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THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD INSPECTION CODE
GRAPHITE TASK GROUP

MINUTES

Meeting of March 26th, 2024
Columbus, OH

The National Board of Boiler & Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, Ohio 43229-1183
Phone: (614)888-8320
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1. **Call to Order**
   The meeting was called to order at 9:08 a.m. Eastern Time.

2. **Introduction of Members and Visitors**
   The Chair, Mr. Aaron Viet, asked all present to introduce themselves. The following members were present for the meeting:
   - Mr. Aaron Viet (Chair)
   - Mr. Nolan Lee
   - Mr. Tracy Rudy
   - Mr. Greg Becherer
   - Mr. Justin Clemens
   - Mr. Chris Cary
   - Mr. Jesse Wince
   - Mr. Andy Stupica
   - Mr. Francis Brown
   - Mr. Jonathan Ellis (Secretary)

   The following visitors were present for the meeting:

   - Mr. Krunal Patel
   - Mr. Sean Smith

3. **Announcements**
   Mr. Ellis announced that the NBIC Committee meeting scheduled for July 2024 in Louisville, KY is the last time items can be approved for inclusion in the 2025 NBIC edition.

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 October 2023 Meeting**
   The minutes from the October 2023 Task Group meeting can be found on the National Board's website.

   A motion was made, seconded, and unanimously approved to approve the minutes from the October meeting.

6. **Review of Rosters**
   a. Membership nominations:
      i. None.
   b. Membership reappointments:
      i. None
   c. Officer nominations:
      i. No new officer nominations.

7. NBIC Business

Item Number: NB15-2208	NBIC Location: Part 3, S3	Attachment Page 1

General Description: Investigate repair options for graphite block heat exchangers

Subgroup: Graphite

Task Group: G. Becherer (PM), A. Viet

March 2024 Meeting Action: Mr. Viet presented a new proposal for this item. The task group discussed revisions to the proposal, and some consideration was given to writing a future procedure for inlaying material. After discussion and editing, a motion was made, seconded, and unanimously approved to approve this proposal.

Item Number: 23-45	NBIC Location: Part 3, S3	Attachment Page 3

General Description: Graphite plate replacement as Routine repair

Subgroup: Graphite

Task Group: Mr. Jesse Wince

March 2024 Meeting Action: The group discussed Main Committee's hang up with the original proposal. After discussion, the group decided to remove the statement about using certified materials from S3.3 a) 8). A motion was made and seconded to approve the amended proposal. Additional consideration was given regarding editing S3.3 b) to potentially include plates. The group ultimately decided to leave it for now and revisit in a future item. A vote was taken, and the motion passed unanimously.

Item Number: 24-67	NBIC Location: Part 3, S3	Attachment Page 4

General Description: Requirement for G-mark when replacing parts

Subgroup: Graphite

Task Group: A Viet, J. Wince, S. Mehrez

March 2024 Meeting Action: Mr. Viet presented a proposal for this item. Discussion was held regarding the proposal's wording. Additional discussion was held regarding switching graphite material, even if the material can be shown to pass necessary requirements. Would that be an alteration? The group made comparisons to other parts of Part 3 (3.3.4, 3.3.3, 3.2.4), and discovered that pressure tests for alteration are performed at 1.3x MAWP, which was not the case for repairs. The groups decided that it didn't make sense for the repair test to be less than the alteration, and so made changes to S3.4 a) to match S3.2 p). It was also decided to add a line item regarding testing re-rates at the new MAWP. A motion was made and seconded to approve proposal. This motion passed unanimously.

Item Number: New	NBIC Location: Part 3, S3	No Attachment
General Description: NBIC Document for Mechanical Repairs - TG Graphite review & comment **Subgroup:** Graphite **Task Group:** A. Stupica (PM), A Viet **October 2023 Meeting Action:** Waiting for further developments on the NBIC guide for mechanical repairs. The TG has provided feedback to the document development process. **March 2024 Meeting Action:** Mr. Viet announced that the National Board's mechanical repair guide is currently on hold for the foreseeable future. The group may consider writing a "mechanical repairs to graphite pressure vessels" section in the meantime.		

Item Number: New	NBIC Location: Part 3, S3	No Attachment
General Description: Editing errors related to plug stitching, Ref S3.2 a) and e) **Subgroup:** Graphite **Task Group:** A Viet **March 2024 Meeting Action:** Mr. Viet presented a proposal to fix errors found in the plug stitching guide. Mr. Ellis stated that these errors can be fixed editorially since this error appeared due to a publishing error.		

8. New Business

- Mr. Stupica proposed increasing the nozzle routine repair limit to 10 inches from 6 inches, as nozzles that size and smaller are popular and very easily handled. The group decided to table this topic for now until a satisfactory technical reason can be provided to present to Main Committee.

9. Future Meetings

NBIC Meeting – July 15th-18th, 2024 in Louisville, KY

10. Adjournment

The meeting was adjourned at 3:00 p.m. Eastern Time.

Respectfully submitted,

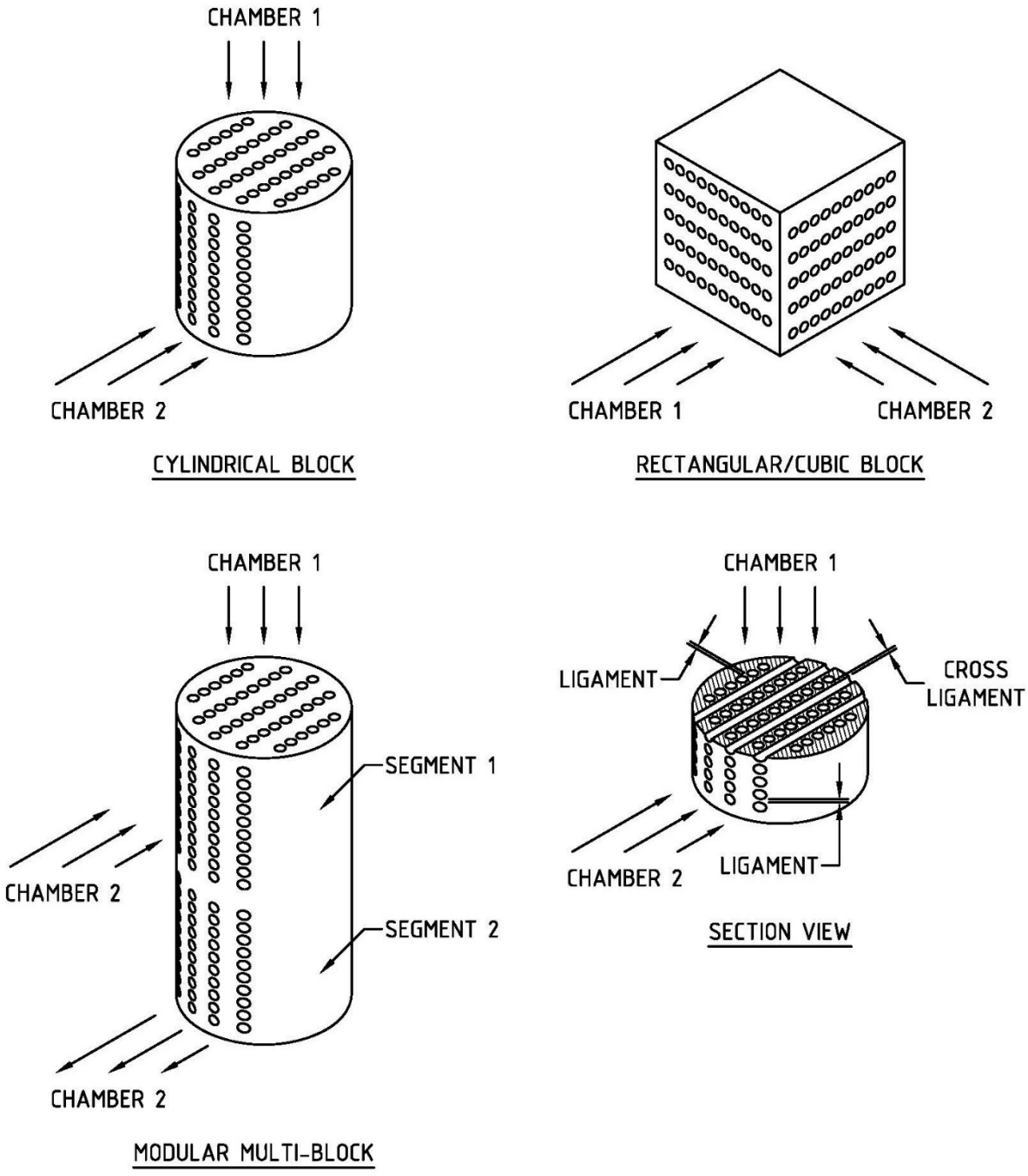
Jonathan Ellis

Jonathan Ellis
NBIC Secretary

S3.5.6 REPAIR OF CROSS-DRILLED ~~EXCHANGE~~ BLOCKS

Cross-drilled ~~exchange~~ blocks are solid impervious graphite forms~~,~~ drilled through in perpendicular patterns to isolate two different operating fluids~~/gases~~.

FIGURE S3.5.6



a) Cross-drilled blocks ~~may~~ can experience failure in a cross ligament~~,~~ due to ~~a~~ crack~~s~~ or erosion~~,~~ that leads to fluid transfer between the opposing chambers. The general steps used to repair a cross-drilled block that is transferring fluid follow below.
   1) Isolate one chamber sufficiently to perform a pressure test.
   2) Test the isolated chamber.
   3) Check the opposing chamber for affected holes.
   4) Identify and mark any leaking holes.
   5) Plug all leaking holes per S3.5.4.

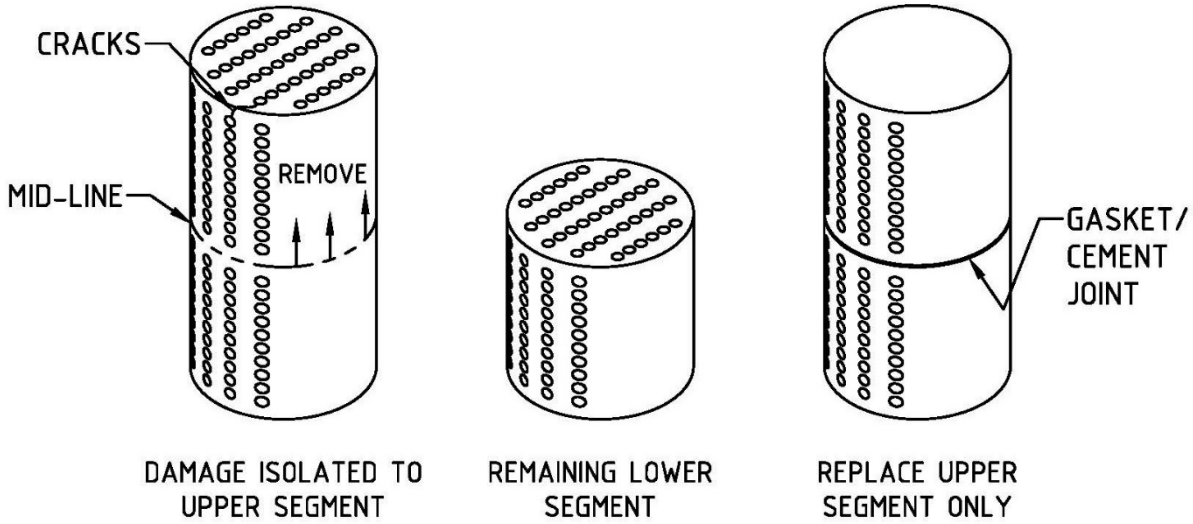
b) During visual inspection of a cross-drilled block, same chamber ligament cracking can~~may~~ be identified. To prevent crack propagation, the affected area can be repaired by material inlaying, or the affected holes can be plugged per S3.5.4

c) ~~Cross-drilled blocks may experience failure due to surface erosion.~~ Surface erosion may be repaired by material inlaying.

~~c)~~d) Damage to gasket surfaces may be repaired per S3.3 a) 2) or by material inlaying.

~~d)~~e) When a modular multi-block type of cross-drilled block is confirmed to be transferring fluid, is showing visible ligament cracking, or has visible surface erosion damage, it shall be tested as required~~according~~ into S3.5.6-a. ~~Once the location of all the damage is identified, if a single S~~segment~~s is~~ determined to be free of damage~~, that segment~~ may be re-used after cutting away the damaged~~affected~~ segment(s). The portion of the block that was removed shall be replaced.

FIGURE S3.5.6-d



Editors note: re-number Reimpregnation section to S3.5.7 and carry through.

Item 23-45

Part 3, S3.2 and S3.3 a)

S3.2 Repairs

k) Blind cracks and delaminations ~~may~~ shall not be repaired by cement injection only.

l) Cracks and porosity in tubes ~~may~~ shall not be repaired. Cracked and porous sections may be removed so that the remainder of the tube may be used. Individual tube sections shall not be less than 24 in. (610 mm) in length, and the number of segments in a tube shall not exceed the quantity listed in NBIC Part 3, Table S3.2.

~~r)~~m) Cracks and porosity in graphite plates used in plate and frame exchangers shall not be repaired.

S3.3 Routine Repairs

a)

8) Replacing graphite plate(s) with new plate(s) in a plate and frame exchanger.

S3.2 REPAIRS

c) The material used in making repairs or alterations shall conform to the requirements of the original code of construction except as provided in NBIC Part 3, S3.2 j). The "R" Certificate Holder is responsible for verifying identification of existing materials from original data, drawings, or unit records and identification of the materials to be installed. Where material properties are used in supporting calculations, replacement parts shall meet or exceed the original material strength values; otherwise, recalculation and alteration is required.

S3.4 ALTERATIONS

a) The requirements provided in this section shall apply, insofar as they are applicable to the materials discussed herein. Completed alterations shall be subjected to a pressure test not less than operating pressure or more than maximum allowable working pressure. The test pressure shall be maintained for 30 minutes minimum.~~subjected to a pressure test not less than that required by the code of construction. The test pressure shall be maintained for a minimum of 30 minutes. The pressure shall be reduced to MAWP and maintained for inspection.~~

b) All re-ratings shall be pressure tested at the new maximum allowable working pressure. The test pressure shall be maintained for 30 minutes minimum.