



THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD INSPECTION CODE GRAPHITE TASK GROUP

MINUTES

Meeting of September 13th, 2022
Columbus, OH

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1. Call to Order

The Chair called the meeting to order at 9:15pm local time.

2. Introduction of Members and Visitors

Mr. Aaron Viet asked those present at the meeting to introduce themselves. The following task group members were present for the meeting:

- Mr. Aaron Viet, Chair
- Mr. Jonathan Ellis, Secretary
- Mr. Greg Becherer
- Mr. Francis Brown
- Mr. Chris Cary
- Mr. Justin Clements
- Mr. Keith Cummins
- Mr. Nolan Lee
- Mr. Sameh Mehrez
- Mr. Tracy Rudy
- Mr. Andy Stupica

Mr. Jesse Wince was in attendance as a visitor. All voting members were present for the meeting.

3. Announcements

There were no announcements for the meeting.

4. Adoption of the Agenda

A motion was made, seconded, and unanimously approved to adopt the agenda as presented.

5. Approval of the Minutes of the May 2022 Meeting

The minutes from the May 2022 meeting can be found on the National Board website on the NBIC Committee Information page under the Inspection Code tab.

A motion was made and seconded to approve the minutes from the May 2022 meeting. Mr. Chris Cary asked to revise the May 2022 Meeting Action description for item 19-73 to remove the sentence regarding the requirement for a G-Mark, as he believed that statement was not made and did not make sense to include. The rest of the group agreed with this. The motion was amended to approve the minutes with Mr. Cary's revision. This motion passed unanimously.

6. Review of Rosters

a. Membership Nominations

- i. Mr. Jesse Wince was unanimously nominated to become a member of the Task Group. Mr. Ellis asked Mr. Wince to send him a resume per the NBIC Committee membership procedures. Mr. Wince's nomination will be voted on at the January 2023 NBIC Meeting.

b. Membership Reappointments

- i. No new reappointments.

- c. Officer nominations
 - i. No new nominations.

7. NBIC Business

Item Number: NB15-2208	NBIC Location: Part 3, S3	No Attachment
General Description: Investigate repair options for graphite block heat exchangers		
Subgroup: Graphite		
Task Group: G. Becherer (PM), Aaron Viet		
September 2022 Meeting Action: Mr. Viet presented sketches of repairs that show common failures. Discussion was held on the necessity of potentially adding sketches of more in-depth repairs. Mr. Viet then asked if there are any failures missing that should be added. This led to discussion on the amount of material needed for routine inlay repair. It was decided that discussion should be put on hold to be discussed in a separate item. Mr. Viet stated that he will add titles and text for the sketches, and either point to an existing procedure or write up new procedure if an existing procedure for a sketch is not present in the NBIC.		

Item Number: 19-73	NBIC Location: Part 3, S3	Attachment Page 1
General Description: Requirements for who can make hole plugging repairs on graphite blocks		
Subgroup: Graphite		
Task Group: C. Cary, A. Viet, A. Stupica (PM), S. Mehrez		
September 2022 Meeting Action: Mr. Stupica presented a proposal for this item. Discussion was held on the proposal and the usage of “tube holes/block holes”. The task group will work further to see how to clearly word the section.		

8. New Business

- Mr. Jesse Wince will be present to discuss the possibility of adding graphite plate replacement to the list of routine repairs for graphite pressure vessels.
 - Replacing a plate would seem to make sense as a routine repair. Discussion was held on how it works in the metal world to get a comparison. The consensus was that this would be a routine repair for a G mark holder. Mr. Wince stated he would come up with a sentence for S3.3 and include description of graphite plates.
- Discussion was held on whether a G mark is required to disassemble a graphite pressure vessel to then perform a repair. Consensus was that disassembling and reassembling should not require the G mark, but the NBIC as it is currently worded seems to indicate that the G Mark would be required. The Task Group would need to write a separate paragraph on requirements for replacing parts without cementing. This led to questions about if replacing a block should be considered a routine repair, along with how to go about potentially writing in an exception or rewriting existing code language. Further discussion was held around what R stamp holders without the G mark should be allowed to do. A Task group of Mr. Viet, Mr. Wince, and Mr. Mehrez was put together to begin investigating solutions.

- The Task Group agreed that it would be good to gather ideas for inlay routine repair requirements to discuss at next meeting.

9. Future Meetings

TG Graphite Meeting – November 2nd and 3rd, 2022 – Clearwater, FL

NBIC Meeting – January 9th-12th, 2023 – Charleston, SC

10. Adjournment

Mr. Viet adjourned the meeting at 2:27pm local time.

Respectfully submitted,

Jonathan Ellis

Jonathan Ellis
NBIC Secretary

S3.3 ROUTINE REPAIRS

a) The following repairs shall be considered routine, and shall comply with NBIC Part 3, 3.3.2.

- 1) Machining — routine repair shall not include the machining of pressure-retaining parts with the exception of minor machining for cleaning and joint preparation not to exceed 1/32 in. (0.8 mm) of material thickness.
- 2) Repair of Gasket Surfaces — re-machining of gasket surfaces, re-serrating, or flattening is permitted if the design thickness is maintained.
- 3) Replacing Individual Tubes — drilling out and replacing tubes with new tubes or repaired tubes. Only certified materials shall be used for this repair.
- 4) Nozzle Replacement — replacement of nozzles by removing the old nozzle and cementing a new nozzle in place. This is applicable for nozzles with inside diameters not exceeding 6 inches (152 mm).
- 5) Plugging Tubes or Block Holes — plugging individual ~~tubes~~ tubes or block holes using accepted procedures.
- 6) Surface Repair — surface repair by installation of plugs or inlay material shall not exceed 1 in.³ (16 cm³) of total volume.
- 7) Replacement or Addition of Non-Load Bearing Attachments to Pressure-Retaining Item — For attachment of non-load bearing attachments to pressure-retaining items, the cementing procedure specification need only be qualified for the pressure part and cement to be used.

S3.5.4 PLUGGING OF LEAKING OR DAMAGED TUBES OR BLOCK HOLES

a) The material used for plugging ~~tubes~~ shall comply with the requirements of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, Part UIG.

b) The point(s) of leakage shall be verified, and the corresponding leak site(s) shall be marked/labeled on the ~~tubesheet, and part and~~ recorded.

c) A plug shall be used to plug each end of the ~~tube~~ hole(s) in question and each plug shall have a minimum length of 1 in. (25 mm). Multiple plugs may be used.

d) The ~~tube~~ hole(s) shall be prepared for plugging ~~by enlarging the inside of the tube(s) with a suitable drill bit or reamer tool, as long as the maximum hole I.D. to plug O.D. clearance of 3/32 in. (2.4 mm) is not exceeded.~~

1) To ensure a sound cement joint between the ~~tube~~ inner sidewall and the plug, a slightly smaller diameter plug shall be selected. The maximum clearance between the ~~tube~~ hole inside diameter and the outside diameter of the plug shall not exceed 3/32 in. (2.4 mm).

~~2) As an alternative to d) 1) a mandrel with an abrasive, such as sandpaper, may be used, as long as the maximum tube I.D. to plug O.D. clearance of 3/32 in. (2.4 mm) is not exceeded.~~

23) The minimum plug insertion depth of the prepared hole(s) shall meet the minimum combined plug length requirements of "c". When the minimum plug length of "c" is exceeded, the total insertion depth of the plugs may exceed the combined length of the plugs; however, the longer plugs shall not project outside the face of the tubehole(s) being plugged.

e) Plugging of leaking or damaged tubes or block holes shall be performed by certified cementing technicians, using qualified cementing procedures, in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, Part UIG.

f) As an alternative to e) any "R" Certificate Holder, with or without the letter "G" included on the "R" *Certificate of Authorization*, may install graphite tube-plugs provided the following conditions are met. The "R" Certificate Holder shall gain the concurrence of the Inspector, and shall utilize a tube plugging kit provided by an ASME Certificate Holder authorized to use the "G" designator. The kit shall include the following items:

1) Certified graphite plugs and certified cement ingredients, both accompanied by the appropriate documentation (Partial Data Report).

2) The qualified cementing procedure of the ASME Certificate Holder authorized to use the "G" designator, and a step-by-step procedural checklist that shall be followed explicitly. The procedure shall address the entire tube plugging process including plug configuration, tube-hole cleaning and preparation, mixing and applying of the cement, application of the plugs, securing the plugs during the curing process, controlling the curing process, and leak testing, thereby meeting S3.3.

3) Additional materials and procedure shall be provided and used to prepare a demonstration plug joint prior to performing the repair. This demonstration plug joint shall be tested by a twist (torsional) test designed to demonstrate acceptable application and curing of the cement (Fig. S3.5.4). The test procedure shall include acceptance criteria, which may be based on a principle of breakage of part of the test piece. A successful twist test, in conjunction with the completed procedural checklist, shall serve as a valid cement technician certification for a single repair operation. The twist test shall be witnessed by the Inspector.

The "R" Certificate Holder shall review the material certifications including verification that the shelf life of the cement has not been exceeded, and assure that the certified cement technician has completed the qualification demonstration, and has access to the procedure and checklist. The Inspector shall review and verify that the procedure and the other elements of the certified kit, as provided by the ASME Certificate Holder authorized to use the "G" designator, have been administered and completed prior to his acceptance. The "R" Certificate Holder shall note on Line 8 of the R-1 Form the installation of cemented graphite tube-plugs in accordance with this section. The letter "G" shall not be applied to the vessel when performing this alternative repair. The "R" Certificate Holder shall identify and document the location of the plugged tubes on the "R" Form.

g) The cement shall be prepared per the cement manufacturer's instructions.

h) When cementing the plugs, 100% of individual plugs, as well as the inside diameter of the tubehole opening(s), shall be coated with cement. The plugs shall then be inserted one by one, against each other, into each end of the tubehole(s) being plugged.

i) Once the plugging is completed, and before the cement cures, the endplugs may need to be held in place, as newly cemented plugs may exhibit a tendency to dislodge from the plugged tubehole(s) prior to final curing of the cement.

j) Curing time is dependent upon the cement manufacturer's instructions, and is considered complete when the cement is hardened to the point that it cannot be indented with pressure from a flat screwdriver or other similar instrument.

k) After the cement is completely cured, the plugged, cemented area(s) on the tubesheet/block face may be dressed with sandpaper or other suitable abrasive.

l) Repaired tubes or block holes shall be tested in accordance with this code, using a method acceptable to the Inspector, with a written procedure as approved by the manufacturer's internal quality system, to ensure leaks have been repaired.

m) The scope of the work completed shall be described and reported on a Form R-1.