Vanderbilt Drive Monroeville, PA 15146 Ph: 412-389-5567 Fax: 724-327-7381 E-mail: jsekely@~~adelphia.net~~ comcast.net	Attended: Yes ☑ No ☐ *Initial*
Raymond Snyder Arise 150 Costa Loop Auburndale, FL 33823 Ph:865-965-4417 Fax: 865-967-0185 E-mail: Raymond.snyder@ariseinc.com	Attended: Yes ☑ No ☐ *Initial*	**James M. Yagen** Materials QC Eval. & Testing Dynegy Inc. ~~2828 N. Monroe Street~~ 366 ShoreLine PL Decatur, IL 62521 Ph: 217-519-5196 Fax: E-mail: jim_yagen@dynegy.com	Attended: Yes ☑ No ☐ *Initial*
Stanley Staniszewski, Jr. US Dept. of Transportation, Pipelines & Administration Hazardous Materials Safety 1200 New Jersey Ave. S.E. Washington, DC 20590 Ph: 202-366-4545 x 0453 Fax: 202-366-3753 E-mail: stanley.staniszewski@ dot.gov	Attended: Yes ☑ No ☐ *Initial*	**Robert Reetz** Chief Boiler Inspector North Dakota Insurance Department Boiler Inspection Program 1701 S. 12th Street Bismarck, ND 58504-6644 Ph: 701/328-9607 Fax: 701/328-9610 E-mail:**breetz@nd.gov**	Attended: Yes ☑ No ☐ *Initial*

Attendance List NBIC Committee

Meeting Date: January 22, 2009

Allan Platt State of Connecticut 1111 Country Club Road Middletown, CT 06457 Ph: 860-685-8320 Fax: 860-685-8363 E-mail: Allan.Platt@state.ct.us	Attended: Yes ☑ No ☐ A. P. *Initial*	**James T. Pillow** Common Arc Corporation 67 Wyndemere Lane Windsor, CT 06095 Ph: 860-688-2531 Fax:860-688-2531 E-mail: JPillow@Commonarc.com	Attended: Yes ☑ No ☐ *Initial*
Frank Hart Manager Valve Services Furmanite Houston 6330 Dixie Drive Houston, TX 77087 Ph: 713-844-7623 Fax: 713-844-9245 Email: fhart@Furmanite.com	Attended: Yes ☒ No ☐ *Initial*	**Gary Scribner** Missouri Division of Fire Safety P.O. Box 844 Jefferson City, MO 65102 Ph: 573-751-8708 Fax: 573-526-5971 E-mail: gary.scribner@dfs.mo.gov	Attended: Yes ☒ No ☐ *Initial*
Paul Bourgeois Travelers Insurance 11441 Sarasota Lane Northport, AL 35475 Ph:205-339-6314 Fax: 888-803-1522 E-mail: pcbourge@[redacted]travelers.com	Attended: Yes ☒ No ☐ *Initial*	**David Parrish** FM Global 1151 Bos-Prov Turnpike PO Box 9102 Norwood, MA 0262-9102 P: 781-255-4734 F: 781-762-9375 E: david.parrish@fmglobal.com	Attended: Yes ☒ No ☐ *Initial*
Name: Joseph Ball Address: NATIONAL BOARD Phone: Fax: E-mail: jball@nationalboard.org		Name: Ron Pulciani (RP) Address: Phone: Fax: E-mail:	

ATTACHMENT 2

NB07-0906

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

NB07-1006

S1 4.2.1(l)

S1.4.2 a) **Rivet Head Wastage for Rivet Joint in Tension**

S1 4.2.1(l)

Rivet head wastage for riveted joints in tension should not exceed 0.250d. In Fig. S1.4.2 a) h must be equal to or greater than 0.250 d where:

h = average height of rivet head on circumference of diameter d

d = shank diameter of driven rivet

Note: This calculation is independent of the type and style of the rivet head.

SHALL

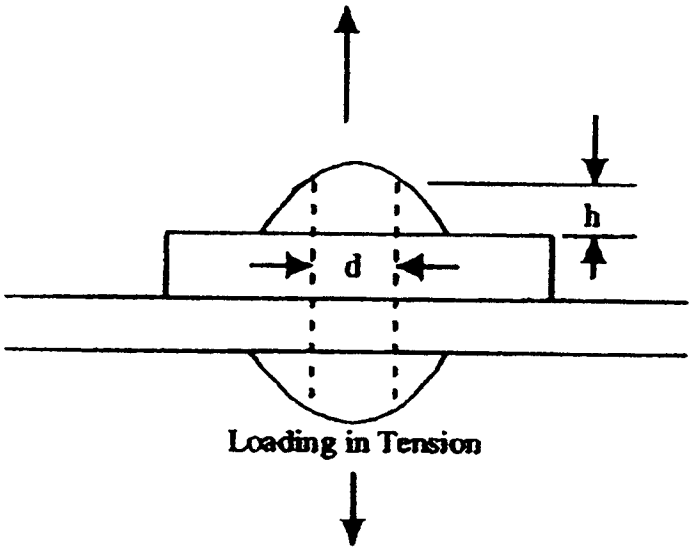


Figure S1.4.2 a)

S1 4.2.1(l)

ATTACHMENT 3

SC

NBIC Subcommittee R&A Action Block

Subject 2007 Edition, Part 3, Paragraph 3.3.4
Repair of Pressure Retaining Items without Complete Removal of Defects

File Number NB05-0122 **Prop. on Pg.** 2-5

Proposed Revision Revise Part 3, paragraph 3.3.4 Repair Methods to address repairs when the defect is not completely removed.

Statement of Need There are instances when it is not practicable to completely remove a defect during repair of a PRI and yet still place the RPI back in service. The proposed rules address the necessary controls needed under these circumstances.

Project Manager G. Galanes B. Aben

SubGroup Negatives 0 **SG Meeting Date** 07/22/08

Background Information for MC Members

In Part 3 of the NBIC, under Section 3.3.4 Defect Repairs, the proposed concept is to add a new section under 3.3.4.8 devoted to repairs that would not result in the complete removal of a defect. I took the position that temporary or interim repairs would not be popular with the Jurisdictions. Instead, this proposal provides rules for Jurisdictions to follow, if they so choose, to deal with repairs of pressure retaining items where defects found may not require complete removal and, in some cases, weld repairs are performed to assure the pressure retaining item is safe to place in operation for repair at a later date or to monitor the item. These concepts are not new and are currently being performed in industry. It is my intention to recognize these options and develop rules for them in the NBIC.

This proposal was discussed during the August, 2008 SG and SC meetings after a letter ballot for the item passed Part 3 R&A SG-Specific and the SC (unanimously). A brief discussion of the item occurred during the Main Committee meeting held in August, 2008 and it was decided to withhold action until the Chiefs meeting in October, 2008.

I presented this item to the Chiefs meeting in Columbus, Ohio and it was well received by them with several constructive comments. What you have before you for your consideration is the final revision of this action item ready for main committee consideration.

Respectfully Submitted;
George Galanes, P.E.

(1)

e) Replacement of heat exchanger tubesheets in accordance with the original design;

f) Replacement of boiler and heat exchanger tubes where welding is involved;

g) In a boiler, a change in the arrangement of tubes in furnace walls, economizer, or super heater sections;

h) Replacement of pressure-retaining parts identical to those existing on the pressure-retaining item and described on the original *Manufacturer's Data Report*. For example:

1) Replacement of furnace floor tubes and/or sidewall tubes in a boiler

2) Replacement of a shell or head in accordance with the original design

3) Rewelding a circumferential or longitudinal seam in a shell or head

4) Replacement of nozzles of a size where reinforcement is not a consideration

i) Installation of new nozzles or openings of such a size and connection type that reinforcement and strength calculations are not a consideration required by the original code of construction;

j) The addition of a nozzle where reinforcement is a consideration may be considered to be a repair provided the nozzle is identical to one in the original design, located in a similar part of the vessel, and not closer than three times its diameter from another nozzle. The addition of such a nozzle shall be restricted by any service requirements;

k) The installation of a flush patch to a pressure-retaining item;

l) The replacement of a shell course in a cylindrical pressure vessel;

m) Welding of gage holes;

n) Welding of wasted or distorted flange faces;

o) Replacement of slip-on flanges with weld neck flanges or vice-versa;

p) Seal welding of buttstraps and rivets;

q) Subject to the administrative procedures of the Jurisdiction and approval of the Inspector, the replacement of a riveted section or part by welding;

r) The repair or replacement of a pressure part with a code accepted material that has a nominal composition and strength that is equivalent to the original material, and is suitable for the intended service; and

s) Replacement of a pressure-retaining part with a material of different nominal composition, equal to or greater in allowable stress from that used in the original design, provided the replacement material satisfies the material and design requirements of the original code of construction under which the vessel was built.

3.3.4 REPAIR METHODS

3.3.4.1 SCOPE

Except as provided in 3.3.4.8

A repair of a defect in a welded joint or base material, shall not be made until the defect has been removed. A suitable Nondestructive Examination (NDE) method such as Magnetic Particle (MT) or Liquid Penetrant (PT) may be necessary to assure complete removal of the defect. If the defect penetrates the full thickness of the material, the repair shall be made with a full penetration weld such as a double buttweld or single buttweld with or without backing. Where circumstances indicate that the defect is likely to recur, consideration should be given to removing the defective area and installing a flush patch or taking other, corrective measures acceptable to the Inspector and when required by the Jurisdiction.

2 of 10

(2)

3.3.4.2 DEFECT REPAIRS

Before a repair is made to a defect in a welded joint or base metal, care should be taken to investigate its cause and to determine its extent and likelihood of recurrence.

a) Cracks
A repair of a crack in a welded joint or base material shall not be made until the defect has been removed. A suitable nondestructive examination method such as a MT or PT may be necessary to assure complete removal of the defect. If the defect penetrates the full thickness of the material, the repair shall be made with a full penetration weld such as a double butt weld or single butt weld with or without backing, as allowed by the original code of construction.

b) Unstayed Boiler Furnace Cracks
Cracks at the knuckle or at the turn of the flange of the furnace opening require immediate replacement of the affected area or specific approval of repairs by the Jurisdiction. See Figure 3.3.4.2-a.

c) Rivet or Staybolt Hole Cracks
Cracks radiating from rivet or staybolt holes may be repaired if the plate is not seriously damaged. If the plate is seriously damaged, it shall be replaced. For suggested methods of repair, see Figure 3.3.4.2-b.

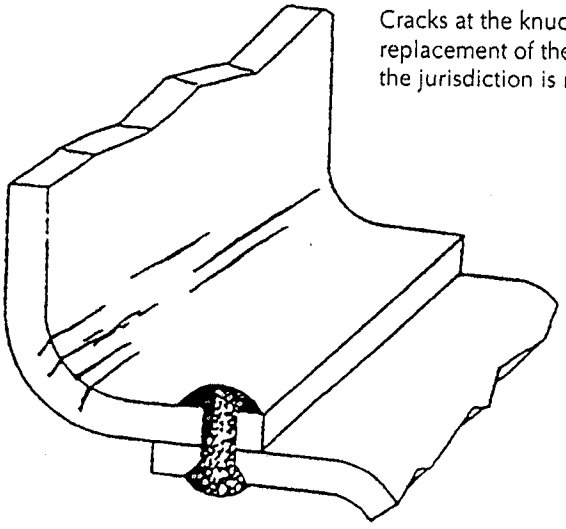
d) Minor Defects
Minor cracks, isolated pits, and small plate imperfections should be examined to determine the extent of the defect and whether repair by welding is required. Prior to repair by welding, the defects shall be removed to sound metal. Liquid penetrant or magnetic particle examination may be used before or after welding.

e) Defective Bolting
Defective bolting material shall not be repaired but shall be replaced with suitable material that meets the specifications of the original code of construction.

f) Bulges

1) A bulge on a watertube shall be investigated to determine the cause and extent of damage to the tube prior to repair. If the bulge has resulted in metallurgical changes to the original tube material, as determined by field metallography, installation of a new length of tubing or tube patch [See 3.3.4.6(b)] is required.

FIGURE 3.3.4.2-a
Unstayed Boiler Furnaces



Cracks at the knuckle or at the turn of the furnace opening require immediate replacement of the affected area. If repairs are attempted specific approval of the jurisdiction is required.

a small bulge. This is referred to as a window patch. Suggested methods for window patches are shown in Figure 3.3.4.6-b.

3.3.4.7 STAYS

Threaded stays may be replaced by welded-in stays provided that, in the judgement of the Inspector, the material adjacent to the staybolt has not been materially weakened by deterioration or wasting away. Requirements of the original code of construction governing welded-in stays shall be met.

3.3.4.8 Insert "A"

3.3.5 ~~REPAIR OF~~ ASME SECTION VIII, DIVISION 2 OR 3, PRESSURE VESSELS

3.3.5.1 SCOPE

The following requirements shall apply for the repair of pressure vessels constructed to the requirements of Section VIII, Division 2 or 3, of the ASME Code.

3.3.5.2 REPAIR PLAN

The user shall prepare or cause to have prepared a detailed plan covering the scope of the repair.

a) Professional Engineer Review
The repair plan shall be reviewed and certified by a Professional Engineer who is registered in one or more of the states of the United States of America or the provinces of Canada, is experienced in pressure vessel design, and is knowledgeable in ASME Section VIII, Division 2 or 3, as applicable. The review and certification shall be such as to ensure the work involved in the repair is compatible with the User's Design Specification and the *Manufacturer's Design Report*.

b) Authorized Inspection Agency Acceptance
Following review and certification, the repair plan shall be submitted for acceptance to the Authorized Inspection Agency/Owner-User Inspection Organization whose Inspector will make the acceptance inspection and sign the Form R-1.

3.4 ALTERATIONS

3.4.1 RE-RATING[10]

Re-rating of a pressure-retaining item by increasing the maximum allowable working pressure (internal or external) or temperature or decreasing the minimum design metal temperature below which notch toughness testing is required by the original code of construction shall be done only after the following requirements have been met to the satisfaction of the Jurisdiction at the location of the installation:

a) Revised calculations verifying the new service conditions shall be prepared in accordance with the "R" Certificate Holder's Quality Control System. Establishing a higher joint efficiency to re-rate a pressure-retaining item is not permitted.

b) All re-ratings shall be established in accordance with the requirements of the construction standard to which the pressure-retaining item was built.

c) Current inspection records verify that the pressure-retaining item is satisfactory for the proposed service conditions.

d) The pressure-retaining item has been pressure tested, as required, for the new service conditions. Any insulation, coatings, or

10 Re-rating: Except as provided for Yankee Dryers in Supplement 5, this code does not provide rules for de-rating boilers or pressure vessels; however, when the MAWP and / or allowable temperature of a boiler or pressure vessel is reduced, the Jurisdiction where the object is installed should be contacted to determine if specific procedures should be followed.

4 of 10

NBIC Subcommittee R&A Action Block

Insert "A"

3.3.4.8 Repair of Pressure Retaining Items without Complete Removal of Defects

(a) There may be cases where removal of a defect in a pressure retaining item is not practical at the time the defect is found. In such cases, with approval of the Inspector and, when required, the Jurisdiction, an engineering evaluation shall be performed to determine the scope of the repair and impact to safety prior to returning the pressure retaining item to service for a specified period of time. The engineering evaluation shall be performed by an organization with demonstrated experience in defect (and flaw) characterization of pressure retaining items. The method of defect evaluation and time interval for returning the pressure retaining item back to service shall be as agreed upon by the Inspector, and when required, the Jurisdiction. The specified period of time the defect can remain in service shall not exceed the remaining life of the pressure retaining item. This repair method is not permitted for vessels used in lethal service or compressed air storage.

(b) One or more fitness-for-service engineering evaluation methods as described in Part 2, Section 4, Paragraph 4.4 shall be used to determine whether the defect may remain, either in part or in whole, in the pressure retaining item. If it is determined that the defect can remain in the item, a risk-based inspection program shall be developed to assure inspection of the defect and monitoring of defect growth over time. This program shall be a controlled and documented inspection program that specifies inspection intervals as agreed upon with the Inspector and, when required, the Jurisdiction, and shall be maintained until the defect can be completely removed and the item repaired.

(c) The following requirements shall apply to the weld repair of pressure retaining items without complete removal of defects;

(1) Engineering evaluation of the defect in the pressure retaining item shall be conducted using one or more fitness-for-service condition assessment method(s) as described in Part 2, Section 4, paragraph 4.4. Engineering evaluation of the condition assessment results shall be performed by an organization that has demonstrated industry experience in evaluating pressure retaining items as referenced in Part 2, Supplement 5.3.

(2) If engineering evaluation indicates a defect can remain in the pressure retaining item, a risk-based inspection program shall be developed and implemented based on review and acceptance by the Inspector and, when required, the Jurisdiction. The risk-based inspection program shall be in accordance with the requirements in Part 2, Section 4.4.

(3) The fitness-for-service condition assessment and risk-based inspection programs shall remain in effect for the pressure retaining item until such time that the defect can be completely removed and the item repaired. The fitness-for-service condition assessment method, results of assessment, and method of weld repair shall be documented on a Report of Fitness for Service Assessment (FFSA) Form as described in Part 2, Section 4, Paragraph 4.4.1 (d) and shall be filed with the Jurisdiction.

(4) When weld repairs are performed without complete removal of the defect(s), this shall be noted on the Form R-1 in the description of the work. The R-Stamp holder performing the weld repairs shall provide detailed information on the Form R-1 describing the method and extent of repair and include the specific location of the repair on the item.

(5)

(5) The interval to either re-inspect or remove the item from service for repair shall be determined based on a risk-based inspection program developed and implemented as required by Paragraph 3.3.4.8 (c) (2). The inspection interval shall not exceed the remaining design life of the item, and shall be documented on the FFSA Form and in the remarks section of the Form R-1. The FFSA Form shall be affixed to the Form R-1 if weld repairs are performed in 3.3.4.8 (c) (4). when

(6) A copy of the completed Form R-1 with the completed FFSA Form attached shall be registered with the National Board, and when required, filed with the Jurisdiction where the ~~repair was made.~~ item is installed.

For INFO only

5.3.7 REPORT OF FITNESS FOR SERVICE ASSESSMENT FORM (NB-403)

The National Board of Boiler and Pressure Vessel Inspectors
REPORT OF FITNESS FOR SERVICE ASSESSMENT

F.F.S. Assessment No. (1)

1. Equipment Owner Information: (2)
(Name)
(Address)

2. FFS Assessment Performed By: (3)
(Name of Organization or Individual)
(Address)

3. Location of Equipment Installation: (4)
(Name of Company)
(Address) (5) (Jurisdiction)

4. Equipment or Component Information: (6)
(MFG SR#, NB#, Jurisdiction# , Year Built, Other)
(Equipment Material Specification, Grade)
(Design & Operating Pressures, Design & Operating Temperatures)

5. Original Code of Construction: (7)
(Name) (Section) (Division) (Edition) (Addendum)

FITNESS FOR SERVICE STANDARD USED FOR ASSESSMENT (8)

6. Flaw Type(s) and/or Damage Mechanisms considered in FFS Assessment: (9)

7. FFS Assessment Procedures (attach FFS Assessment reference documents with details if applicable): (10)

Inspection Results: (11)
(Type of NDE Performed, Pressure Tests, Thickness Measurements, etc.)

Failure Modes Identified: (12)
(Crack-Like Flaws, Pitting, Bulges/Blisters, General or Localized Corrosion, etc.)

(7)

For INFO only

8. FFS Assessments Results / Recommendations (Check boxes that apply and provide details): (13)
☐ Continued Operation (14) ☐ Repair (15) ☐ Replace (16) ☐ Continue Operation Until: (17) (18)

Details (if applicable) _____

9. Owners Inspection Intervals (Based on Assessment): (19) _____
(Months/Years)

10. Inservice Monitoring Methods and Intervals: (20) _____
(Methods, Months/Years)

11. Operating Limitations (if applicable): (21) _____

I, (22) _____ certify that to the best of my knowledge and belief the statements in this report are correct and that the information, data, and identification numbers are correct and in accordance with provisions of the *National Board Inspection Code*, Part 2, 4.4. Applicable documentation is attached to support this assessment.

Owner Name (23) _____
(Printed)

Signature (24) _____ Date (25) _____
(Owner)

Organization Performing Assessment (26) _____
(Name)

Signature (27) _____ Date (28) _____
(Responsible Engineer)

Verified By (29) _____ Employer (30) _____
(Inspector, Printed) (Accredited Inspection Agency)

Signature (31) _____ Date (32) _____
(Inspector)

NB Commission # (33) _____
(National Board & Jurisdiction Number)

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, OH 43229 NB-403 Rev. 0

8 & 10

(6)

For INFO only.

5.3.7.1 GUIDE FOR COMPLETING FITNESS FOR SERVICE ASSESSMENT REPORTS

1. For tracking and reference purposes indicate the sequential Fitness for Service Assessment number.
2. Name and address of the owner of the equipment that is being assessed for Fitness for Service.
3. Name and address of the organization or individual performing the Fitness for Service Assessment.
4. Name and address of the facility where the equipment being assessed for Fitness for Service is located.
5. Name of the Jurisdiction where the assessed equipment is located.
6. Identification of Equipment including Manufacturer, Manufacturer's serial number, National Board Number, Jurisdiction assigned registration number, and Year built. Also include Equipment/Component Material Specification/Grade, Design and Operating Pressures, Design and Operating Temperatures, if applicable.
7. Indicate the name, section, division, edition, and addenda of the original Code of Construction.
8. Name of the Standard used to perform the Fitness for Service Assessment.
9. Description of the Equipment / Component damage mechanism or flaw types considered in the Fitness for Service Assessment.
10. Description of the Fitness for Service Assessment level and technique. Attach all relevant Fitness for Service Assessment procedures and detailed documentation.
11. Description of the Inspection and NDE results as prescribed in the Fitness for Service Assessment analysis.
12. Description of the Failure, Damage and/or Deterioration modes identified in the Fitness for Service Assessment.
13. Indicate the results of the Fitness for Service Assessment, including remediation recommendations.
14. Indicate if the equipment can continue current operation.
15. Indicate if repairs are required.
16. Indicate if equipment replacement is required.
17. Indicate if continued operation has a finite date.
18. Indicate finite date of continued operation (if applicable).
19. Indicate the required Inspection intervals as determined by the Fitness for Service Assessment.
20. Indicate the required inservice monitoring methods and intervals for the equipment as defined by the Fitness for Service Assessment.
21. Describe any operating or inservice limitations for the equipment. This would include any reductions / changes in operating pressures or temperatures.
22. Type or print the name of the representative of the Organization or individual performing the Fitness for Service Assessment.
23. Name of the Owner of the equipment.
24. Signature of Owner.

9 & 10

(9)

25. Indicate the month, day, and year of the Owner review and acceptance of Fitness for Service Assessment.

26. Indicate the name of the organization performing the Fitness for Service Assessment (this may be the same name as in line 22)

27. Signature of the responsible engineer performing the Fitness for Service Assessment.

28. Indicate the month, day, and year of the completion of the Fitness for Service Assessment by the Organization responsible.

29. Type or print the name of the Inspector.

30. Name of the Accredited Inspection Agency employing the Inspector.

31. Signature of the Inspector.

32. Indicate the month, day, and year of the review and acceptance by the Inspector of the Fitness for Service Assessment.

33. National Board commission number of Inspector, Jurisdiction, and Certificate of Competency Numbers.

10 & 10

(10)

Subject:	Clarification of Alterations & relevance to a change in steaming capacity

NB-Item number:	NB04-0302 & NB05-1201 was combined with PR07-0801, 0803, 0804, & 0805 ➡ NB-item NB07-2401 NB-item NB07-2401 closed ➡ **Item NB05-1201** now represents the action

Explanation of Assignment needed:	Much confusion exists due to definition of "alteration" and Examples of Alterations in Part 3 @ 3.4.3 not coinciding. Additionally, this problem has been compounded with the addition of the ASME Form P-7 represented as a, "manufacturer's data report" and the inevitable "change" in the item described when a safety relief valve would require replacement.

Assigned to:	Webb, Pavlovicz

Background:	Item has gone through much discussion and debate relative to the inevitable replacement of the original safety relief valve which may be documented on a Form P-7 to include a one-time use serial number representing "a change" in a Manufacturer's Data Report. Sent to Sub-Committee members as a letter ballot 4-08 with 1-negative received. Negative was addressed during 7-08 meeting and forwarded to MC. Voted @ MC to return to SC for further review relative to replacement of a PRD-replacement using mechanical means. During a previous progress report the Sub-Committee identified that the only relevance to documenting the PRD-replacement on the Form R-1 as a Repair was due to the PRD's attachment weld and the likely requirements for PWHT & NDE-required by the original Code. **NB-Item NB07-2401 was closed @ Seattle NB-meeting and now represents NB-05-1201.**

Existing Text in '08-addenda	Proposed Revision	Rational	Notes during discussion
Part 3, Section 9-Glossary	***Proposed Change #1***		
Alteration: Any change in the item described on the original Manufacturer's Data Report which affects the pressure retaining capability of the pressure-retaining item. Nonphysical changes such as an increase in the maximum allowable working pressure (internal or external) , increase in the design temperature, or a reduction in minimum temperature of a pressure-retaining item shall be considered an alteration.	Alteration: A ~~ny~~ change in the item described on the original Manufacturer's Data Report which affects the pressure retaining capability of the pressure-retaining item. (See sub-section 3.4.3, EXAMPLES OF ALTERATIONS) Nonphysical changes such as an increase in the maximum allowable working pressure (internal or external), increase in the design temperature, or a reduction in minimum temperature of a pressure-retaining item shall be considered an alteration.	"A" change may represent a broader scheme affecting pressure-retaining capability yet identify the comparative information is the Manufacturer's Data Report. ← Numerous inquiries have been submitted by jurisdictions requesting clarification. A change in a serial number may represent mfg. parts or preventative maintenance activities not affecting the PRI's pressure retaining capability.	Changes following original manufacturer's installation represented as tag identification for aligning future maintenance activities, such as an item's serial number does not represent this definition.

5/11

(11)

Existing Text in '08-addenda	Proposed Revision	Rational	Notes during discussion
Part 3, Section 3.3.3	***Proposed Change #2***	**Rational for 3.3.3 "t":**	
3.3.3 EXAMPLES OF REPAIRS s) Replacement of a pressure-retaining part with a material of different nominal composition, equal to or greater in allowable stress from that **Examples "a) thru s)" No Change** the original Code of Construction under which the vessel was built. The minimum required thickness shall be at least equal to the thickness of the material stated on the original Manufacturer's Data Report.	**3.3.3 EXAMPLES OF REPAIRS** s) Replacement of a pressure-retaining part with a material of different nominal composition, equal to or greater in allowable stress from that used in the original design, provided the replacement material meets the design requirements of the original Code of Construction under which the vessel was built. The minimum required thickness shall be at least equal to the thickness of the material stated on the original Manufacturer's Data Report. **Examples "a) thru s)" No Change** Add "t" → t) The replacement of a Pressure Relieving Device (PRD) attached by welding, provided the replacement device's relieving capacity is equal to or greater than the PRD-capacity required by the original code of construction.	An effort is made to re-establish the list of examples to re-align the definitions representing, "A" change deviating from the information documented on the original Manufacturer's Data Report. After many comments and lengthy discussion, at the R&A Sub-committee meeting 1-16-08 a general consensus identified that the Inservice Inspector has the principle responsibility in assuring that adequate overpressure protection exists. Therefore, from a repair and alteration standpoint only the attachment weld or point of attachment of the PRD is within the purview of the Inspector reviewing work to a pressure-retaining item. The pressure-retaining item is represented as the boiler or pressure vessel not the PRD. Relative to mechanical assembly, Jurisdictions identify what reporting requirements are necessary.	Safety valve mfg's are finding ways to improve or increase the coefficient of discharge in safety valve design. Some current replacement models now represent a 10% capacity increase over originally provided models. "Capacity creep" will likely continue as a result of manufacturing improvements and refinements in valve component design. At a glance, capacity creep does not appear detrimental, however, if feedwater control does not maintain drum water level, then a boil-dry situation could take place, upsetting the balance originally designed by the boiler manufacturer...and the requirements of the original code of construction. Prior to the 1996-addenda ASME Section I, minimum required safety relief valve capacity was based on boiler heating surface and a fuel type & delivery factor. Post 1996-addenda, the boiler manufacture identifies the boiler's max. steaming capacity. What if the replaced PRD is attached by mechanical means? ←

5/e

(7)

Existing Text in '08-addenda	Proposed Revision	Rational	Notes during discussion
Part 3, Section 3.4.3	***Proposed Change #3***	**Rational for 3.4.3 "e":**	
3.4.3 EXAMPLES OF ALTERATIONS e) In a boiler, an increase in the heating surface or steaming capacity such that an increase in the relieving capacity is required;	**3.4.3 EXAMPLES OF ALTERATIONS** e) In a boiler, an increase in the heating surface or steaming capacity as described on the original Manufacturer's Data Report. ~~such that an increase in the relieving capacity is required~~: i) The replacement of a Pressure Relieving Device (PRD) as a result of work completed on a Pressure Retaining Item (PRI) that changes the resultant capacity to exceed the Minimum Required Relieving Capacity (MRRC) required by the original code of construction, as described on the original Manufacturer's Data Report.	An increase in relieving capacity; whether required or not required should be fully reported on the Form R-2 per interpretation 01-41. The issue of sufficient relieving capacity should be routinely addressed...and would be with the acceptance of new proposed language @ 5.2.2 b)	

Add & Delete →

Add "i"

SK

Existing Text in '08-addenda	Proposed Revision	Rational	Notes during discussion
Background- Addresses PR-comments PR07-0801-0805 regarding suggestions to rerating nameplates and maximum design steaming capacity from submitter Wayne Matheson May 17, 2007. Also identified a need to revise the "Guide for completing a National Board "R" reports @ 5.13.4.1 to address them. After much discussion, the consensus seems to be that it is not advisable to add words to address specific terms related to objects altered relative to increased design steaming capacity. This brought about more discussion that resulted in the real change needed to establish the minimum required relieving capacity if there is an alteration that could affect the minimum required relieving capacity of the PRD or PRDs. The MDSC (max. design steaming capacity) really only applies to Section I boilers. Alterations affecting btu/hr output for water boilers and low-pressure boilers may also be effected.			
Part 3, Section 5.2.2	***Proposed Change #4***	About proposed change #4:	
5.2.2 PREPARATION OF FORM R-2 (ALTERATIONS) a) Initial preparation- No change b) Final preparation of Form R-2, including the gathering and attaching of supporting reports, shall be...-NO CHANGE c) – NO CHANGE change semi-colon To comma	**5.2.2 PREPARATION OF FORM R-2 (ALTERATIONS)** a) Initial preparation- No change ADD new "b)" b) The information describing an alteration to a pressure-retaining item shall be identified on the Form R-2 with a complete description of the scope of work for physical or non-physical changes. When the scope of work represents a change that will increase the Minimum Required Relieving Capacity (MRRC) of a pressure retaining item such as a change in heating surface, Maximum Designed Steaming Capacity (MDSC), or Btu/hr (W) heating capacity, the new MRRC shall be documented on the Form R-2 and indicated on the appropriate nameplate of Figure 5.9.6-b or Figure 5.9.6-c. **Revise current paragraph references:** **1. The present paragraph 5.2.2 (b) will become 5.2.2 (c).** **2. The current paragraph 5.2.2 (c) will become 5.2.2 (d)**	Revising Nameplate Stamping (New '07-edition figure 5.9.6 –b and c), so that the Inspector is aware of successive projects where any surface area or steaming capacity may have been changed, representing the definition of "alteration". This line if marked, would identify the Minimum Required Relieving Capacity as a result of a change in heating surface or steaming capacity than what was originally provided by the original manufacturer. The ensuing stamped nameplate located adjacent to the original boiler nameplate would, at a minimum, provide a historical trail, recognizing document retention may be limited for 5-years per Part 3, Section 5.5 (c).	

5/14

Existing Text in '08-addenda	Proposed Revision- Additional Change to #4

Existing Text in '08-addenda

FIGURE 5.9.6-b
Required markings for alterations, with use of National Board Form R-2

ALTERED BY
CERTIFICATE HOLDER
R
M.A.W.P. P.S.I.
AT °F
NATIONAL BOARD "R" CERTIFICATE NUMBER
DATE ALTERED

FIGURE 5.9.6-c
Required markings for re-ratings, with use of National Board Form R-2

RE-RATED BY
CERTIFICATE HOLDER
R
M.A.W.P. P.S.I.
AT °F
NATIONAL BOARD "R" CERTIFICATE NUMBER
DATE ALTERED

Proposed Revision- Additional Change to #4

3. **Revise nameplate Fig. 5.9.6-b and 5.9.6-c to add, "Minimum Required Relieving Capacity" on nameplates.**
4. **Add footnotes a-c as noted, adjacent to the proposed figure examples 5.9.6-b and 5.9.6-c**

FIGURE 5.9.6-b
Required markings for alterations, with use of National Board Form R-2

ALTERED BY
CERTIFICATE HOLDER
R
M.A.W.P. P.S.I.
AT °F
NATIONAL BOARD "R" CERTIFICATE NUMBER
DATE ALTERED

Add with the line:

* *Minimum Required Relieving Capacity*

FIGURE 5.9.6-c
Required markings for re-ratings, with use of National Board Form R-2

RE-RATED BY
CERTIFICATE HOLDER
R
M.A.W.P. P.S.I.
AT °F
NATIONAL BOARD "R" CERTIFICATE NUMBER
DATE ALTERED

Add with the line:

* *Minimum Required Relieving Capacity*

* Note: a) Not required when the scope of work does not change the Minimum Required Relieving Capacity.

b) If the line identifying Minimum Required Relieving Capacity is represented on the nameplate and the scope of work does not affect the Minimum Required Relieving Capacity, the line shall be "X'd" to represent "no change".

c) Minimum Required Relieving Capacity may be abbreviated to M.R.R.C.

The 3-footnotes a-c are to be added below or adjacent to figures 5.9.6-b and 5.9.6-c

5/15

(15)

NBIC Subcommittee R&A Action Block

Subject

Engineer Review and Certification of Repair and Alteration Plans

File Number NB08-0313

Prop. on Pg.

Proposal

Revise Part 3, paragraphs 3.3.5.2, 3.4.4.1, S4.6, S4.16.3, S4.17.3 and S4.17.4 to clarify qualification requirements for Engineers reviewing and certifying repair and alteration plans for Section VIII Div. ~~1~~ 2 and Div ~~2~~ 3 and Section X pressure vessels.

Explanation

Recent revisions to Section VIII Div. ~~1~~ 2 and Div. ~~2~~ 3 expanded the qualification criteria for Engineers reviewing and certifying a Manufacturer's Design Report. The proposed revisions are needed to bring the NBIC requirements in line with those of Section VIII. The proposed revisions to Supplement 4 are needed to maintain consistent wording regarding Engineer qualification criteria.

Project Manager

Jim Pillow (Paul Edwards, Wayne Jones)

Task Group Negatives

TG Meeting Date

1/11

(16)

ATTACHMENT "A"

an Engineer meeting the criteria of ASME Section VIII, Division 2 or 3, as applicable, for an Engineer signing and certifying a Manufacturer's Design Report.

ATTACHMENT "B"

an Engineer meeting the Section X criteria for an Engineer certifying Section X compliance of the calculations contained in the Fabricator's Design Report.

ATTACHMENT "C"

NOTE: The Engineer qualification criteria of the jurisdiction where the pressure vessel is installed should be verified before selecting the certifying Engineer.

2/11 (17)

a small bulge. This is referred to as a window patch. Suggested methods for window patches are shown in Figure 3.3.4.6-b.

3.3.4.7 STAYS

Threaded stays may be replaced by welded-in stays provided that, in the judgement of the Inspector, the material adjacent to the staybolt has not been materially weakened by deterioration or wasting away. Requirements of the original code of construction governing welded-in stays shall be met.

3.3.5 REPAIR OF ASME SECTION VIII, DIVISION 2 OR 3, PRESSURE VESSELS

3.3.5.1 SCOPE

The following requirements shall apply for the repair of pressure vessels constructed to the requirements of Section VIII, Division 2 or 3, of the ASME Code.

3.3.5.2 REPAIR PLAN

The user shall prepare or cause to have prepared a detailed plan covering the scope of the repair.

a) Professional Engineer Review AND CERTIFICATION

The repair plan shall be reviewed and certified by a Professional Engineer who is registered in one or more of the states of the United States of America or the provinces of Canada, is experienced in pressure vessel design, and is knowledgeable in ASME Section VIII, Division 2 or 3, as applicable. The review and certification shall be such as to ensure the work involved in the repair is compatible with the User's Design Specification and the *Manufacturer's Design Report*.

REPLACE WITH "A" ATTACHMENT "A"

b) Authorized Inspection Agency Acceptance Following review and certification, the repair plan shall be submitted for acceptance to the Authorized Inspection Agency/Owner-User Inspection Organization whose Inspector will make the acceptance inspection and sign the Form R-1.

3.4 ALTERATIONS

3.4.1 RE-RATING[10]

Re-rating of a pressure-retaining item by increasing the maximum allowable working pressure (internal or external) or temperature or decreasing the minimum design metal temperature below which notch toughness testing is required by the original code of construction shall be done only after the following requirements have been met to the satisfaction of the Jurisdiction at the location of the installation:

a) Revised calculations verifying the new service conditions shall be prepared in accordance with the "R" Certificate Holder's Quality Control System. Establishing a higher joint efficiency to re-rate a pressure-retaining item is not permitted.

b) All re-ratings shall be established in accordance with the requirements of the construction standard to which the pressure-retaining item was built.

c) Current inspection records verify that the pressure-retaining item is satisfactory for the proposed service conditions.

d) The pressure-retaining item has been pressure tested, as required, for the new service conditions. Any insulation, coatings, or

10 Re-rating: Except as provided for Yankee Dryers in Supplement 5, this code does not provide rules for de-rating boilers or pressure vessels; however, when the MAWP and / or allowable temperature of a boiler or pressure vessel is reduced, the Jurisdiction where the object is installed should be contacted to determine if specific procedures should be followed.

INSERT ATTACHMENT "C"

3/11

(19)

NB08-0313

g) Except as permitted in 3.3.3(s), replacement of a pressure-retaining part in a pressure-retaining item with a material of different allowable stress or nominal composition from that used in the original design; and

h) The addition of a bracket or an increase in loading on an existing bracket that affects the design of the pressure-retaining item to which it is attached.

3.4.4 ALTERATION OF ASME CODE SECTION VIII, DIVISION 2 OR 3, PRESSURE VESSELS

3.4.4.1 ALTERATION PLAN

a) Professional Engineer Review (AND CERTIFICATION)
The alteration plan shall be reviewed and certified by a Professional Engineer who is registered in one or more of the states of the United States of America or the provinces of Canada, is experienced in pressure vessel design, and is knowledgeable in ASME Section VIII, Division 2 or 3, as applicable. The review and certification shall be such as to ensure the work involved in the alteration is compatible with the user's design specification and the *Manufacturer's Design Report*.

b) User's Design Specification
If the alteration is such that the work is not compatible with or changes one or more requirement(s) of the original user's design specification, the user's design specification shall be revised by the user with the new parameters or changes. The revisions shall be certified by a Professional Engineer who is registered in one or more of the states of the United States of America or the provinces of Canada, is experienced in pressure vessel design, and is knowledgeable in ASME Section VIII, Division 2 or 3, as applicable.

c) *Manufacturer's Design Report*
The "R" Certificate Holder shall prepare or cause to have prepared a supplement to the manufacturer's design report to reconcile the new parameters or changes with the user's design specification.

The supplement to the manufacturer's design report shall be certified by a Professional Engineer who is registered in one or more of the states of the United States of America or the provinces of Canada, is experienced in pressure vessel design, and is knowledgeable in ASME Section VIII, Division 2 or 3, as applicable.

d) Authorized Inspection Agency Acceptance
Following review and certification, the alteration plan shall be submitted for acceptance to the Authorized Inspection Agency/Owner-User Inspection Organization whose inspector will make the acceptance inspection and sign the Form R-2.

REPLACE WITH ATTACHMENT "A"

INSERT ATTACHMENT "C"

4/11

(A)

c) Barcol hardness tester;

d) small pick or pen knife;

e) small quantity of acetone and cotton swabs;

f) camera with flash capability; and

g) liquid penetrant testing kit.

S4.4 LIMITATIONS

All field work shall be limited to secondary bonding.

S4.5 REPAIR LIMITATIONS FOR FILAMENT WOUND VESSELS

When the MAWP is greater than 200 psig (1.38 MPa), field repair of filament wound ASME Code Section X, Class I vessels shall be limited to corrosion barrier or liner repairs only, provided there is access to the vessel interior. No structural repairs, re-rating, or alterations are allowed for filament wound ASME Code Section X, Class 1 vessels that have an MAWP greater than 200 psig (1.38 MPa).

S4.6 VESSELS FABRICATED USING ELEVATED TEMPERATURE CURED RESIN SYSTEMS

Repair of vessels fabricated using elevated temperature cured resin systems shall be limited to the corrosion barrier or liners only, providing there is adequate access to the vessel surface that requires the repair. No structural repairs, re-rating or alterations are permitted with the following exceptions:

a) Repair of vessels fabricated using elevated temperature cured material is permitted only if the following provisions are met:

1) Calculations must be submitted by a Professional Engineer (P.E.) experienced in the field of FRP vessels. See S4.17.4.

2) The original fabricator must provide its approval showing that the damage does not compromise the pressure rating of the vessel and that the safety factor required by the ASME Code or the original code of construction is maintained.

b) Repairs that results in a revision to the pressure rating of a vessel covered as a part of this section is permitted providing the new rating is less than the original rating and as long as the safety factor required by the ASME Code or the safety factor used as a design basis from the original code of construction is met in its entirety and all the requirements under S4.17, *Additional Requirements for Alterations*, are met.

S4.7 CODE OF CONSTRUCTION

a) When the standard governing the original construction is the ASME Code Section X or ASME RTP-1, repairs and alterations shall conform, insofar as possible, to the section and edition of ASME Code Section X or ASME RTP-1 most applicable to the work planned.

b) When the standard governing the original construction is not the ASME Code Section X or ASME RTP-1, repairs and alterations shall conform to the original code of construction or standard. Where this is not possible, it is permissible to use other codes, standards, or specifications, including the ASME Code (Section X or RTP-1), provided the "RP" designated "R" Certificate Holder (hereafter called the Certificate Holder) has the concurrence of the Inspector and the Jurisdiction where the pressure-retaining item is installed.

INSERT ATTACHMENT "C"

REPLACE WITH "B" ATTACHMENT

5/11

20

During the vacuum test, the vacuum source may be left connected to the vessel to compensate for leakage at fittings. All vessels acoustic emission tested, as required by the original code of construction, shall be retested during the vacuum test concentrating on the repaired or altered part of the vessel.

S4.16 ADDITIONAL REQUIREMENTS FOR REPAIRS

S4.16.1 SCOPE

This section provides additional requirements for repairs to pressure-retaining items and shall be used in conjunction with S4.1 thru S4.14 and S4.18.

S4.16.2 DRAWINGS

Drawings shall be prepared or modified to describe the repair. Drawings shall include sufficient information to satisfactorily perform the repair.

S4.16.3 REPAIR PLAN

When repairs other than those defined in S4.16.4 are being made to ASME Section X or RTP-1 stamped equipment, the user shall prepare or cause to have prepared a detailed plan covering the scope of the repair.

a) Professional Engineer Review AND CERTIFICATION
The repair plan shall be reviewed and certified by a Professional Engineer who is registered in one or more of the states of the United States of America or the provinces of Canada and is experienced in reinforced plastic vessel design. The review and certification shall be such to ensure that the work involved in the repair is compatible with the *User's Design Specification* or *User's Basic Requirements Specification* and the *Manufacturer's Design Report*. The certification shall also include any drawings and calculations prepared as part of the repair plan.

b) Authorized Acceptance
Following review and certification, the repair plan shall be submitted to the Inspector for his review and acceptance. Repairs to pressure-retaining items shall not be initiated without the authorization of the Inspector. Subject to acceptance of the Jurisdiction, the Inspector may give prior approval for routine repairs, provided the Inspector assures that the Certificate Holder has acceptable procedures covering the repairs.

S4.16.4 ROUTINE REPAIRS

Prior to performing routine repairs, the Certificate Holder should determine that routine repairs are acceptable to the Jurisdiction where the work is to be performed.

a) Acceptable routine repairs are listed below:

1) The addition or repair of non-load bearing attachments to pressure-retaining items where post curing is not required.

2) Replacement and repair of damaged corrosion liner areas in shells and heads shall not exceed 100 sq. in. (65 sq. cm) and not exceed the original corrosion liner thickness.

b) Routine repairs may be performed under the Certificate Holder's quality system program; however, the requirement for in-process involvement of the Inspector and stamping are waived. (See Section 5 of this part).

REPLACE WITH ATTACHMENT "B"
INSERT ATTACHMENT "C"

6/11

21

NB 08-0313

c) The process of controlling and implementing routine repairs shall be documented in the Certificate Holder's quality system program.

d) Routine repairs shall be documented on a Form R-1 with a statement on line 10, Remarks: "Routine Repair".

S4.16.5 REPAIR METHODS

The repair methods shall be acceptable to the inspector. Some methods of repair are contained in S4.18.

S4.17 ADDITIONAL REQUIREMENTS FOR ALTERATIONS

S4.17.1 SCOPE

This section provides additional requirements for alterations to pressure-retaining items, and shall be used in conjunction with S4.1 thru S4.14 and S4.18.

S4.17.2 DESIGN

The Certificate Holder performing alterations shall establish controls to ensure that all required design information, applicable drawings, design calculations, specifications and instructions are prepared, obtained, controlled, and interpreted to provide the basis for an alteration in accordance with the original code of construction. When a *Fabricator's Data Report* is required by the original code of construction, a copy of the original data report shall be obtained for use in the design of the alteration. When the original *Fabricator's Data Report* cannot be obtained, agreements on the method of establishing design basis for the alteration shall be obtained from the Inspector and the Jurisdiction.

INSERT ATTACHMENT "C"

S4.17.3 ALTERATION PLAN

The user shall prepare or cause to have prepared a detailed plan covering the scope of the alteration.

ANA CERTIFICATION

a) Professional Engineer Review
The alteration plan shall be reviewed and certified by a Professional Engineer (P.E.) who is registered in one or more of the states of the United States of America or the provinces of Canada and is experienced in reinforced plastic vessel design. The review and certification shall be such as to ensure that the work involved in the alteration is compatible with the user's design specification and the *Fabricator's Data Report*.

b) Authorized Acceptance
Following review and certification, the alteration plan shall be submitted to the Inspector for his review and acceptance. Alterations to pressure-retaining items shall not be initiated without the authorization of the Inspector.

S4.17.4 CALCULATIONS

A set of calculations shall be completed prior to the start of any physical work. All design work shall be completed by an organization experienced in the design portion of the standard used for the construction of the item. All calculations for ASME Code Section X and RTP-1 alterations shall be certified by a P.E. experienced in reinforced plastic vessel design. All calculations shall be made available for review by the Inspector.

S4.17.5 RE-RATING

a) Re-rating of a pressure-retaining item by increasing the maximum allowable working pressure (internal or external) or temperature, or decreasing the minimum

REPLACE WITH ATTACHMENT "B"

7/11

(22)

NB08 - 0313

ANNEX 2.B

GUIDE FOR CERTIFYING A MANUFACTURER'S DESIGN REPORT

(NORMATIVE)

INFO ONLY

2.B.1 General

An individual(s) in responsible charge of the design and construction of the vessel(s) shall certify that the Manufacturer's Design Report is complete, accurate and in accordance with the User's Design Specification, and that all the requirements of this Division and any additional requirements needed for adequate design have been met. Such certification requires the signature(s) of one or more Engineers with requisite experience and qualifications as defined below. One or more individuals may sign the documentation based on information they reviewed, and the knowledge and belief that the requirements of this Division have been satisfied.

2.B.2 Certification of Manufacturer's Design Report

2.B.2.1 One or a combination of methods shown below shall be used to certify the Manufacturer's Design Report.

a) One or more Professional Engineers, registered in one or more of the states of the United States of America or the provinces of Canada and experienced in pressure vessel design, shall certify the Manufacturer's Design Report meets the requirements in paragraph 2.3.3. The Registered Professional Engineer(s) shall apply the Professional Engineer seal in accordance with the required procedures. In addition, the Registered Professional Engineer(s) shall prepare a statement to be affixed to the document attesting to compliance with the applicable requirements of the Code (see paragraph 2.B.2.6). This Professional Engineer shall be other than the Professional Engineer who certifies the User's Design Specification, although both may be employed by or affiliated with the same organization.

b) One or more individual(s), experienced in pressure vessel design shall certify that the Manufacturer's Design Report meets the requirements in paragraph 2.3.3. Such certification requires the signature(s) of one or more Engineers with requisite technical and legal stature, and corporate authority needed for such a document. These responsible individuals shall sign the documentation based on information they reviewed, and the knowledge and belief that the objectives of this Division have been satisfied. In addition, these individuals shall prepare a statement to be affixed to the document attesting to compliance with the applicable requirements of the Code (see paragraph 2.B.2.6).

2.B.2.2 Any Engineer that signs and certifies a Manufacturer's Design Report shall meet either of the criteria shown below.

a) A Registered Professional Engineer who is registered in one or more of the states of the United States of America or the provinces of Canada and experienced in pressure vessel design.

b) An Engineer experienced in pressure vessel design who meets all required qualifications to perform engineering work and any supplemental requirements stipulated by the user. The Engineer shall identify the location under which he has received the authority to perform engineering work stipulated by the user in the Design Specification.

2.B.2.3 The Engineer certifying the Manufacturer's Design Report shall comply with the requirements of the location to practice engineering where that Report is prepared unless the jurisdiction where the vessel will be installed has different certification requirements.

8/11

(23)

NB08-0313

FORM KG-324.1 TYPICAL CERTIFICATION OF COMPLIANCE OF THE MANUFACTURER'S DESIGN REPORT A08

CERTIFICATION OF COMPLIANCE OF
THE MANUFACTURER'S DESIGN REPORT

I (We), the undersigned, being experienced and competent in the applicable field of design related to pressure vessel construction relative to the certified User's Design Specification, certify that to the best of my knowledge and belief the Manufacturer's Design Report is complete, accurate, and complies the the User's Design Specification and with all the other applicable construction requirements of the ASME Section VIII, Division 3 Pressure Vessel Code, _____ Edition with _____ Addenda and Code Case(s) _____. This certification is made on behalf of the Manufacturer _____ (company name) _____

Certified by: _____
Title and areas of responsibility: _____
Date: _____

Certified by: _____
Title and areas of responsibility: _____
Date: _____

Professional Engineer Seal: _____ (as required)
_____
Date: _____

Authorized Inspector review: _____
Date: _____

INFO ONLY

(b) One or more individual(s), experienced in pressure vessel design shall certify that the Manufacturer's Design Report meets the requirements in KG-323. Such certification requires the signature(s) of one or more Engineers with requisite technical and legal stature, and corporate authority needed for such a document. These responsible individuals shall sign the documentation based on information they reviewed, and the knowledge and belief that the objectives of this Division have been satisfied. In addition, these individuals shall prepare a statement to be affixed to the document attesting to compliance with the applicable requirements of the Code; see KG-324.1(g).

KG-324.1 Requirements for Signing and Certifying a Manufacturer's Design Report

(a) Any Engineer who signs and certifies a Manufacturer's Design Report shall meet either of the criteria shown in (1) or (2) as follows:

(1) a Registered Professional Engineer who is registered in one or more of the states of the United States of America or the provinces of Canada and experienced in pressure vessel design.

(2) an Engineer experienced in pressure vessel design who meets all required qualifications to perform engineering work and any supplemental requirements stipulated by the user. The Engineer shall identify the location under which he has received the authority to perform engineering work stipulated by the user in the Design Specification.

(b) The Engineer certifying the Manufacturer's Design Report shall comply with the requirements of the location to practice engineering where that Report is prepared unless the jurisdiction where the vessel will be installed has different certification requirements.

(c) When more than one Engineer certifies and signs the Manufacturer's Design Report the area of expertise shall be noted next to their signature under "areas of responsibilities" (e.g., design, metallurgy, pressure relief, fabrication, etc.). In addition, one of the Engineers signing the

9/11

24

NB08-0313

Manufacturer's Design Report shall certify that all elements required by this Division are included in the Report.

(d) The manufacturer's Design Report shall be certified only after

(1) all design requirements of this Division and the User's Design Specification have been met.

(2) the Manufacturer's Construction Records are reconciled with the Manufacturer's Design Report and with the User's Design Specification.

(e) Certification of the Design Report shall not relieve the Manufacturer of the responsibility for the structural integrity of the completed item for the conditions stated in the User's Design Specification.

(f) The inspector shall review the Manufacturer's Design Report and ensure that the requirements of KG-440 have been satisfied.

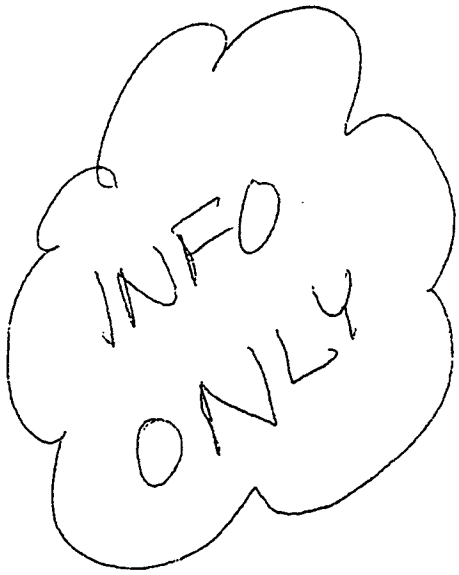
(g) An example of a typical Manufacturer's Design Report Certification Form is shown in Form KG-324.1.

KG-325 Manufacturer's Construction Records (MCR)

The Manufacturer shall prepare, collect, and maintain construction records and documentation of NDE reports,repairs, and deviations from drawings, as production progresses, to show compliance with the Manufacturer's Design Report. An index to the construction records file shall be maintained current. See KS-320.

KG-330 DESIGNER

The Designer is the individual engineer, or group of engineers, experienced in high pressure vessel design, who performs the required analysis of the vessel. The Designer may be in the employ of the Manufacturer, or an Agent acting in his behalf.



10/11

(29)

NB08-0313

INFO ONLY

ARTICLE RD-11
MANDATORY DESIGN RULES FOR CLASS II VESSELS[1]

RD-1100 GENERAL

Class II vessels and vessel parts shall be designed using the stress analysis methods given in this Article. By definition, Class II vessels are those whose designs are qualified by adherence to the mandatory design rules of this Article and are acceptance tested individually as specified in Article RT-6. The engineering constants for laminates used in the design and fabrication of Class II vessels shall be determined in accordance with Article RD-12.

RD-1110 DESIGN BASIS

Two methods of design are permitted under this Article:

(a) Method A — Design Rules: RD-1170

(b) Method B — Discontinuity Analysis: RD-1180

Specific design by either method must be qualified by acceptance testing as specified in Article RT-6. The maximum strain theory of failure is used for Method A, and the quadratic interaction criterion is used for Method B.

RD-1111 Certification of Design

A Professional Engineer knowledgeable in the design of reinforced plastics, registered in one or more of the states of the United States or provinces of Canada, shall certify that the calculations contained in the Fabricator's Design Report are in compliance with the rules of this Article and that the vessel design complies with this Section for Class II vessels.

RD-1120 DESIGN LIMITATIONS

The maximum design pressure and inside diameter of Class II vessels shall be restricted as follows (see Fig. RD-1120.1).

(a) Vessels designed in accordance with Method A (Design Rules) shall be limited to a maximum internal pressure of 100 psi (689 kPa) and a maximum inside diameter of 144 in. (3.66 m).

(b) Vessels designed in accordance with Method B (Discontinuity Analysis) shall have pressure and diameter restrictions as follows:

(1) the algebraic product of the internal pressure [psi (kPa)] and the inside diameter [in. (mm)] shall not exceed 14,400 lb/in. (for Customary units, PD = 14,400 lb/in.; for SI units, PD = 2 522 kPa-m);

(2) the maximum internal pressure shall not exceed 250 psi (1 724 kPa);

(3) the maximum inside diameter shall not exceed 192 in. (4.88 m).

(c) Vessels may be designed using a combination of Methods A and B. For such vessels the maximum design pressure shall be limited to 100 psi (689 kPa) with a maximum inside diameter of 144 in. (3.66 m).

(d) Vessels designed by either Method A or B shall be limited to an external pressure of 15 psi (100 kPa).

(e) Design temperature shall be as limited by RD-112.

RD-1130 DESIGN ACCEPTABILITY

Design acceptability shall be demonstrated by comparing design stress and strain values with calculated buckling values, allowable strain values, and the mechanical properties obtained from the physical test defined in Article RT-7. The appropriate comparison will depend on the governing criterion and is specified in RD-1170 through RD-1189.

RD-1140 LOADINGS

Loadings that must be considered in the design of specific vessels under this Article are specified in RD-120.

[1] The governing principle in the design and fabrication of a Class II vessel is the establishment of the Procedure Specification (Form Q-120) at the time of design and the strict observance of the Procedure Specification during fabrication. The engineering constants of laminate materials upon which the design is based, and from which fabrication will occur, are determined using a mathematical treatment known as laminate theory. Laminate theory utilizes the orthotropic properties of the individual lamina (based on the specific resin–fiber combination), ply sequence, and ply orientations identified in the Procedure Specification to determine the stiffness coefficients and effective elastic properties of the resultant laminate.

The Procedure Specification is qualified by observance of the mandatory design rules of this Article and strict observance of the Procedure Specification during fabrication (as documented by quality control records) to assure that the combinations of resin, reinforcement, ply sequence, and ply orientation upon which the design was based are followed during fabrication.

The structural integrity of the vessel is confirmed by individual acceptance testing of each vessel using acoustic emission monitoring.

11/11

(26)

NB08-1601 → 1/20/2009 — Replace Page 43 of Printed Agenda

The following list is intended as a basic guideline only and covers basic carbon steel and some alloy steel material specifications. Other alloy materials may be available for these applications if necessary.

Add Line → 1

Application	Specification
Boiler Tubes & Flues, Arch Tubes Superheater Units	SA-178 Grade A, SA-192, SA-210
Boiler & Firebox Plate, Pressure Retaining Plate	SA-285 Grade C, SA-515, SA-516, SA-203, SA-204
Staybolts	SA-675, SA-36, ASTM A-31
Staybolt Sleeves and Caps	SA-105 Forging, SA-675
Boiler Braces	SA-675, SA-36
Rivets	SA-675, SA-31
Forged Parts & Fittings	SA-105, SA-181
Pressure-Retaining Steel Castings	SA-216, A-217
Hollow Cylindrical Pressure-Retaining Parts	SA-105 Forgings, SA-675 Bar Stock
Superheater Unit Bolts & Nuts	Bolts - SA-193, Nuts - SA-194
Pipe Flanges	SA-181, SA-105
Pipe	SA-106, SA-53 seamless
A08 Bronze Castings & Washout Plugs	SB-61, SB-62, SB-148

a) SA-516 steel is recommended for firebox repairs. It is a fine grain steel that accepts flanging and bending with less tendency to crack than coarse grain steels such as SA-515 or SA-285 Grade C. Coarse grain steels have, on occasion, been found to crack or split after complicated flanging, bending, and forming.

b) SA-36 shall not be used to make any pressure-retaining part such as shells, staybolt sleeves, or caps.

c) When rivets are made from SA-675, the finished rivets must meet the physical requirements of the original rivet specification or SA-31 Grade A or B.

d) When staybolt material tensile strength is stronger than that of the firebox sheets, the firebox sheets deflect instead of the staybolts, which can result in the sheets developing cracks and leaking staybolts. In addition, high tensile strength steels are difficult to drive.

~~Maximum allowable tensile stress on staybolts shall be 7,500.~~ psi ← Ad.

Staff-add metric value

S1.1.4 FORMULA AND CALCULATIONS FOR STEAM LOCOMOTIVE BOILERS

a) Most steam locomotive boilers were manufactured in the first half of the 20th century or before. The calculations, formula, and shop practices used are now distant history and quite difficult to obtain. The rules for riveted construction were last published by ASME in Section I Code, 1971 Edition.[12]

b) This Supplement herein, is based in part on the ASME Code, Section III, 1952 Edition,[12] which was the last published edition of the Steam Locomotive Code. The railroad industry has attempted to collect the old formula and some shop practices. These have been published by The Engineering Standards Committee for Steam Locomotives, Inc. (ESC) as Compendium, Volume 1, Compilation of Calculations.[13]

~~Welded Staybolts~~	~~SA-675, SA-36 ASTM A-31~~ SA-31 Grade B
~~Threaded Staybolts~~	~~SA-31 Grade A, SA-675 with a tensile strength of 47,000 psi to 65,000 psi inclusive~~

12 This Code is available from the National Board.

13 Copies of *The Engineering Standards Committee for Steam Locomotives, Inc., Compendium, Volume 1, Compilation of Calculations,* may be obtained from the Strasburg Rail Road, P.O. Box 96, Strasburg, PA 17579, 717.687.8421.

27

tion mark may be stamped (low stress stamp) adjacent to welded joints made by the individual or the "R" Certificate Holder may keep a documented record of welded joints and the welders or welding operators used in making the joints.

2.2.6 WELDERS' CONTINUITY

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

a) When the welder or welding operator has not welded using a specific process during a period of six months or more, their qualifications for that process shall expire. The "R" Certificate Holder shall maintain a
A07 welding continuity record and shall make the record available to the Inspector. The method of recording welding continuity and the record retention period shall be described in the "R" Certificate Holder's Quality System Manual.

b) When there is specific reason to question their ability to make welds that meet the specification, the qualification which supports the welding that is being performed shall be revoked. All other qualifications not questioned remain in effect.

2.3 STANDARD WELDING PROCEDURE SPECIFICATIONS (1)

One or more (SWPSs) from Table 2.3 may be used as an alternative to one or more WPS documents qualified by the organization making the repair or alteration provided the organization accepts by certification (contained therein) full responsibility for the application of the SWPS in conformance with the application as stated in the SWPS. When using SWPS's, all variables listed on the standard welding procedure are considered essential and, therefore, the repair organization cannot deviate, modify, amend, or revise any SWPS's. US Customary units or metric units may be used for all SWPSs A07 in Table 2.3, but one system shall be used for application of the entire SWPS in accordance with the metric conversation table contained in the SWPS. The user may issue supplementary instructions as allowed by the SWPS. Standard Welding Procedures Specifications shall not be used in the same product joint together with the other Standard Welding Procedures Specifications or other welding procedure specifications qualified by the organization.

Add a Footnote (1) reference to the title of paragraph 2.3, as follows:

(1) The AWS reaffirms SWPSs in accordance with ANSI procedures. When reaffirmation occurs without revision to the SWPS, the letter "R" is added to the SWPS designation following the year. Such designation is considered to be identical with the previously published version and may be used pending incorporation herein, on the same basis as the version listed in Table 2.3.

NB 08-2001
1/5

97

A08	Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, E7018, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-208-96
A08	Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through1-1/2 in. (38 mm) Thick, E7018, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-208-96(R2007)
A08	Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Carbon Steel, (M-1/P-1, Group 1 or 2), 3/16 in. (5 mm) through 7/8 in. (22 mm) Thick, in the As-Welded Condition, With or Without Backing.	B2.1-002-90, B2.1-002-90(R2006) and B2.1-1-002-90R
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Application.	B2.1-1-207-96
A08	Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Application.	B2.1-1-207-96 (R2007)
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding (Consumable Insert) of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, INMs1 and ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Application.	B2.1-1-210-96
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding with Consumable Insert Root of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, INMs-1, ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-210:2001
	Standard Welding Procedure Specification for Self-Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, E71T-8, As-Welded Condition.	B2.1-1-018-94 and B2.1-1.018-94R
	Standard Welding Procedure Specification for CO2 Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, E70T-1 and E71T-1, As-Welded Condition.	B2.1-1-019-94 and B2.1-1-019-94R
	Standard Welding Procedure Specification for 75% Ar/25% CO2 Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, E70T-1M and E71T-1M, As-Welded or PWHT Condition.	B2.1-1-020-94 and B2.1-1-020-94R
	Standard Welding Procedure for Self-Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 1/2 in. (13 mm) Thick, E71T-11, As-Welded Condition.	B2.1-1-027-1998

Insert A

NB 08-2001
2/5

28

Austenitic Stainless Steel — (M8/P8/S8Materials)

	SMAW — Shielded Metal Arc Welding	
	Standard Welding Procedure Specification for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition.	B2.1-8-023-94
A08	Standard Welding Procedure Specification for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, E3XX-XX, As-Welded Condition, Primarily Pipe Application.	B2.1-8-213-97 and B2.1-8-213-96(R2007)
	GTAW — Gas Tungsten Arc Welding	
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition.	B2.1-8-024-94
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. (1.6 mm) through 1-1/2 in. (38 mm) Thick, ER3XX, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-8-024:2001
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. (1.6 mm) through 1-1/2 in. (38 mm) Thick, ER3XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-212-97
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. (1.6 mm) through 1-1/2 in. (38 mm) thick, ER3XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-212:2001
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding With Consumable Insert Root of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, IN3XX and ER3XX As-Welded Condition, Primarily Pipe Applications.	B2.1-8-215:2001
	Combination Processes GTAW/SMAW	
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition.	B2.1-8-025-94
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, ER3XX and E3XX-XX, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-8-025:2001
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding Followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, ER3XX and E3XX-XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-214-97
	Standard Welding Procedure Specification for Gas Tungsten Arc Welding Followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, ER3XX and E3XX-XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-214:2001

Insert B

NB 08-2001
3/5

Chromium Molybdenum Steel (M4/P4 and M5a/P5A Materials)

SMAW — Shielded Metal Arc Welding	
Standard Welding Procedure Specifications for Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-4/P-4, Group 1 or 2), E8018-B2, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-4-218:1999
Standard Welding Procedure Specifications for Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), E9018-B3, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-5A-223:1999
GTAW — Gas Tungsten Arc Welding	
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding of Chromium-Molybdenum Steel (M-4/P-4, Group 1 or 2), ER80S-B2, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-4-217:1999
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding (Consumable Insert Root) of Chromium-Molybdenum Steel (M-4/P-4, Group 1 or 2), E8018-B2, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, PWHT Condition, IN515 and ER80S-B2, Primarily Pipe Applications.	B2.1-4-220:1999
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), ER90S-B3, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-5A-222:1999
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding (Consumable Insert Root) of Chromium-Molybdenum Steel (M-5A/P-5A), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, PWHT Condition, IN521 and ER90S-B3, Primarily Pipe Applications.	B2.1-5A-225:1999
Chromium-Molybdenum Steel Processes GTAW/SMAW	
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding (Consumable Insert Root) followed by Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-4/P-4, Group 1 or 2), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, PWHT Condition, IN515, ER80S-B2, and E8018-B2, Primarily Pipe Applications.	B2.1-4-221:1999
Standard Welding Procedure Specifications for Gas Tungsten Arc Welded followed by Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, PWHT Condition, ER90S-B3 and E9018-B3, Primarily Pipe Applications.	B2.1-5A-224:1999
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding (Consumable Insert Root) followed by Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, PWHT Condition, IN521, ER90S-B3, and E9018-B3, Primarily Pipe Applications.	B2.1-5A-226:1999

Insert C

NB 08-2001
4/5

20

Insert A

B2.1-1-027:1995 and B2.1-1-027-1998

Insert B

B2.1-8-215:1998 and B2.1-8-215:2001

Insert C

Standard Welding Procedure Specifications (SWPS) for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-4/P-4, Group 1 or 2), 1/8 through 1/2 in. Thick, As-Welded Condition, 1/8 through 1-1/2 in Thick, PWHT Condition, ER80S-B2 and E8018-B2, Primarily Pipe Applications.	B2.1-4-219:1999

NBIC Subcommittee R&A Action Block

Subject Deletion of Table 2.5.3 in Part 3 of the 2007 Edition of the NBIC

File Number NB09-0401 **Prop. on Pg.** NBC Pages 54, 55, 56, 57

Proposal Request to delete Table 2.5.3 in Part 3 of the 2007 Edition of the NBIC

Explanation The request for deletion of Table 2.5.3 was considered. This table no longer is needed and conflicts with Section IX of the ASME Boiler and Pressure Vessel Code regarding temper bead qualification. This table was originally used for guidance because the temper bead method had not been recognized by ASME B&PV Code.

Despite the fact that the NBIC is applicable to other construction codes, it was decided to implement requirements for users to follow Section IX guidelines for temper bead procedure qualification, since it is now recognized by ASME B&PV Code.

Project Manager G.W. Galanes

Task Group Negatives

TG Meeting Date

1) For P-No. 1 Groups 1, 2, and 3 and P-No. 3 Groups 1, 2, and 3, the minimum preheat temperature shall be 350°F (177°C), and the maximum interpass shall be 450°F (232°C).

2) For P-No. 9A, P-No. 10A, P-No. 10B, P-No. 10C, P-No. 11A, or P-No. 11B, the minimum preheat and interpass temperature requirements shall be in accordance with the guidelines in 2.5.1.

3) For P-No. 4 and P-No. 5A materials, the minimum preheat, interpass temperature, and technique shall be in accordance with 2.5.3.4. The repair depth for temper bead repairs to P-No4 and P-No 5A materials shall be in accordance with the requirements of 2.5.3.4(a) .

e) The test material for the welding procedure qualification shall be of the same material specification (including specification type, grade, class, and condition of heat treatment) as the material being repaired. In the event that the notch toughness of the material to be repaired is unknown, evidence from tests of that material or from another acceptable source (see 2.5.3) may be used for the base metal notch toughness when qualifying the WPS as required in 2.5.3.2(h). In the event that the original material specification is obsolete, the test material used should conform as closely as possible to the original material used for construction based on nominal composition and carbon equivalent (IIW Formula)[7], but in no case shall the material be lower in strength.

f) The qualification thickness for the test plates and repair groove depths shall be in accordance with ~~Table 2.5.3.~~

g) The organization making the repair shall Section IX of the ASME Boiler and Pressure Vessel Code.

include, when qualifying its WPS, sufficient tests to determine that the notch toughness of the weld metal and the heat-affected zone of the base metal in the as-welded condition is adequate at the minimum operating and pressure test temperatures (including start-up and shutdown). If for reasons of corrosion resistance, special hardness limits are necessary, such limits shall be included when qualifying the WPS.

h) Notch toughness shall be determined and evaluated by Charpy impact tests in accordance with the provisions of the original code of construction at the temperature determined in accordance with 2.5.3.2(d). Exemptions from impact testing described in the original code of construction are not applicable.

i) For the welding process in 2.5.3.2(c), use only electrodes and filler metals that are classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower. When shielding gases are used with a process, the gas shall exhibit a dew point that is below -60°F (-50°C). Surfaces on which welding will be done shall be maintained in a dry condition during welding and be free of rust, mill scale, and hydrogen producing contaminants such as oil, grease, and other organic materials.

j) After the weld has been deposited flush with the base metal, a surface temper reinforcing weld layer shall be applied.

k) For welds made by SMAW and FCAW, after completion of welding and without allowing the weldment to cool below the minimum preheat temperature, the temperature of the weldment shall be raised to a temperature of 450°F (232°C) minimum for a minimum period of two hours. This hydrogen bake-out treatment may be omitted provided the electrode used is classified by the filler metal manufacturer with a diffusible-hydrogen designator of H4 (e.g., E7018-H4).

7 The IIW Carbon Equivalent Formula is CE= C+ Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15. Elements are expressed in Weight Percent Amounts.

l) After the finished repair weld has cooled to ambient temperature, the surface temper reinforcing layer shall be removed substantially flush with the surface of the base material.

2.5.3.3 WELDING METHOD 3

When using this method, the following is required:

a) This method may be used when the applicable rules of the original code of construction did not require notch toughness testing.

b) The materials shall be limited to any P-No. 1 or P-No. 3 material as permitted for welded construction by the applicable rules of the original code of construction.

c) The welding shall be limited to the SMAW, FCAW, and GTAW processes.

d) The test material for the welding procedure qualification shall be of the same P-No. and Group No. as the base material specification of the repair. In the event that the original material specification is obsolete, the test material used should conform to the nominal composition and carbon equivalent (IIW Formula)[8] as the material being repaired, but in no case shall the material be lower in strength.

e) If for reasons of corrosion resistance, special hardness limits are necessary, such limits shall be included when qualifying the WPS.

f) The qualification thickness for the test plates and repair groove depths shall be in accordance with ~~Table 2.5.3.~~

g) The WPS shall be qualified in accordance Section IX of the ASME Boiler and Pressure Vessel Code.

8 The IIW Carbon Equivalent Formula is CE= C+ Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15. Elements are expressed in Weight Percent Amounts.

with the temper bead procedure qualification requirements in QW-290 of Section IX of the *ASME Boiler and Pressure Vessel Code*, and shall include the following additional requirements:

1) The minimum preheat temperature for welding shall be 350°F (177° C) and the maximum interpass temperature shall be 450°F (232°C).

2) For the welding processes in 2.5.3.3(c), only electrodes or filler metals that are classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower may be used. When shielding gases are used with a process, the gas shall exhibit a dew point that is below -60°F (-50°C). Surfaces on which welding will be done shall be maintained in a dry condition during welding and be free of rust, mill scale, and hydrogen producing contaminants such as oil, grease, and other organic materials.

3) After completion of welding using SMAW and without allowing the weldment to cool below the minimum preheat temperature, the temperature of the weldment shall be raised to a temperature of 450°F (232°C) minimum for a minimum period of two hours. This hydrogen bake-out treatment may be omitted provided the electrode used is classified by the filler metal manufacturer with a diffusible-hydrogen designator of H4 (e.g., E7018-H4).

4) After the finished repair weld has cooled to ambient temperature, the final temper bead reinforcement layer shall be removed substantially flush with the surface of the base material.

2.5.3.4 WELDING METHOD 4

When using this method, the following is required:

34

a) This method is limited to repair welds in pressure-retaining items containing defects not penetrating through the full thickness for which the applicable rules of the original code of construction did not require notch toughness testing.

b) The materials shall be limited to P-No. 4, Groups 1 and 2, and P-No. 5A steels as permitted for welded construction by the applicable rules of the original code of construction.

c) The welding shall be limited to the SMAW, FCAW, or GTAW processes using low-hydrogen electrodes and filler metals classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower, and suitably controlled by maintenance procedures to avoid contamination by hydrogen producing sources. The surface of the metal prepared for welding shall be free of contaminants.

d) The test material for the welding procedure qualification shall be of the same P-No. and Group No. as the original material specification for the repair. In the event that the original material specification is obsolete, the test material used shall conform to the nominal composition and carbon equivalent (IIW formula)[9] as the original material used for construction, and in no case shall the material be lower in strength.

e) If for reasons of corrosion resistance, special hardness limits are necessary, such limits shall be included when qualifying the WPS.

f) The qualification thickness for the test plates and repair groove depths shall be in accordance with ~~Table 2.5.3.~~

g) The welding procedures (WPS) shall be qualified in accordance with the temper bead procedure qualification requirements in QW-290 of Section IX of the *ASME Boiler and Pressure Vessel Code*, and shall include the following additional requirements:

Section IX of the ASME Boiler and Pressure Vessel Code.

1) The minimum preheat temperature for welding shall be 300°F (150°C) for P-No. 4 material and 400°F (200°C) for P-No. 5A material. The preheat temperature shall be checked to assure that 4 in. (102mm) of the material or four times the material thickness (whichever is greater) on each side of the groove (or full thickness of joint for a groove weld) is maintained at the minimum temperature during welding. The interpass temperature shall not exceed 800°F (430°C). When the weld does not penetrate through the full thickness of the material, the minimum preheat and maximum interpass temperature need only be maintained for 4 in. (102mm) or four times the depth of the repair weld (whichever is greater) on each side of the joint.

2) For the welding processes in 2.5.3.4(c), use only electrodes or filler metals that are classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower. When shielding gases are used with a process, the gas shall exhibit a dew point that is below -60°F (-50°C). Surfaces on which welding will be done shall be maintained in a dry condition during welding and be free of rust, mill scale and, hydrogen producing contaminants, such as oil, grease, and other organic materials.

3) After the weld has been deposited flush with the base metal, a surface temper reinforcing weld layer shall be applied.

4) For welds made by the SMAW and FCAW, after completion of welding and without allowing the weldment to cool below the minimum preheat tem-

9 The IIW Carbon Equivalent Formula is CE=C+ Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15. Elements are expressed in Weight Percent Amounts

perature, the temperature of the weldment shall be raised to 450°F (232°C) minimum for a minimum period of two hours. This hydrogen bake-out treatment may be omitted provided the electrode used is classified by the filler metal manufacturer with a diffusible-hydrogen designator of H4 (e.g., E7018 H4).

5) After the finished repair weld has cooled to ambient temperature, the surface temper reinforcing weld layer shall be removed substantially flush with the surface of the base metal (and for a fillet weld to the required size and suitable contour of the toes).

2.5.3.5 WELDING METHOD 5

When using this method, the following is required:

a) This welding method may be used when the applicable rules of the original code of construction or the construction standard or code selected permit joining dissimilar materials used in pressure-retaining items.

b) The materials shall be limited to ASME P-No. 1, Groups 1, 2, and 3, P-No. 3, Groups 1, 2, and 3, P-No. 4, P-No. 5A, P-No. 9A, P-No. 10A, P-No. 10B, P-No. 10C, P-No. 11A, P-No. 11B joined to either P-No. 8, P-No. 42, P-No. 43, or P-No. 45, as permitted for welded construction by the applicable rules of the original code of construction.

c) The welding shall be limited to the SMAW, FCAW, GMAW and machine or automatic GTAW processes. The filler metal used for joining the dissimilar materials shall be either A-No 8 or Nickel-Chrome alloy classification (F-No 43). When selecting a filler metal for dissimilar metal weld joints, determine if the weld joint will be exposed to elevated temperature service. A-No 8 filler metals exposed to service temperatures greater than 800°F (427°C) will exhibit reduced creep life along the fusion zone of the ferritic material due to carbon diffusion. Instead, a low hydrogen, Nickel-Chromium alloy classification filler metal shall be used for dissimilar weld joints exposed to service temperatures at or above 800°F (427°C).

d) The WPS shall be qualified in accordance with the temper bead rules of QW-290 in Section IX of the *ASME Boiler and Pressure Vessel Code*.

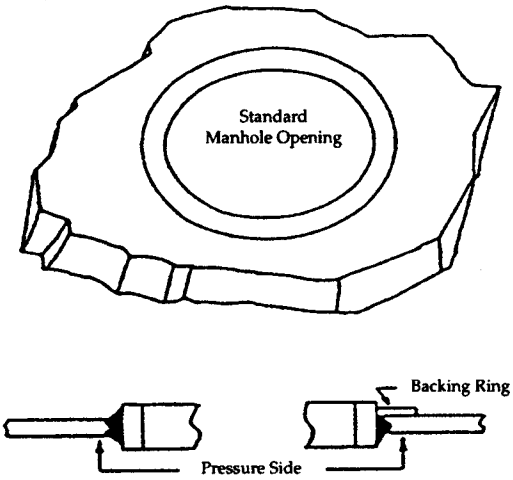
TABLE 2.5.3

Base Metal Thickness	Repair Groove Depth	PQR Test Material Thickness	PQR Groove Depth (Note 2)	Thickness Qualified (Note 1)
< 2 in. (50 mm)	< 1 in. (25 mm)	1 in. (25 mm)	< 1 in. (25 mm)	See PQR test material thickness column
2 in. (50 mm)	> 1 in. (25 mm)	Thickness of the base metal to be repaired	> 1 in. (25 mm)	PQR test material thickness
> 2 in. (50 mm)	1 in. (25 mm)	2 in. (50 mm)	1 in. (25 mm)	All base metal thickness and 1 in. (25 mm) repair groove depth
2 in. (50 mm)	> 1 in. (25 mm)	2 in. (50 mm)	> 1 in. (25 mm)	All base metal thickness and PQR groove depth

Note 1: Repair groove depth is limited to the maximum depth qualified.
Note 2: The depth of the groove used for procedure qualification must be deep enough to remove test specimens.

FIGURE 3.3.4.3-b
Repairs for Access Openings

A badly wasted manhole flange may be removed and replaced with a ring-type frame as shown below. The requirements for flush patches shall be met. A full penetration weld is required. May be either double or welded from one side with or without a backing ring.



A badly wasted area around a handhole opening may be repaired by adding a ring, as shown below, on the inside of the object.

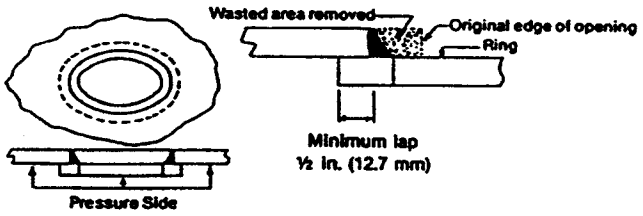
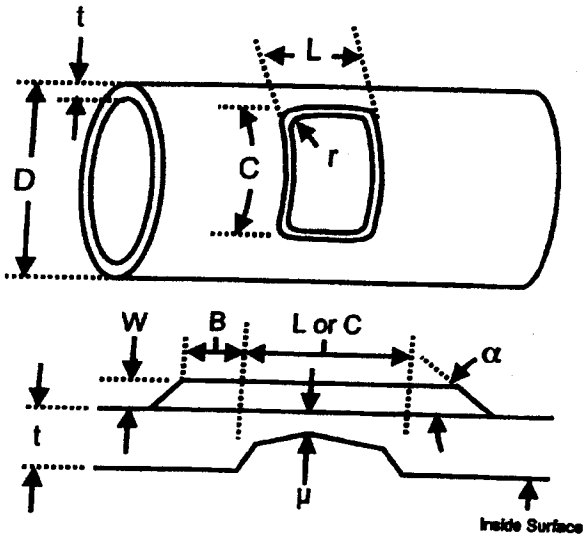


FIGURE 3.3.4.3-c
External Overlay Terms and Definitions



L = length of area to be repaired along the axis of the component
C = length of area to be repaired along outside circumference of the component
W = the completed thickness of the overlay
a = the angle between the component and the overlay (maximum 45°)
B = 3/4 (R t) minimum
R = nominal outside radius of the component
D = the nominal outside diameter of the component
t = nominal wall thickness of the component
μ = remaining wall thickness of the component shall be 1/16 or greater.

ADD:
r = minimum radius , not less than the overlay thickness.

37

NB07-1207

ATTACHMENT 4

Committee: National Board Inspection Code
Sub Committee on Pressure Relief Devices

ADDRESS WRITER CARE OF:
Farris Engineering
Curtisswright Flow Control Corp.
10195 Brecksville Road
Brecksville, Ohio 44141
Phone: 440-838-5090
Fax: 440-838-5194
Email: Tpatel@Curtisswright.com

To: Raymond McCaffery
Thakor Patel
Joe Ball
Frank Hart

Date: 10/20/08

Subject: NB07-1207 Part 1 5.3.6, Add sections regarding bolting and flanges.

Existing Part 1, Paragraph 5.3.6

(f) Pressure relief discharges shall be arranged such that they are not a hazard to personnel or other equipment and when necessary, lead to a safe location for disposal of fluids being relieved.

(g) Discharge lines from pressure relief devices shall be designed to facilitate drainage or be fitted with drains to prevent liquid from collecting in the discharge side of a pressure relief device. The size of discharge lines shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the pressure relief device, or adversely affect the operation of the pressure relief device.

Add following paragraph.

(h) The reaction forces due to discharge of pressure relief device shall be considered in the design of discharge piping, inlet and fittings, flanges, gaskets, and bolting etc.

Renumber the following paragraph.

(i) Pressure relief devices shall be installed so that they are accessible for inspection, repair, or replacement.

Thank you for consideration.

Regards,

Approved by SC-PRD
1/21/09 AS AMENDED.

Thakor Patel

NB07-2204

b) When a Y-base is used, the inlet area shall be not less than the combined outlet areas. When the size of the boiler requires a safety valve or safety relief valve larger than NPS 4 (DN100), two or more valves having the required combined capacity shall be used. When two or more valves are used on a boiler, they may be single, directly attached, or mounted on a Y-base.

3.9.1.2 THREADED CONNECTIONS

A threaded connection may be used for attaching a valve.

3.9.1.3 PROHIBITED MOUNTINGS

Safety and safety relief valves shall not be connected to an internal pipe in the boiler.

3.9.1.4 USE OF SHUTOFF VALVES PROHIBITED

No shutoff of any description shall be placed between the safety or safety relief valve and the boiler, or on discharge pipes between such valves and the atmosphere.

3.9.1.5 SAFETY AND SAFETY RELIEF VALVE DISCHARGE PIPING

a) A discharge pipe shall be used. Its internal cross-sectional area shall be not less than the full area of the valve outlet or of the total of the valve outlets discharging thereinto, and shall be as short and straight as possible and so arranged as to avoid undue stress on the valve or valves. A union may be installed in the discharge piping close to the valve outlet. When an elbow is placed on a safety or a safety relief valve discharge pipe, it shall be located close to the valve outlet downstream of the union.

Add
TO MINIMIZE REACTION MOMENT STRESS

b) The discharge from safety or safety relief valves shall be so arranged that there will be no danger of scalding attendants. The safety or safety relief valve discharge shall be piped away from the boiler to a safe point of discharge, and there shall be provisions made for properly draining the piping. The size and arrangement of discharge piping shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the relieving devices below that required to protect the boiler. A07

3.9.1.6 TEMPERATURE AND PRESSURE SAFETY RELIEF VALVES

Hot-water heating or supply boilers limited to a water temperature of 210°F (99°C) may have one or more National Board capacity certified temperature and pressure safety relief valves installed. The requirements of 3.9.1.1 through 3.9.1.5 shall be met, except as follows:

a) A Y-type fitting shall not be used.

b) If additional valves are used, they shall be temperature and pressure safety relief valves.

c) When the temperature and pressure safety relief valve is mounted directly on the boiler with no more than 4 in. (100 mm) maximum interconnecting piping, the valve should be installed in the horizontal position with the outlet pointed down.

3.9.2 SAFETY VALVE REQUIREMENTS FOR STEAM BOILERS

a) Safety valves are to be manufactured in accordance with a national or international standard.

b) Each steam boiler shall have one or more National Board capacity certified safety valves of the spring pop type adjusted and sealed to discharge at a pressure not to exceed 15 psig (100 kPa).

Approved SC-PRD 1/24/09

(2)

NB08-0901

USING TEXT IN 08 ADDENDA

1-21-09

Part 2,
2.2.12.3 THERMAL FLUID HEATERS

f. **Pressure relief devices** –Pressure relief valves shall be a closed bonnet design with no manual lift lever. The pressure relief discharge should be connected to a closed, vented storage tank or blowdown tank with solid piping *(no drip pan elbow, or other air gap)*. When outdoor discharge is used, the following should be considered for discharge piping at the point of discharge.

Italics = new text

Approved 1/21/09 SC-BRD

NB09-0302

instrumentation, with care taken to avoid rough handling or contamination prior to installation.

b) The following practices are recommended:

1) Valves should be securely fastened to pallets in the vertical position to avoid side loads on guiding surfaces except threaded and socket-weld valves up to 2 in. (50mm) may be securely packaged and cushioned during transport. **A08**

2) Valve inlet and outlet connection, drain connections, and bonnet vents should be protected during shipment and storage to avoid internal contamination of the valve. Ensure all covers and/or plugs are removed prior to installation. **A08**

3) Lifting levers should be wired or secured so they cannot be moved while the valve is being shipped or stored. These wires shall be removed before the valve is placed in service. **A08**

4) Pilot valve tubing should be protected during shipment and storage to avoid damage and/or breakage. **A08**

The valve should not be picked up OR CARRIED USING THE LIFTING LEVER.

2.5.7 TESTING AND OPERATIONAL INSPECTION OF PRESSURE RELIEF DEVICES

a) Pressure relief valves must be periodically tested to ensure that they are free to operate and will operate in accordance with the requirements of the original code of construction. Testing should include device set or opening pressure, reclosing pressure, where applicable, and seat leakage evaluation. Tolerances specified for these operating requirements in the original code of construction shall be used to determine the acceptability of test results.

b) Testing may be accomplished by the owner on the unit where the valve is installed or at a qualified test facility. In many cases, testing on the unit may be impractical, especially if the service fluid is hazardous or toxic. Testing on the unit may involve the

Approved SC-PRD 1/21/09

ATTACHMENT 5

NB-07- 1205 Should Stop Valves Be Optional

Original wording of NBIC section 3.7.5.1

3.7.5.1 STEAM HEATING, HOT-WATER HEATING, AND HOT-WATER SUPPLY BOILERS

~~a) For Single Installations~~
~~Stop valves shall be located at an accessible point in the supply and return pipe connections, as near the boiler as is convenient and practicable.~~

~~b) For Multiple Boiler Installations~~
~~A stop valve shall be used in each supply and return pipe connection of two or more boilers connected to a common system, See Figures 3.7.5-a, 3.7.5-b, and 3.7.5-c.~~

~~c) Types of Stop Valve(s)~~

Recommended wording for section 3.7.5.1.

3.7.5.1 STEAM HEATING, HOT-WATER HEATING, AND HOT-WATER SUPPLY BOILERS

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

b)For Single Hot Water Heating & Hot Water Supply Boilers
(1) Stop valves shall be located at an accessible point in the supply and return pipe connections as near the boiler as is convenient and practicable, of a single hot water boiler installation to permit draining the boiler without emptying the system.
(2) When the boiler is located above the system and can be drained without draining the system, stop valves required on paragraph 3.7.5.1 b(1) may be eliminated.

c) For Multiple Boiler Installations
A stop valve shall be used in each supply and return pipe connection of two or more boilers connected to a common system, See Figures 3.7.5-a, 3.7.5-b, and 3.7.5-c.

d) Types of Stop Valve(s)

Brian W. Moore, P.E.

Existing Text	Proposed Text
S2.3 CALCULATULATION OF SAFETY VALVE RELIEVING CAPACITY a) When a pressure-reducing valve is installed, there are two possibilities of introducing boiler pressure into the low-pressure system: 1) the failure of the pressure-reducing valve so that it remains wide open; and 2) the possibility of the bypass valve being open. b) It is necessary therefore, to determine the flow under both circumstances (a) and (b) and check that the size of the safety valve under either condition will be adequate. The following formula should be used: 1) steam flow, W in lbs/hr through the pressure-reducing valve $W = AKC$ where, A = internal area in sq. in. of the inlet pipe size of the pressure-reducing valve (ref. 2.5) K = flow coefficient for the pressure-reducing valve (see 2.4) C = flow of saturated steam through a 1 sq. in. pipe at various pressure differentials from Table S2.3-a, Table S2.3-b, or Table S2.3-c. 2) steam flow, W in lbs/hr through the by-pass valve $W = A_1K_1C_1$ where, A_1 = internal area in sq. in. of the pipe size of the bypass around the pressure-reducing valve K_1 = flow coefficient for the bypass valves (see 2.4) C_1 = flow of saturated steam through a 1 sq. in. pipe at various pressure differentials from Table S2.3-a, Table S2.3-b, and Table S2.3-c.	b) It is necessary therefore, to determine the flow under both circumstances ~~(a) and (b)~~ in paragraph a) above and check that the size of the safety valve under either condition will be adequate. The following formula should be used: 1) steam flow, W in lbs/hr (kg/hr) through the pressure-reducing valve $W = AKC$ where, A = internal area in sq. in. (sq. mm) of the inlet pipe size of the pressure-reducing valve (~~ref.~~ see S2.5) K = flow coefficient for the pressure-reducing valve (see S2.4) C = flow of saturated steam through a 1 sq. in. (1 sq. mm) pipe at various pressure differentials from Tables S2.3-a, ~~Table~~ S2.3-b, or ~~Table~~ S2.3-c (for U.S. Customary units) or Tables S2.3M-a, S2.3M-b, or S2.3M-c (for metric units). 2) steam flow, W in lbs/hr (kg/hr) through the by-pass valve $W = A_1K_1C_1$ where, A_1 = internal area in sq. in. (sq. mm) of the pipe size of the bypass around the pressure-reducing valve (see S2.5) K_1 = flow coefficient for the bypass valves (see S2.4) C_1 = flow of saturated steam through a 1 sq. in. (1 sq. mm) pipe at various pressure differentials from Tables S2.3-a, ~~Table~~ S2.3-b, or ~~Table~~ S2.3-c (for U.S. Customary units) or Tables S2.3M-a, S2.3M-b, or S2.3M-c (for metric).

Brian W. Moore, P.E.

Background: These equations came from the NBIC 2004 with 2006 Addenda Appendix G-4000 and Tables G-4000 and G-5000. When printed in the 2007 Edition with 2007 Addenda, the formulae were carried over, but the parenthetic metric equivalents were taken out of the text. In the general flow equation W=AKC, the flow coefficient K is dimensionless and is valid for both U.S. Customary units as well as metric units. As long as the variables A (area) and C (flow capacity) are in a consistent set of units (i.e., either U.S. Customary or metric units) the equation holds true for a unit flow through a unit area.. See attached calculations for validation. The value of K only depends on the valve and is independent of the units of measure. So technically, only the standard textbook flow equation is needed for both situations. However, to help the users keep the pressure reducing valve and the bypass separate, it is probably better to maintain separate K and K_1 equations.

NBIC 2004 with 2006 Addendum
G-4000 CALCULATION OF SAFETY
VALVE RELIEVING CAPACITY

When a pressure-reducing valve is installed, there are two possibilities of introducing boiler pressure into the low pressure system:

a. the failure of the pressure-reducing valve so that it remains wide open;

b. the possibility of the bypass valve being open.

It is necessary therefore, to determine the flow under both circumstances (a) and (b) and check that the size of the safety valve under either condition will be adequate. The following formula should be used:

Check calculation of US Customary versus metric safety valve flow equations

US Customary	Metric	
$P_{in} := 1100 \cdot psi$	$P_{in} = 7.58 \cdot 10^6 \cdot Pa$	P_{in} and P_{out} determine the value of C from the Tables 2.3
$P_{out} := 600 \cdot psi$	$P_{out} = 4.14 \cdot 10^6 \cdot Pa$	
$A := 1 \cdot in^2$	$A = 645.16 \cdot mm^2$	Calculate W based on the above pressures, a pipe area of 1 in^2, and a K value of 1/3
$K := 0.333333$		
$C := 56270 \cdot \frac{lb}{hr \cdot in^2}$	$C = 39.562 \cdot \frac{kg}{hr \cdot mm^2}$	Using Table S2.3-a, the US Customary value of C for the input conditions is directly converted to metric units.
$W := A \cdot K \cdot C$		Formula for W in US Customary units.
$W = 18757 \cdot \frac{lb}{hr}$	$W = 8508 \cdot kg \cdot \frac{1}{hr}$	Value of W directly converted to metric.

Now, to validate that the US Customary formula and the Metric formula are the same, determine W using the same conditions, but determine the C value from the tables. If the C values match, then the flow will match and one equation works in both units.

To determine the metric C value for the same conditions as above requires a double interpolation of the table entries - first on the C values at the bounding pressures then on the C values on the pressure between the bounding values.

First interpolation is for the C value at 4.0 MPa.

$P_{in} = 7.58 \cdot 10^6 \cdot Pa$	$P_{in} = 1100 \cdot psi$
$x_1 := 7.75 \cdot 10^6 \cdot Pa$	$y_1 := 40.48$
$x_2 := P_{in}$	y_2 is the desired value
$x_3 := 7.50 \cdot 10^6 \cdot Pa$	$y_3 := 39.12$

$$y_2 := \frac{(x_2 - x_1) \cdot (y_3 - y_1)}{(x_3 - x_1)} + y_1 \qquad y_2 = 39.578$$

General interpolation procedure

x_1 y_1

x_2 y_2

x_3 y_3

The x values are available pressure valves from the table. The y values are the C values from Table S2.3M-a.

Interpolation at P_{in} = 1000 psi

Then at Pin = 600 psi

And finally, interpolate between the two above results.

Next interpolate for the C value at 4.25 MPa

$P_{out} = 4.137 \cdot 10^6 \cdot Pa$ $P_{out} = 600 \cdot psi$

$x_1 \quad 7.75 \cdot 10^6 \cdot Pa$ $y_1 \quad 40.46$

$x_2 \quad P_{in}$ y_2 is the desired value

$x_3 \quad 7.50 \cdot 10^6 \cdot Pa$ $y_3 \quad 39.10$

$y_2 \quad \frac{(x_2 - x_1) \cdot (y_3 - y_1)}{(x_3 - x_1)} + y_1$ $y_2 = 39.558$

Finally, interpolate between 4.0 and 4.25 MPa

$x_1 \quad 4.25$ $y_1 \quad 39.578$

$x_2 \quad 4.137$ y_2 is the desired value

$x_3 \quad 4.00$ $y_3 \quad 39.558$

$y_2 \quad \frac{(x_2 - x_1) \cdot (y_3 - y_1)}{(x_3 - x_1)} + y_1$ $y_2 = 39.569$

Compared to 39.562 from the look up in the US Customary table. This is only 0.028% difference.

CONCLUSION: The only changes needed in the formulae in paragraph S2.3 are to add the metric units in the variable definitions.

Final check: substitute back into the equation.

$A = 645.16 \cdot mm^2$

$C \quad 39.569 \cdot \frac{kg}{hr \cdot mm^2}$

$K = 0.33333$

$W \quad A \cdot K \cdot C$

$W = 8509 \cdot kg \cdot \frac{1}{hr}$

Compared to 8508 from the US to metric conversion above.

National Board Inspection Code
Subcommittee Installation
Subgroup on Pressure Vessels and Piping

NB08-0319

Members:

Jim Yagen

Task Group Assignment

Part 1 Section 3.7.9.1

Remove Potable Water Heaters as it is covered under 3.7.9.2

Source

National Board Staff

Discussion

A proposal of new wording was approved at the subgroup and subcommittee level. At the Main Committee meeting (July 2008) it was decided more work needed to be done and it was given as a progress report.

Proposal

Make the changes shown below on page 47, of NBIC Part 1 Installation 08 Addendum.

3.7.9.1 EXPANSION TANKS AND PIPING FOR STEAM HEATING, HOT-WATER HEATING, AND HOT-WATER SUPPLY BOILERS~~, AND POTABLE WATER HEATERS~~

a) Expansion Tanks for Hot-Water Heating, and Hot Water Supply Boilers. All hot-water heating systems incorporating hot-water tanks or fluid relief columns shall be so installed as to prevent freezing under normal operating conditions.

Make the changes shown below on page 48, of NBIC Part 1 Installation 08 Addendum

3) Hot-Water Supply Systems ~~and Potable Water Systems~~

Make the changes shown below on page 49, of NBIC Part 1 Installation 08 Addendum

3.7.9.2 EXPANSION TANKS AND PIPING FOR POTABLE WATER HEATERS

a) Expansion Tanks

If a system is equipped with a check valve or pressure-reducing valve in the cold water inlet line, consideration should be given to the installation of an airtight expansion tank or other suitable air cushion. Otherwise, due to the thermal expansion of the water, the safety relief valve may lift periodically. If an expansion tank is provided, it shall be constructed in accordance with an acceptable code of construction. The minimum capacity of the expansion tank may be determined from Table ~~3.7.9.1-e~~ 3.7.9.2. See Figures 3.7.5-d and 3.7.5-e for a

(7)

Table ~~3.7.9.1-e~~ 3.7.9.2
EXPANSION TANK CAPACITIES for a POTABLE WATER HEATER (Note)

Tank Capacities, gal. (l)

System Volume, gal. (l)	Prepressurized Diaphragm type	Nonpressurized type
50 (190)	1 (4)	3 (11)
100 (380)	2 (8)	6 (23)
200 (760)	3 (11)	12 (45)
300 (1140)	4 (15)	18 (68)
400 (1514)	5 (19)	24 (91)
500 (1890)	6 (23)	30 (114)
1,000 (3790)	12 (45)	60 (227)
2,000 (7570)	24 (91)	120 (454)

Note: Capacities in this table are given as a guide to reduce or eliminate relief valve weeping under conditions of partial water system demands or occasional water draw during recovery.

System volume includes water heater capacity plus all piping capacity for a recirculation system or potable water heater capacity only for a nonrecirculation system.

The capacities are based upon a water temperature rise from 40°F to 180°F (4°C to 80°C), 60 psig (414 kPa) fill pressure, maximum operating pressure of 125 psig (862 kPa) 20% water recovery, and an acceptance factor of 0.465 for prepressurized types, and 0.09156 for nonpressurized types. For other cases or metric calculations see Chapter 12 of the 1996 *HVAC Systems and Equipment* Volume of the ASHRAE Handbook.

typical acceptable installation. Except for pressurized diaphragm-type tanks, which should be installed on the cold water side, provisions shall be made for draining the tank without emptying the system.

b) Piping
Provisions shall be made for the expansion and contraction of hot water mains connected to potable water heater(s) so that there will be no undue stress transmitted to the potable water heater(s). See figures 3.7.5-d and 3.7.5-e for typical schematic arrangements of piping incorporating strain absorbing joints.

8

(3)

NB09-0101 *Part 1* This action item is a result of PR08-0601 and PR08-0702.

3.8.1.5 AUTOMATIC LOW-WATER FUEL CUTOFF AND/OR WATER FEEDING DEVICE

c) In addition to the requirements in a) and b) above, a secondary low water fuel cuttoff with manual reset shall be provided on each automatically fired steam or vapor-system boiler. ~~with a combined fuel input of greater than 400,000 Btu/hr (117 kW).~~

January 22, 2009

Dear Terry,

Please accept below my reasons for a negative vote on January 22, 2008 at the NBIC main committee meeting.

NB09-0101 Part 1 3.8.1.5 (c) PR08-0601 and PR08-0702
Submitted by Jack Given &
Gary Scribner respectively.

The main committee voted to affirm the sub-committee vote to strike the exception for a secondary low water cut off on steam boilers under 400,000 Btus (117kW). Compromise language allowing jurisdictional discretion within the NBIC was rejected.

Reasons for my negative vote.

1) Personal experience in my jurisdiction, nor any other evidence presented, convinces me of the necessity.

2) Physically impossible in some instances.

Al Platt-CT

Al Platt, Brian Moore, Gary Scribner, Jack Given

Existing Text	Proposed Text
2.7.5 Blowoff a) Except for forced-flow steam generators with no fixed steam or water line, each boiler shall have a blowoff pipe, fitted with a stop valve, in direct connection with the lowest water space practicable. When the maximum allowable working pressure of the boiler exceeds 100 psig (700 kPa), there shall be two valves installed. b) The blowoff piping for each electric boiler pressure vessel having a nominal water content not exceeding 100 gal. (378 l) is required to extend through only one valve. c) ~~One of the blowoff valves shall be a slow-opening valve. When a second valve is required, the second valve may be a quick-opening or slow-opening valve.~~	Part 1 2.7.5 Blowoff c) When two valves are required, each bottom blowoff pipe shall have two slow-opening valves, or one quick-opening valve, at the boiler nozzle followed by a slow-opening valve.

Al Platt, Brian Moore, Gary Scribner, Jack Given

(4)

BACKGROUND – FOR INFORMATION ONLY

B31.1 -- 2007
122.1.7 Valves and Fittings.

(C) Blowoff Valves

(C.4) For all boilers [except electric steam boilers having a normal water content not exceeding 100 gal (380 L), traction-purpose, and portable steam boilers; see (C.11) and (C.12) below] with allowable working pressure in excess of 100 psig [690 kPa (gage)], each bottom blowoff pipe shall have two slow-opening valves, or one quick-opening valve or cock, at the boiler nozzle followed by a slow-opening valve. All valves shall comply with the requirements of (C.5) and (C.6) below.

(C.10) Two independent slow-opening valves, or a slow-opening valve and a quick-opening valve or cock, may be combined in one body and may be used provided the combined fitting is the equivalent of two independent slow-opening valves, or a slow-opening valve and a quick-opening valve or cock, and provided further that the failure of one to operate cannot affect the operation of the other.

(C.11) Only one blowoff valve, which shall be either a slow-opening or quick-opening blowoff valve or a cock, is required on traction and/or portable boilers.

(C.12) Only one blowoff valve, which shall be of a slow-opening type, is required for the blowoff piping for forced circulation and electric steam boilers having a normal water content not exceeding 100 gal (380 L). Electric boilers not exceeding a normal water content of 100 gal (380 L) and a maximum MAWP of 100 psig [690 kPa (gage)] may use a quick-opening manual or slow-opening automatic quarter-turn valve up to NPS 1. Electric boilers not exceeding a normal water content of 100 gal (380 L) but with a MAWP greater than 100 psig [690 kPa (gage)] shall only use either a slow-opening type manual or automatic valve, regardless of size.

Section I -- 2007

PG-58.3.6 The blowoff piping for all boilers, except forced-flow steam generators with no fixed steam and waterline, high-temperature water boilers, and those used for traction and/or portable purposes, when the maximum allowable working pressure exceeds 100 psi (700 kPa) shall extend through and including the second valve. The blowoff piping for all traction and/or portable boilers and for forced circulation and electric boilers having a normal water content not exceeding 100 gal (380 L) are required to extend through only one valve.

PG-59.3.3 Each boiler except forced-flow steam generators with no fixed steam and waterline and high-temperature water boilers shall have a bottom blowoff outlet in direct connection with the lowest water space practicable for external piping conforming to PG-58.3.6.

National Board Inspection Code
Subcommittee Installation
Subgroup on Boilers

NB09-0202

Members:

Jim Yagen

Task Group Assignment

Part 1 Section 3.8.2.3

The wording, "commonly connected boilers without intervening valves" conflicts with Section IV HG 710.3

Source

Public Review Comment 2008 Addendum – Cycle B
PR08-0703

Discussion

HG 710 STOP VALVES

HG-710.1 For Single Steam Boilers
HG-710.2 For Single Hot Water Heating Boilers
HG – 710.3 For Multiple Boiler Installations. A stop valve shall be used in each supply and return pipe connection of two or more boilers connected to a common system. See Figs. HG-703.1 and HG-703.2.

Proposal

3.8.2.3 TEMPERATURE CONTROL

Each automatically fired hot-water heating or hot-water supply boiler shall be protected from over-temperature by two temperature-operated controls.

A08 a) Each individual hot-water heating or hot-water supply boiler or each system of commonly connected boilers ~~without intervening valves~~ shall have a control that will cut off the fuel supply when the water temperature reaches an operating limit, which shall be less than the maximum allowable temperature.

A08 b) In addition to a) above, each individual automatically fired hot-water heating or hot-water supply boiler ~~or each system of commonly connected boilers without intervening valves~~ shall have a safety limit control with manual reset that will cut off the fuel supply to prevent the water temperature from exceeding the maximum allowable temperature at the boiler outlet.

January 22, 2009

Dear Terry,

Please accept my reasons below for a negative vote on January 22nd at the NBIC Main committee meeting.

NB09-0202 Part 1 Section 3.8.2.3 PR08-0704
Submitted by Gary Scribner

The Main-Committee voted in favor of language which would allow for the required operating control on each boiler or **"system of commonly connected boilers"** to be installed as a common control external to the boiler and, as I understand it possibly at a remote "system" location.

Reasons for my negative vote.

1) Connecticut has an **object based** rather than "system based" inspection scheme. The current "without intervening valves" recognizes this. The new language would place the required operating control outside jurisdictional scope.
2) From a control perspective even modular boiler requirements have proved to be confusing for installers, owner/users, and inspectors. "Commonly connected boilers" as a stand alone phrase appears to me to open up a whole additional scenario inviting confusion and much future interpretation.
3) While understanding the difference, (marginal at times), between a control and safety device, I believe the danger in the new language is the isolation of a single "commonly connected boiler" from a "control" device through the inadvertent closing of the supply and return valves, reducing the devices that will shut down the boiler due to temperature rise from two to one. This seems to me to contradict the purpose of a secondary aquastat.
4) System water temperature is not boiler water temperature and I believe the new language may blur this important distinction for some.

Al Platt-CT

NB09-0203 ***Part 1 3.8.2.4 a) and c) SG on Boilers*** This action item is a result of PR08-0704

3.8.2.4 Low-Water Fuel Cutoff

a) Each automatically fired hot-water boiler ~~with heat input greater than 400,000 Btu/hr (117 kW)~~ shall have an automatic low-water fuel cutoff with manual reset. The low-water fuel cutoff shall be designed for hot-water service, and it shall be so located as to automatically cut off the fuel supply when the surface of the water falls to the level established in (b) below.

b) remain unchanged

c) ~~A coil-type boiler or a watertube boiler with heat input greater than 400,000 Btu/hr (117 kW) requiring forced circulation to prevent overheating of the coils or tubes shall have a safety control to prevent burner operation at a flow rate inadequate to protect the boiler unit against overheating at all allowable firing rates. This safety control shall shut down the burner and prevent restarting until an adequate flow is restored.~~

c) In lieu of the requirements for low-water fuel cutoffs in paragraph a), boilers requiring forced circulation to prevent overheating of the tubes, coils, or vessel, shall have an accepted flow, and/or temperature sensing device to prevent burner operation at a flow rate inadequate to protect the boiler unit against overheating at all allowable firing rates. This safety control(s) shall shut down the burner and prevent restarting until an adequate flow is restored and shall be independent of all other controls.

January 22, 2009

Dear Terry,

Negative vote, NBIC Main Committee 01-22-08

NB09-0203 Part 1 3.8.2.4 a) and c) PR08-0704

The main committee agreed with Sub-Committee installation in removing language excepting a low water cut/flow switch on hot water heating boilers under 400,000Btus (117kW). My reasons for a negative vote were based on part (a) only.

1) Personal experience in my jurisdiction, nor any other evidence presented convinces me of the necessity in removing the exception.

2) The language (as amended) now is prescriptive disallowing newer technology to protect from overheating.

NOTE; My inspection resources are extremely strained, and in fact may be less in the near future. From a public safety perspective I believe it would be irresponsible of me to vote for an action which might result in diminishing resources being used to address at worst, (due to emerging technology), a diminishing problem.

Al Platt-CT

ATTACHMENT 6

Secretary, NBIC Committee
National Board of Boiler and Pressure Vessel Inspectors
1055 Crupper Ave,
Columbus Ohio, 43229

Attention: Chuck Withers

Date: January 21, 2009

Sub: Liaison Report
AWS Activities

Dear Mr. Parks,

The following SWPSs are in the final stages of the balloting process for reaffirmation:

B2.1-4-217-99R-09	B2.1-5A-222-99R-09
B2.1-4-218-99R-09	B2.1-5A-223-99R-09
B2.1-4-219-99R-09	B2.1-5A-224-99R-09
B2.1-4-220-99R-09	B2.1-5A-225-99R-09
B2.1-4-221-99R-09	B2.1-5A-226-99R-09

Anticipated publish date is expected by May, 2009

At the request of the Navy, a new Subgroup has been formed within the B2 committee to develop SWPSs for use by the Navy and their suppliers. Final confirmation of this Subgroup will be at the TAC Committee meeting in Miami on January 29th, 2009.

No other AWS activities, that affect the NBIC, are noted at this time.

Respectfully submitted,

Jim Sekely
Jim Sekely