



345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel.: 416.734.3300
Fax: 416.231.1626
Toll Free: 1.877.682.8772

www.tssa.org

bpv_registrations@tssa.org
416.734.3299

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Guidelines for Design Approval of Used and/or Altered Boilers or Pressure Vessels

Any person or organization, intending to install a used boiler or pressure vessel^{1,2} in Ontario, or to operate a vessel that has been altered from the original registered design, must obtain design approval for the design of the used vessel in its current condition or the alteration³ of the vessel. Vessels that have left the manufacturer's facility and are found in Ontario without a CRN, whether it has been in service or not, should follow this guideline.

To obtain design approval of a used and/or altered vessel design, the following documents shall be submitted to TSSA office:

1) Registration application form

Please refer to the following application form:

<https://www.tssa.org/en/boilers-pressure-vessels/resources/Documents/2017-PV-09556.pdf>

The type of design is indicated by checking the box for used/altered vessel. The original Manufacturer's name, serial number(s) of the vessel(s), National Board number(s) and/or CRN (as applicable) need to be provided – can be on the application form, drawings or under separate letter.

2) Design drawings and design calculations

- a) Drawings and calculations in accordance with the applicable ASME Code can be submitted electronically⁴ or if by hard copy, two sets of drawings and one set of calculation need to be included.
Note: The design submission for such vessels, shall include similar technical information as required to obtain a CRN⁵ for a new vessel⁶.
- b) The vessel assembly/arrangement drawing must be stamped and signed by a professional engineer licensed in Ontario. If the vessel has been altered from the original registered design, an explanation of the alteration details needs to be included.

¹ Boiler or pressure vessel for this document will be referred to as vessel.

² "used boiler or pressure vessel" means a boiler or pressure vessel that has been in service.

³ "alteration" means any change in the item described on the original manufacturer's data report that requires a change of design calculations or otherwise affects the pressure-containing capability of a boiler or pressure vessel.

⁴ See guidelines for electronic submissions: <https://www.tssa.org/en/boilers-pressure-vessels/resources/Documents/BPV-Guidelines-for-Electronic-Application-Apr-25-2018.pdf>

⁵ A CRN is the acronym for a Canadian Registration Number.

⁶ Refer to TSSA website

https://www.tssa.org/en/boilers-pressure-vessels/register-a-design.aspx?_mid_=413

- c) If the vessel is in corrosive service, the thickness calculation shall be based on the actual wall thickness determined through ultrasonic thickness (UT) examination and a copy of the UT report by a qualified⁷ examiner, shall be provided.
Note: During the inspection, the inspector will conduct an internal inspection to verify current condition of the vessel, for situations such as vessels with inspection openings or corrosion allowance. Where indications of material wall thickness degradation is found, an ultrasonic thickness examination will be required.
- d) Calculations need to verify compliance to the original code of construction and shall be based on actual thickness. For alterations where a new part is added, the new part can be designed and constructed to the current code edition however the interface with the existing materials must be considered and shall meet the safety factor of the original code of construction. For example, a new nozzle to be added to an existing shell is designed and fabricated in accordance with the current code of construction and the interface with the vessel as well as reinforcement calculations are compliant with the safety factor of the original code of construction.

3) Firebox grade and SA-212 coarse grain materials

Used vessels with Firebox grade material or SA-212 material made to a coarse grain practice will not be accepted as a new item in the province of Ontario. Existing vessels with these materials, if they are to remain in operation that is under O.Reg.220/01, they cannot be relocated, modified or repurposed.

4) Minimum Design Metal Temperature (MDMT)

Used vessels new to the province or existing vessels to be altered may have been constructed to an edition of ASME Section VIII Division 1 that was prior to the inclusion of minimum design metal temperature (MDMT). For these vessels the current code requirements for MDMT must be considered. For SA212 material, produced to fine grain practice shall follow follow UCS-66 requirements for Curve A materials.

5) A legible copy of the used vessel nameplate “rubbing”, nameplate photograph or manufacturer’s data report

A copy of the manufacturer’s data report (MDR) for the used vessel where available needs to be provided. A legible copy of the nameplate either as a nameplate “rubbing” or photograph that includes information about the vessel needs to be included in the submission. The nameplate must have an ASME mark (or stamping) and/or CRN to demonstrate fabrication and inspection compliance with the ASME code.

Note 1: For vessels not fabricated with full compliance with the ASME code, the variance process is required⁸.

Note 2: If the nameplate information was provided but not verified at the time of design registration (either through nameplate rubbing or photograph), this will be reviewed by the inspector during the inspection.

⁷ The examiner shall be a properly trained individual using calibrated equipment. Where specific accuracy is needed for calculations, the examiner shall have a minimum UT level I CGSB or ASNT-TC-1A certification.

⁸ Refer to the variance form:

<https://www.tssa.org/en/boilers-pressure-vessels/applications-forms-and-fees.aspx>

6) Design Approval and Ontario Registration Number

Upon review of the submitted documentation, if the design of the used vessel or alteration has been found to be acceptable, an Ontario registration number is issued for each vessel. The registration number starts with the designation “**5AN**”, followed by numbers, e.g. 5AN7123.

The used or an altered vessel, to which a “5AN” has been issued, the TSSA Inspector (AI) as part of their inspection, will witness the attachment of an alteration nameplate. The alteration nameplate shall be attached adjacent to the original vessel nameplate.

Note: Vessels can be issued and stamped with an existing CRN, where, the data report can be updated, and the nameplate is stamped with the CRN in the presence of the Authorized Inspector.