Alberta Municipal Affairs

ABSA
the pressure equipment safety authority

VARIANCE

No. VA22-005

(IB22-020)

Subject

Provision of a method for owners of historical pressure equipment (traction engine boilers) with riveted lap joints in the steam dome to determine a safe operating pressure that is acceptable to the Administrator.

Variance VA11-007 and IB11-009 has been withdrawn and replaced with this IB22-020.

Date of Issue

October 13, 2022

This Variance applies to

Province-wide variance to Section 6(a)(i) and Section 45(1) of the *Pressure Equipment Safety Regulation* (AR49/2006) as applied to the determination of maximum allowable working pressure (MAWP) for traction engine boilers with longitudinal lap joints in the steam dome only where the main cylindrical part of the boiler shell is not of lap seam construction.

Reason for variance

Variance (Permanent)
To Section 45(1) of the *Pressure Equipment Safety Regulation* (AR49/2006)

Clause 6.2.1 of the *CSA B51-19*, Boiler, pressure vessel, and pressure piping Code which is adopted under Section 6(a)(i) as part of the PESR, provides for an increase of factor of safety for lap-seam riveted boilers, similar to the provisions under Section 45(1) of the PESR.

Where the steam dome of a traction engine is constructed with a lap seam and the entire boiler is in full compliance with the detailed provisions of this Variance, the steam dome portion of the engine, without the application of an increased factor of safety, is considered as having an equivalent level of safety as the rest of the engine which is not of lap seam construction.

Details of variance

This Variance is based on satisfactory compliance with the following conditions:

- The material and thickness of the plate used in the construction of the steam dome shall be the same as those used in the main cylindrical part of the boiler;
- Non-destructive examination will be performed by a CGSB level II or level III technician and will consist of ultrasonic thickness examination (UT) of all stayed and unstayed pressure components. The method of examination will be as described in National Board Inspection Code (NBIC) Part 3, Supplement 2 (Historical Boilers). The thickness of these components will be used to calculate the respective maximum allowable working pressure (MAWP) of each of the components;

- The MAWP governing the use of the boiler will be the lower of the calculated MAWP of the traction engine boiler following the above thickness examinations, the MAWP originally assigned by the manufacturer, or 1034 kPa (150 psi);
- The minimum shell thickness of the steam dome shall not be less than the minimum shell thickness, as determined by non-destructive examination, of the main cylindrical part of the boiler;
- A thorough visual internal and external inspection will be carried out and witnessed by an ABSA Safety Codes Officer;
- UT will be required for 30% of staybolts and 100% of through-stays (where accessible). Any defective stays will be replaced as per NBIC repair procedures;
- UT will be required for 10% of barrel longitudinal seam rivets and 30% of firebox rivets. Rivets to be examined will be spaced evenly along seams;
- Shear wave UT examination will be required for all longitudinal seams including the dome seam;
- Magnetic particle inspection (MPI) will be required for the dome lap seam and rivet areas of the dome;
- A hydrostatic test will be performed at 1.5 times the MAWP established by the above method and the test has to be witnessed by an ABSA Safety Codes Officer;
- Depending on the findings of the above examinations, the local ABSA Safety Codes Officer may request additional inspections or calculations;
- An ASME Code marked pressure relief valve with a set pressure not exceeding the MAWP determined above must be installed; and
- The internal and external visual inspection along with the hydrostatic examination at 1.5 times the MAWP are to be repeated annually. UT examination and verification of the MAWP is to be repeated every five years and depending on the findings of the visual examination, more frequently.

Variance is specific and non-precedent setting	This Variance is specific and sets no precedent.
Authority under which the Variance is being issued	Section 38(1) of the Safety Codes Act, Chapter S-1

Advisement of Offence

Non-compliance with the requirements of this Variance is an offence under the Safety Codes Act.

Approval of Administrator

<original signed by>

Robin Antoniuk, P.Eng. (Acting)
Administrator Pressure Equipment Safety
Province of Alberta

Accredited organization employing the Administrator

ABSA the pressure equipment safety authority
9410 – 20 Avenue
Edmonton, Alberta T6N 0A4

Phone:(780) 437-9100
Fax: (780) 437-7787

Submission of a copy of Variance to the Safety Codes Council

A copy of this Variance will be submitted to:

Safety Codes Council
1000, 10665 Jasper Avenue
Edmonton, AB T5J 3S9

Explanation of variance

A Variance is a written permission issued to build, install, process or otherwise act in a manner not consistent with the specific requirements of an applicable code, standard or regulation but which provides, in the opinion of the issuing Administrator, an equivalent level of safety to persons and property.