

LETTER BALLOT

Subj: Tube Plugging Procedure

Explanation: Add the proposed tube plugging procedure to Supplement 3

PM: Tim Bonn

Background: The attached proposal provides a generic tube plugging procedure for impregnated graphite tube and shell heat exchangers.

Existing Text: None

Proposed Revision: See attachment

Rationale: The proposed procedure provides a minimum quality level for the plugging of tubes in impregnated graphite heat exchangers.

Notes during discussion:

Tracking Number: [11-702](#)

### **S3.5.5 -- Plugging of Leaking or Damaged Tubes**

- 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) Proper materials and equipment shall be obtained in preparation for the tube plugging to be performed.
- c) Personnel performing tube plugging shall be certified cementing technicians using qualified cementing procedures.
- d) The point(s) of leakage shall be verified, and the corresponding opening(s) shall be marked/labeled on the tubesheet.
- e) A drill with a suitable bit or a reamer shall be used to ream the inside diameter of the tube(s). As an alternative, a mandrel with an abrasive, such as sandpaper, may be used to ream the hole(s). Ream to a depth that the first plug will be inserted.
- f) The cement shall be prepared per the cement manufacturer's instructions.
- g) Graphite plugs that are slightly smaller in diameter than the inside diameter of the tube opening(s) shall be selected for plugging to allow for a sound cement joint.
- h) A minimum of two (2) graphite plugs, each with a minimum length of 1" shall be used to plug each end of the tube(s) in question, for a minimum total of four (4) plugs per tube.
- i) 100% of individual plugs, as well as the inside diameter of the tube opening(s) in question, shall be coated with cement. The plugs shall then be inserted one by one, snugly fit against each other, into each end of the tube(s) to be plugged.
- j) In some instances, insertion depth can vary; however, the plug(s) shall not project outside of the face of the tube(s) being plugged.
- k) Once plugging is completed, and before the cement cures, the end plugs may need to be held in place, as cemented plugs may exhibit a tendency to dislodge from the plugged tube(s) prior to final curing of the cement.

- l) 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.
- m) After cement is completely cured, the plugged, cemented area(s) on the tubesheet face may be dressed with sandpaper or other suitable abrasive.
- n) Plugging of leaking or damaged tubes 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.
- o) Repaired tubes shall be tested in accordance with approved procedures to ensure leaks have been repaired.