

VARIANCE

No. VA17-004
(IB17-012)

Subject Variance to Subsection 6(d) of the Pressure Equipment Safety Regulation regarding the use of 2017 Edition of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 2.

Date of Issue July 07, 2017

This Variance applies to **Province-wide Variance**

Reason for variance The 2017 Edition of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 2 introduces pressure vessel classes. The distinguishing characteristics of Class 1 and Class 2 pressure vessels are:

Class 1 – pressure vessels will have 3.0 design factor on ultimate tensile strength with more design and construction requirements than Section VIII, Division 1, but fewer administrative requirements than Section VIII, Division 2, Class 2. The use of the 2017 Edition of Section VIII, Division 2, Class 1 is intended for custom engineered vessels.

Class 2 – pressure vessels will have 2.4 design factor on ultimate tensile strength. The design and construction requirements for these pressure vessels are the same as requirements specified in the previous edition of Section VIII, Division 2.

In accordance with Section 38 of the Safety Codes Act and Section 23 of the Pressure Equipment Safety Regulation, a variance is hereby issued with respect to the use of the 2017 Edition of Section VIII, Division 2 in Alberta. This Variance supersedes VA11-008 issued August 04, 2011.

Details of variance

The details of this Variance apply to Class 1 and Class 2 pressure vessels unless specifically stated differently in the text hereunder.

Class 1 and Class 2 pressure vessels constructed in accordance with the ASME Code, and which otherwise comply with the *Pressure Equipment Safety Regulation*, may be operated in Alberta provided the following provisions are met:

1. In general, use of Part 5^(Note A) Design by Analysis Requirements of the Section VIII, Division 2 to override provisions under Part 4 Design by Rule Requirements will be prohibited for Class 1 and Class 2 pressure vessel designs. Use of Part 5 to supplement, or in addition to Part 4 requirements, is not considered as using Part 5 to override requirements under Part 4 (e.g. use of Part 5 for fatigue analysis when required in accordance with a User's Design Specification is not considered as using Part 5 in contravention of this specific provision of the Variance);

Note A: *Part* refers to the different parts of the ASME Code and the annexes to the respective Parts of the Code. In this case, Part 5 refers to Design by Analysis Requirements and all associated annexes including Annex Part 5A to Annex Part 5F of Section VIII, Division 2.

2. Notwithstanding provision # 1 above, for fully justified circumstances of Class 2 pressure vessel designs only, a design submission may be made utilizing Part 5 and, if found acceptable, a site-specific Variance for that particular design may be issued by the Administrator under Section 38 of the Safety Codes Act;
3. Two significantly different fatigue analysis methodologies are included in Part 5 of Section VIII, Division 2 with one being the alternative to the other. Until such time that it can be ascertained that one method will provide more accurate results consistently should fatigue loading be expected, analyses shall be carried out using both methods and the more conservative result will govern;
4. When required by Section VIII, Division 2 for Class 1 pressure vessels and for all Class 2 pressure vessels, a Professional Engineer experienced in pressure vessel design and the analytical methods used in the design under consideration, shall certify (stamp, authenticate, etc.) the design submission. This requirement is applicable for all designs involving the use of Division 2, for new construction, repair or alteration. The Professional Engineer may be required to provide supporting evidence of experience;

5. As a condition of obtaining design registration of a Class 1 or Class 2 pressure vessel, the owner must establish an integrity management plan for the pressure vessel to ensure safe operation and compliance with the Safety Codes Act and ASME Code through the entire life cycle of the pressure vessel in accordance with the requirements of this Variance and with the requirements of Clauses 4.1.9 and 7.1.4 of CSA B51-2014 *boiler, pressure vessel and pressure piping code* (hereunder referred to as CSA B51). The owner shall provide documented evidence of their commitment to develop and implement the integrity management plan. Evidence may be provided by written statement and shall be included in the User's Design Specification;
6. In addition to the requirements specified in Section VIII, Division 2, the User's Design Specification must also address the requirements of Clause 4.1.9(a) of CSA B51 related to a program for lifetime in-service monitoring of the pressure vessel and specific limits or conditions, including cyclic and other conditions of individual components or parts of the pressure vessel;
7. When required by Section VIII, Division 2, the Professional Engineer who certifies the User's Design Specification, on behalf of the owner, shall be independent of the pressure vessel manufacturer;
8. The Professional Engineer involved in the application of the ASME Code rules for the pressure vessels that will be installed in the Province of Alberta, including but not limited to the certification of the User's Design Specification or Manufacturer's Design Report, shall meet the requirement of Section 1(2) of the Pressure Equipment Safety Regulation^(Note B);

Note B: Section 1(2) of the Pressure Equipment Safety Regulation states that a Professional Engineer means a person who is registered as a professional engineer and authorized to practice engineering in any province or territory of Canada or in any state of the United States of America.

9. An owner of a pressure vessel constructed to the Section VIII, Division 2 shall comply with the requirements of Clause 7.1.4 of CSA B51 and shall have in place a certificate of authorization permit issued for their pressure equipment integrity management system pursuant to Section 11(3) of the Pressure Equipment Safety Regulation. The pressure equipment integrity management system shall specifically address the use of Class 1 and Class 2 pressure vessels including:
 - a. competency of operating personnel. There shall be a training system in place and, as part of the system, a procedure to verify that operators of the pressure vessel

- have sufficient knowledge of the User's Design Specification and the Manufacturer's Design Report for the pressure vessel;
- b. verification that the operators having an understanding of how cyclic service is defined and monitored;
 - c. procedures for documentation and reporting of incidents when operation of the vessel deviates from the User's Design Specification. Continued operation of the pressure vessel after such an incident shall be justified and subject to regulatory approval;
 - d. provisions for accurate and continual monitoring of operating parameters and record keeping to comply with the User's Design Specification and Manufacturer's Design Report limitations must be clearly stated and specified;
 - e. maintenance of information and documentation affecting the safe use of the pressure vessel for the life of the pressure vessel. Records shall include documentation such as the User's Design Specification, Manufacturer's Design Report, fabrication documents, operation monitoring results and other records that are required to be maintained by the vessel owner^(Note C); and
 - f. the media and system used for record keeping. This must be in a form that will allow the information to be retrievable and legible. The record keeping system shall be subject to internal and external audit.

Note C: Sections 41 & 42 of the Pressure Equipment Safety Regulation require that the owner must maintain *equipment records* and Section 1(1)(k) of the Regulation states that equipment record includes design information, data reports, inspection plans, and integrity assessment, repair and alteration records .

10. An owner of a pressure vessel built to the Section VIII, Division 2 shall, in the case of change of ownership of the plant, transfer to the new owner all records as required under Section 36(3) of the Pressure Equipment Safety Regulation;
11. On a change of ownership of a pressure vessel constructed to the Section VIII, Division 2, the new owner shall meet the requirements of Clause 4.1.9(c) of CSA B51 and shall have a Professional Engineer:
 - a. verify and certify the acceptability of the original User's Design Specification, as well as the condition of the pressure vessel, or
 - b. prepare a new User's Design Specification within the limitations of the Manufacturer's Design Report and the condition of the pressure vessel.

The new owner shall submit the certified document to ABSA and retain a copy as part of the owner's Pressure Equipment Integrity Management program record; and

12. In the case of a pressure vessel built to Section VIII, Division 2 and sold individually (not as part of a plant), the User's Design Specification and the Design Registration will be rendered void as the pressure vessel will no longer be operated as originally intended. A revised User's Design Specification in accordance with Clause 4.1.9(b) of CSA B51 shall be produced to address the new operating conditions and the design of the vessel shall be resubmitted for registration.

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

Contravention of a condition of this Variance is an offence under the Safety Codes Act.

Approval of Administrator

<original signed by>

Mike Poehlmann, P.L.(Eng.)
Chief Inspector & Administrator
Pressure Equipment Safety
Province of Alberta

Accredited organization employing the Administrator

ABSA the pressure equipment safety authority

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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 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.