

Lance Tube / Feed Tube Assembly Fabrication and Welding Qualifications for Recovery Boilers

TECHNICAL SERVICE BULLETIN

Purpose

It has been reported that a recent non-Babcock & Wilcox (B&W) lance tube failure resulted in a recovery boiler explosion. This event, and other recent sootblower-related events, have focused attention on the manufacturing practices of lance tube and feed tube assemblies. This technical service bulletin is specific to lance tube assemblies manufactured for recovery boiler use, and was developed to help recovery boiler owners understand B&W's qualification and inspection procedures for feed tube welds and recovery lance tube welds.

B&W Design and Procedures for Fabricating Diamond Power® Sootblower Components for Recovery Boilers

Fatigue testing

B&W designed and built full-scale fatigue test machines to qualify the forged flange designs and lance tube weld combinations on its Diamond Power sootblowers. Lance tube fatigue testing was performed by B&W from the 1970s to the mid-1990s to establish maximum stress levels for each lance tube design. The extensive knowledge gained from fatigue testing lance tube welds has been incorporated into the B&W equipment design and fabrication procedures.

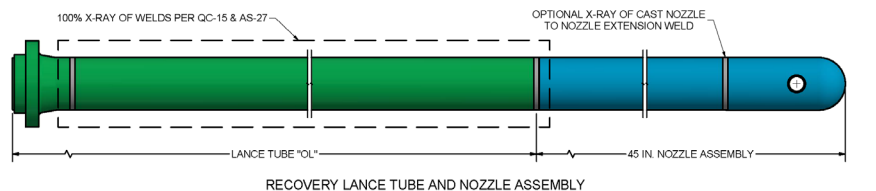
Non-destructive examination (NDE)

B&W's radiographic testing/examination (RT) acceptance standard, AS-27, was tightened in January 1990 to meet ASME B31.1 RT acceptance criteria (ref. paragraph 136.4.5). Since January 1990 we have had excellent service results with our full-penetration lance tube welds that have been X-rayed per B&W's internal quality standard, QC-15, and its internal acceptance standard, AS-27. B&W is not aware of any recovery boiler lance tube flange weld failures since the acceptance standard was tightened.

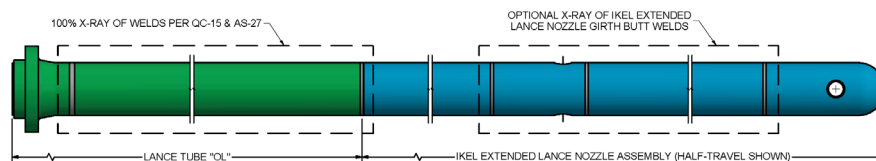
B&W's recovery boiler lance tube welds require RT examination of the following welds:

- 100% RT of all IK-SD, TDP and forged flange welds
- 100% RT of all lance tube front-to-rear and splice welds (if present in the lance tube)
- 100% RT of all lance tube-to-nozzle extension dissimilar metal welds

Optional: Customers may require 100% RT for low stress, cast nozzle or fabricated nozzle welds by specifying: *100% RT of all welds per QC-15 with acceptance standard AS-27.*



RECOVERY LANCE TUBE AND NOZZLE ASSEMBLY



RECOVERY LANCE TUBE AND IKEL EXTENDED LANCE NOZZLE ASSEMBLY

continued ▶

NDE examination is recommended for existing lance tube assemblies that do not exhibit the three following B&W recovery boiler lance tube features:

1. IK-SD, TDP or forged flange design with full penetration groove weld
2. Unique stamped serial number on flange OD
3. Diamond Power logo

X-ray serial number traceability

Each Diamond Power recovery boiler lance tube is assigned a unique X-ray serial number that is stamped into the forged flange outside diameter as shown in the photo above. Since mid-2005, the first two characters of the serial number indicate the year of manufacture of the flange weld, the third character is a sequential letter, and the last three characters are sequential numbers. For the flange shown in the photo example, serial number 18B-109 would indicate that the lance tube flange was welded in 2018.

Digital X-ray images of each X-rayed weld are stored in folders corresponding to the serial number and weld joint description for a minimum retention period of five years from the date of shipment. These records are available for customer review at our facility.

ASME Section IX qualification testing

Lance tube and feed tube welds are beyond the ASME pressure boundary and are technically

considered non-Code welds. However, due to the inherent dangers present to both personnel and the boiler itself, should a lance tube or feed tube weld fail, B&W lance tube and feed tube welding procedure specifications (WPS) are qualified by ASME Section IX groove weld procedure qualification records (PQR).

B&W lance tube and feed tube welding operators are familiarized with the machine welding equipment and certified using RT volumetric examination or destructive bend tests per ASME Section IX.

Support

This document is specific for lance tube assemblies manufactured for recovery boiler use. B&W fabricates other lance tube designs for specific applications. If there are any questions or concerns please contact your local sales or service representative office to discuss.



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