

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) The point(s) of leakage shall be verified, and the corresponding leak site(s) shall be marked/labeled on the tubesheet, and recorded.
- c) 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. This represents a minimum total of four (4) plugs per tube.
- d) The tube(s) shall be prepared for plugging by enlarging the inside of the tube(s) with a suitable drill bit or reamer.
 - 1. To ensure a sound cement joint between the tube sidewall and the plug, a slightly smaller diameter plug shall be selected. The maximum clearance between the tube inside diameter and the outside diameter of the plug shall not exceed 3/32".
 - 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" is not exceeded.
 - 3. 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 tube(s) being plugged.
- e) 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.
- f) The cement shall be prepared per the cement manufacturer's instructions.

- g) When cementing the plugs, 100% of individual plugs, as well as the inside diameter of the tube opening(s), shall be coated with cement. The plugs shall then be inserted one by one, against each other, into each end of the tube(s) being plugged.
- h) Once the plugging is completed, and before the cement cures, the end plugs may need to be held in place, as newly cemented plugs may exhibit a tendency to dislodge from the plugged tube(s) prior to final curing of the cement.
- i) 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.
- j) After the cement is completely cured, the plugged, cemented area(s) on the tubesheet face may be dressed with sandpaper or other suitable abrasive.
- k) Repaired tubes shall be tested in accordance with this Code, using a method acceptable to the Inspector, with a written procedure approved by the manufacturer's internal quality system, to ensure leaks have been repaired.
- l) The scope of the work completed shall be described and reported on a Form R-1.