

Subgroup Locomotives National Board Item No. NB13-1406

Current Level: Subgroup

NBIC Part 3 Paragraph(s): S1.2.15 Title: **Superheater Units**

Date Opened: April 2013

Background: None Provided

The purpose of this document is to provide guidance for the repair of locomotive boiler superheater units.

Proposed Action:

1) Cracks in superheater unit components, including superheater return bends, tube sections and connection ends made from steel may be repaired by welding. All weld repairs shall be done in accordance with NBIC Part 3 and ASME Section I Part PW.

2) When new replacement parts and tubes are installed in steel superheater unit components the interior edges of the new and original surfaces subject to steam flow shall be set concentric with each other and, when practical, these surfaces and the completed welds should be ground smooth to prevent forming raised edges between the original and new interior surfaces. Welds shall be the full penetration-type, unless the original design requires a different weld configuration be used, and shall be done in accordance with NBIC Part 3 and ASME Section I Part PW.

3) Superheater unit tubes and parts shall be cut to or made to the required length and alignment. Bends in superheater unit tubes and parts shall be formed to the correct shape and curvature. Tubes and parts that are cut too short or which cannot be aligned correctly shall not be used.

4) Replacing the forged connection ball ends of Ball-End type superheater units with cast, fabricated or machined connection ball ends is a repair.

5) Damage and cuts on the surfaces of forged connection ball ends of Ball-End type superheater units may be repaired by weld build up. The welding shall be done in accordance with NBIC Part 3 and ASME Section I Part PW. The weld repaired surfaces then shall be returned back to the required profile by machining, grinding and lapping.

6) The connection ends of superheater units shall align with and attach to the superheater header without having to be forced into their attachment location or placing bending loads on their connection fasteners, fittings, washers or clamps.

7) The fasteners, fittings, washers and clamps used to attach and secure the ends of superheater units to the superheater header shall fit to their respective parts and assemble together without being forced or creating damage or misalignment between the superheater unit end and the superheater header. Threaded fittings and threaded fasteners shall have the required length of thread engagement as required by the original design. Changing the location, number, or size or design of the fasteners, fittings or clamps from the original design is an alteration.

8) The replacement of forged return bends with cast or fabricated return bends, or the reverse, is a repair.

9) Replacement return bends, tubes bends and tube shall have the same bend radius, ID and interior cross section area subject to steam flow as the original design parts. The use of replacement return bends, tube bends and tube that have a larger or smaller bend radius, ID or interior cross section area is an alteration.

10) Superheater unit supports, tube bands and cinder shields may be repaired by welding. The replacement of superheater unit supports, tube bands and cinder shields is a repair.

11) Repaired superheater units shall be tested by hydrostatic pressure upon completion of the repair and prior to installation into the locomotive boiler. The hydrostatic test pressure should follow the manufacturer's original requirements. If this is not known, the hydrostatic test pressure shall not be less than 1.25 x MAWP. If it is necessary to hydrostatic test the superheater units after these have been installed in the boiler, the hydrostatic test pressure shall not exceed 1.25 x MAWP.

Original Proposed Text Of This Draft - Now Obsolete (Use For Reference Only)

~~1) Superheater units that are worn to less than the minimum allowable wall thickness shall be removed from service and either repaired or replaced.~~

~~2) When cracks are repaired or new sections installed the welds shall be the full penetration type.~~

~~3) Weld build-up may be used if the corroded section does not exceed 10 square inches in area and the corrosion depth does not exceed 50% of the original wall thickness. If the corrosion depth or area exceeds one or both of these values, the corroded section shall be replaced.~~

~~4) Superheater units shall align with and attach to the superheater header without having to be forced.~~

~~5) Cinder shields and tube supports, and tube bands may be attached to superheater units by welding. These welds do not require inspection. The use of fillet welds to attach these items is acceptable.~~