

# Design, Construction, Installation and Use of Boilers and Pressure Vessels

*Repealed*

by Chapter B-5.1 Reg 1 (effective January 1, 2007)

*Formerly*

Saskatchewan Regulation 262/67 (effective August 15, 1957)  
as amended by Saskatchewan Regulations 96/70.

## **NOTE:**

This consolidation is not official. Amendments have been incorporated for convenience of reference and the original statutes and regulations should be consulted for all purposes of interpretation and application of the law. In order to preserve the integrity of the original statutes and regulations, errors that may have appeared are reproduced in this consolidation.

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## SASKATCHEWAN REGULATION 262/67

### Respecting the Design, Construction, Installation and Use of Boilers and Pressure Vessels – *Made pursuant to sections 19 and 31 of The Boiler and Pressure Vessel Act*

#### SECTION 1 DEFINITIONS

101 In these regulations the expression:

- (a) **“Act”** means The Boiler and Pressure Vessel Act;
- (b) **“approved”** unless otherwise stated, means approved by the Chief Inspector;
- (c) **“authorized”** means with authority recognized by and having the approval of the Chief Inspector;
- (d) **“A.S.A. Code”** means the A.S.A. Pressure Piping Code B31.1 of the American Standards Association;
- (e) **“A.S.M.E. Code”** means the A.S.M.E. Boiler and Pressure Vessel Construction Code of the American Society of Mechanical Engineers;
- (f) **“A.S.T.M.”** means the American Society for Testing Materials;
- (g) **“air receiver”** means a pressure vessel as defined in the Act;
- (h) **“boiler”** means a boiler as defined in the Act and includes a “heating boiler”, a “high pressure boiler” and a “miniature boiler” as defined in these regulations;
- (i) **“C.R.N.”** means the Canadian Registration Number as recorded by Saskatchewan and as allotted by the Chief Inspector to an approved and registered design;
- (j) **“C.S.A.”** means the Canadian Standards Association;
- (k) **“Chief Inspector”** means the chief inspector of boilers and pressure vessels of the Province of Saskatchewan appointed under section 5 of the Act;
- (l) **“department”** means the Boiler and Pressure Vessel Inspection Branch of the Department of Labour of Saskatchewan;
- (m) **“design”** means and includes the blueprints and specifications, specimens or models, submitted to the Chief Inspector for approval and registration;
- (n) **“expansion tank”** means a vessel for installation in a closed hot-water heating system to provide an air cushion for the expansion of the water when heated by a hot water heating boiler;

- (o) **“fittings”** means safety valves, safety-relief valves, thermostatic relief valves, rupture discs, stop valves, check valves, automatic stop-and-check valves, blow-off valves, reducing valves, pressure or temperature regulating valves, water gauges, pressure gauges, gauge cocks, fusible plugs, regulating and controlling devices, boiler feeding devices, low-water cut-off devices and any other fitting or accessory including pipe fittings, designed for use with any boiler, pressure vessel or pressure piping provided for in these regulations;
- (p) **“heat exchanger”** means a condenser, evaporator, heater or cooler or any similar apparatus not specifically defined herein;
- (q) **“heating boiler”** means a low pressure heating boiler designed for a steam pressure of not more than 15 pounds to the square inch or a water pressure from 30 to not more than 160 pounds to the square inch in accordance with the A.S.M.E. Code for low pressure heating boilers and these regulations but does not include a hot water boiler operating in an open system and such a boiler in a private residence occupied by not more than three families;
- (r) **“heating surface”** means the total plate and tube or other material surface of a boiler in square feet which is exposed during operation to the products of combustion and is below the manufacturers high water mark or where no such mark is specified, below the top of the gauge glass, calculated by the manufacturer and approved by the department for the purpose of determining the horse power rating for registration purposes, the minimum sizing of safety valves, registration and inspection fees and for operating engineers’ certificates;
- (s) **“high pressure boiler”** means a boiler designed for a steam pressure exceeding 15 pounds to the square inch in accordance with the A.S.M.E. Code for Power boilers and these regulations (see also **“miniature boilers”**);
- (t) **“hot water tank”** means a pressure vessel used to contain hot water at a pressure exceeding 15 pounds to the square inch and having a diameter of more than 24 inches but for the purpose of field inspection does not include a hot water tank in a private residence designed to accommodate not more than 3 families;
- (u) **“hydropneumatic tank”** means a pressure vessel used to contain liquid and air at a pressure exceeding 15 pounds to the square inch having a diameter of more than 24 inches, but for the purpose of field inspection does not include a hydropneumatic tank used for agricultural purposes or in a private residence designed to accommodate not more than 3 families;
- (v) **“inspector”** means an inspector appointed under section 5 of the Act or an inspector having the approval of and authorized by the Chief Inspector;
- (w) **“manufacturer”** means the company or person manufacturing a boiler, pressure vessel or fitting and who shall be responsible for the construction of same complying with the design approved and registered for use in Saskatchewan and for the stamping of the Saskatchewan registration number thereon;

- (x) **“manufacturers affidavit”** means a certification made upon a special form obtained from the department, to the effect that a boiler or pressure vessel complies in every respect with the design submitted to and approved and registered by Saskatchewan and without which certification no boiler or pressure vessel shall enter the province;
- (y) **“manufacturers specification”** means the specifications respecting a boiler or pressure vessel made upon a special form obtained from the department and submitted to the Chief Inspector in triplicate along with the design drawings for approval and registration;
- (z) **“miniature boiler”** means a boiler having a shell with an inside diameter not greater than 16 inches, an over-all length from outside to outside of heads not greater than 42 inches, a heating surface not greater than 20 square feet, a design pressure not greater than 100 pounds to the square inch and designed in accordance with the A.S.M.E Code for Miniature Boilers and these regulations;
- (aa) **“National Board”** means the National Board of Boiler and Pressure Vessel Inspectors of the U.S.A.;
- (bb) **“oil refinery”** means a plant for separating, evaporating, cracking, desalting, purifying or refining oil or any of the constituents thereof and includes all fired or unfired pressure vessels other than boilers installed therein;
- (cc) **“person”** includes a manufacturer, association, corporation, firm, partnership and syndicate;
- (dd) **“pressure”** means gauge pressure in pounds per square inch (designation **“p.s.i.”**);
- (ee) **“pressure piping”** means any pipe or fitting used or designed to be used in connection with any boiler, pressure vessel, or plant provided for in the Act or in these regulations;
- (ff) **“pressure plant”** means a plant as defined in the Act which is or may be used under pressure in connection with air, hot water, steam, oil, compressed gas or for refrigeration purposes;
- (gg) **“pressure vessel”** means a vessel as defined in the Act;
- (hh) **“pressure welding”** means any welding upon any boiler, pressure vessel or pressure piping which is subject to the requirements of these regulations, to Saskatchewan Pressure Welding Regulations or the Boiler and Pressure Vessel Act;
- (ii) **“registered design”** means registered by the Boiler and Pressure Vessel Inspection Branch of Saskatchewan for legal use in the province and allotted a registration number (C.R.N.) ending with decimal 3 (.3) by the Chief Inspector;
- (jj) **“seal”** means to seal with a department seal and prohibit the use of any boiler or pressure vessel shipped into the province prior to having its design approved and registered by the Chief Inspector or not designed and constructed in accordance with the requirements of the Act and these regulations;

(kk) **“second hand vessel”** means a used boiler or pressure vessel prohibited by Sections 25 and 26 of the Act and these regulations from being shipped into the province or being reinstalled inside the province unless prior permission in writing has been obtained from the Chief Inspector, and where a violation of such requirements has occurred is subject to such fees and penalties as are specified in section 2 of these regulations;

(ll) **“separator”** means a pressure vessel designed especially for well-head or oil-field use for the purpose of separating any gas or fluid from crude oil and for the purpose of field inspection includes every type separator irrespective of design pressure;

(mm) **“steam processor”** means a pressure vessel used for the purpose of raising the temperature of any material placed therein by means of steam;

(nn) **“symbol”** means letters or figures or a combination of same issued to an authorized pressure welder for stamping his work in accordance with Saskatchewan Pressure Welding Regulations;

(oo) **“treater”** means a pressure vessel designed especially for oil-field or gas-field or well-head use for the purpose of extracting water or otherwise treating crude oil or gas and for the purpose of field inspection includes every type treater irrespective of design pressure;

(pp) **“unfired pressure vessel”** means an air receiver, refrigerant receiver, heat exchanger, steam processor, digester, oil still, treater, unfired treater, separator petrochemical vessel, well-head vessel, oil-field or gas-field vessel, hot water tank, hot-water heat exchanger, hydropneumatic tank, blow-off tank, expansion tank, L.P. gas tank, anhydrous ammonia tank, reactor containment vessel, reactor vessel or any similar pressure vessel which is or may be used for containing, storing, distributing, transferring, distilling, treating, separating, evaporating, processing, or otherwise handling air, hot water, steam, oil, compressed gas or for nuclear reaction or refrigeration purposes;

(qq) **“unfired steam boiler”** means an electric boiler or any similar pressure vessel in which steam is generated by means other than the direct combustion of fuel and for which requirements are provided in both the A.S.M.E. “Unfired Pressure Vessels” Code and the A.S.M.E. “Power Boilers” Code; and all other expressions shall have the same meaning as in the Act;

(rr) a minimum of 1/16" corrosion allowance is required on all vessels using petroleum products.

## SECTION 2

## APPLICATION AND GENERAL REQUIREMENTS

**201** These regulations apply to the design, construction, fabrication, shop inspection, installation, alteration, repair and operation of every high pressure boiler, low pressure boiler, pressure vessel, pressure piping or fitting which is subject to inspection, approval, or registration under the Boiler and Pressure Vessel Act or is defined herein and the design, construction, fabrication, shop inspection, installation and repair shall be strictly in accordance with the requirements of these regulations and any codes or standards adopted hereby except where same are at variance with these regulations or the Act.

**202** These regulations do not apply to boilers or pressure vessels operating or used under the supervision of the Board of Transport Commissioners for Canada and constructed, marked and maintained in accordance with their specifications and requirements.

**203(a)** Except as otherwise provided in these regulations, the standards governing the design, construction, fabrication, shop inspection, installation and testing of boilers and pressure vessels as minimum requirements shall be those set forth in the current editions of the following codes of the American Society of Mechanical Engineers, namely "Power Boilers", "Material Specifications", "Low Pressure Heating Boilers", "Miniature Boilers", "Unfired Pressure Vessels", "Qualifications for Welding", and "Boilers of Locomotives", and for piping and fittings as set forth in the "A.S.A. Code for Pressure Piping".

(b) Except where the same are at variance with the requirements of these regulations, C.S.A. Code B51 shall, where required herein, be complied with as constituting part of these regulations.

**204** Where any requirements of these regulations is at variance with the requirements of the codes and standards mentioned in Rule 203, the requirements of these regulations shall govern and the Chief Inspector may approve or reject any revision or amendment hereafter made in any codes or standards referred to in these regulations.

**205** The Chief Inspector may formulate rules in special cases, where appropriate rules have not been provided by these regulations, in accordance with Section 4 and Section 8 of the Act.

**206** Any inspector appointed under Section 5 of the Act or an authorized inspector having the approval of the Chief Inspector may increase the factor of safety on any boiler or pressure vessel when he considers the construction, material or workmanship is such that a reduction in working pressure of the boiler or pressure vessel is necessary.

**207** All fittings attached to any boiler or pressure vessel or used in any steam plant, refrigeration plant, or oil refinery, shall be for new installations such as are sanctioned by these Regulations, and for existing installations all fittings found to be unsafe or to be replaced, shall be replaced with fittings that are sanctioned by these regulations.

**208(a)** The age limit of every high pressure lap-seam riveted boiler shall be 20 years at its original design pressure after which the inspector shall reduce the working pressure by increasing the factor of safety by not less than 0.1 each year and if the boiler is over 36 inches in diameter and installed in a new location, the safety valves shall be set at not more than 15 pounds to the square inch;

(b) No traction boiler more than 35 years old shall be allowed a working pressure of more than 100 pounds to the square inch.

**209** For the purposes of design registration fees, inspection fees and other specified requirements of these regulations one boiler horse power shall be considered as being the equivalent of 10 square feet of heating surface as defined in Section 1 except that for an electric boiler, the maximum kilowatt capacity of the heating element divided by ten shall be the horse power rating.

**210(a)** Liquefied petroleum gas storage tanks or containers other than those designed for use in an oil refinery and subject to special rulings, shall be designed, constructed and used in accordance with Saskatchewan Regulations Respecting L.P. Gas Pressure Vessels;

(b) Anhydrous Ammonia storage tanks or containers for use with  $\text{NH}_3$  as a liquid fertilizer shall be designed, constructed and used in accordance with Saskatchewan Regulations Respecting Anhydrous Ammonia Pressure Vessels;

(c) Refrigeration vessels and refrigeration plants having a capacity of 5 tons or more, including all piping, fittings and appurtenances attached thereto, shall be designed, constructed and used in accordance with the requirements of C.S.A. Code B52 and these regulations;

(d) Portable cylinders for L.P. gas shall be constructed in accordance with specifications of the Board of Transport Commissioners for Canada or the Interstate Commerce Commission of the U.S.A.

**211** All piping used in connection with boilers, pressure vessels and pressure plants shall meet the requirements of:

(a) the A.S.M.E. Codes where applicable;

(b) the A.S.A. Code for Pressure Piping where the A.S.M.E. Codes are not applicable;

(c) the requirements of Saskatchewan Pressure Welding Regulations where such piping is welded.

**212** All low pressure steel heating boilers shall be constructed of flange or fire-box quality plate as a minimum requirement.

**203** All boilers and pressure vessels defined in these regulations shall be registered.

**214** Heat exchangers of the fin-tube type up to 100 square feet of tube heating surface shall be exempt from shop inspection, but a manufacturer's affidavit for same shall be forwarded the department.

**215** Cast iron boilers shall be constructed in accordance with the A.S.M.E. Low Pressure Heating Boilers Code and these regulations except where these regulations are obviously not applicable.



**220** All welding in connection with boilers, pressure vessels and pressure piping for use in the province shall be strictly in accordance with Section 12 of these regulations and Saskatchewan Pressure Welding Regulations.

**221** Non ferrous vessels including those of copper base material shall be designed with a factor of safety as specified in the A.S.M.E. Code provided that the yield point of the material shall not be exceeded to the extent that the material takes on a permanent elongation when the vessel is hydrostatically tested to twice the design pressure.

**222** Where a non registered or second hand boiler or pressure vessel is installed or shipped into the province for installation in violation of any of the requirements of these regulations or the Act, the following requirements shall be applicable thereto:

- (a) a special inspection or inspections by an inspector and payment of the special inspection fees;
- (b) sealing by an inspector until the design has been approved;
- (c) payment of all expenses incurred by the department including those for any inspection trips made by an inspector;
- (d) a per diem fee for the inspector's time;
- (e) the payment of a fee of \$100.00 as specified in Section 14, Rule 1401.(3) for a special department survey;
- (f) registration if approved by the special survey and payment of the registration fee;
- (g) payment of the stamping fee as specified in Section 14, Rule 1401.(6);
- (h) any other charges in connection with the violation deemed by the Chief Inspector to be fair and just;

irrespective of whether or not the vessel is found in a useable condition, is condemned, is registered or its use prohibited.

19 Jly 57 SR 262/67 s2; 8 May 70 SR 96/70.

### SECTION 3

#### REGISTRATION OF DESIGNS (Drawings and Specifications)

**301** Blueprints and specifications of designs in duplicate shall be submitted to the department for registration for all boilers and pressure vessels defined in these regulations or provided for in the Act.

**302** Drawings and specifications of any boiler or pressure vessel shall give the maximum design pressure and temperature, the working pressure (for proportioning safety valves), the material thickness and specifications, method of fabrication and welding details and the purpose for which the boiler or pressure vessel is to be used.

**303** Before commencing construction of any boiler or pressure vessel to be built under these regulations, the manufacturer's drawings and specifications shall have been submitted to, and approved by, the Chief Inspector.

**304** Drawings or blueprints, submitted with applications for approval and registration, shall be provided with a blank or white area 4 inches by 4 inches on which an official approval stamp may be placed.

**305** Specification forms and Affidavit of Manufacturer forms printed by the Province of Saskatchewan will be supplied by the department on request.

**306** Fees for surveying designs of boilers and pressure vessels for approval and registration are as specified in the schedule of fees and shall be paid in Canadian funds upon the request of the department.

**307** Designs, when finally approved, will be given a registration number (C.R.N.) for Saskatchewan and vessels may be manufactured to such registered designs in any quantity provided they meet the requirements of the registered design in every detail. Reference shall be made to the registration number, when submitting Affidavit of Manufacturer to the department respecting each vessel for use in the province.

**308** Boilers and pressure vessels may be built in accordance with a registered design until changes are made in these regulations or in the codes adopted hereby which affect the design in which case the design shall become obsolete and no further construction shall be made to such a design after a period of 12 months except with the permission of the Chief Inspector.

**309** Notwithstanding the fact that a design has been approved by the department, if it is afterwards found to be defective in any way, the manufacturer will be notified accordingly, and shall thereupon revise the design to meet the approval of the Chief Inspector.

**310** Changes made by a manufacturer in a design already approved and registered will necessitate the submitting of new drawings and specifications to the department for approval. In such cases the manufacturer may at the discretion of the Chief Inspector be required to pay registration fees in the same manner as if they were original designs.

**311** When a design is submitted and not approved, a report on the design will be sent by the department to the manufacturer by whom it was submitted, who shall forward new blueprints and specifications conforming with the requirements of these regulations.

**312** The approval and registration of design drawings and specifications of a boiler or pressure vessel will not in any way relieve the manufacturer of full responsibility in connection with same.

**313** Boilers or pressure vessels, the design of which differs from the requirements of these regulations, or which have been previously installed or used, may not be shipped into Saskatchewan for installation without first obtaining permission in writing from the Chief Inspector, who shall at the time of the request be supplied with complete design drawings, manufacture's specifications, affidavit of manufacturer and the last provincial inspection report, and where this requirement is violated all the provisions of Section 2, Rule 222 as specified for a non-registered or second hand boiler or pressure vessel shall apply thereto.

**314** When a boiler or pressure vessel is delivered to a purchaser in the province, an Affidavit of Manufacturer on a special Saskatchewan Affidavit form, bearing the signature of the authorized shop inspector where shop inspection is required by the Code or these regulations, shall be forwarded to the department. In the case of boilers or pressure vessels manufactured for stock, the name and address of the ultimate owner and location of the installation, when not available to the manufacturer at the time the boiler or pressure vessel leaves the plant, may be filled in by the sales agent.

**315** All low pressure boilers of 50 square feet of heating surface and less are exempt from shop inspection unless otherwise required by the A.S.M.E. Code. All high pressure boilers, and low pressure boilers of more than 50 square feet of heating surface, shall be built under shop inspection and shop inspection of pressure vessels shall be as required in Section 8 of the A.S.M.E. Code.

**316** All boilers and pressure vessels subject to shop inspection and manufactured in the U.S.A. for use in Saskatchewan shall be shop inspected by an inspector holding a current National Board Commission and shall be stamped "National Board" in addition to being stamped with the A.S.M.E. symbol. The authorized inspector holding the National Board Commission shall be a state inspector or an inspector regularly employed by a boiler insurance company.

19 Jly 57 SR 262/67 s3; 8 May 70 SR 96/70.

#### SECTION 4 REGISTRATION OF FITTINGS (Fittings include Accessories)

**401(a)** Blueprints and specifications, in duplicate, of all fittings to be used on boilers, pressure vessels and pressure piping connected therewith shall be submitted to the Chief Inspector for registration, before any fitting is used. The blueprints and specifications shall indicate all sizes and thicknesses of metal, compositions of all materials, tensile strength, compressive strength of all parts which are subject to compression, also the pressure to which the design was tested by the manufacturer. The pressure at which a sample fitting ruptured if tested to destruction shall also be given in addition to the maximum operating pressure and temperature rating of the fitting;

(b) Registration of fittings shall in no way relieve the manufacturer or his agent of full responsibility in connection with the use of same;

(c) Subject to the approval of the Chief Inspector, it shall not be necessary to register separately the design of every globe, angle, gate and check valve, or ells, tees, unions and flanges and similar appurtenances provided they comply with all the requirements of the A.S.M.E. and A.S.A. Codes and Standards and these regulations. Each manufacturer may have such fittings registered collectively by forwarding a certificate in duplicate respecting same on a Saskatchewan form to the Chief Inspector;

(d) Safety valves shall be registered separately in full compliance with subsection (a).

**402** Should an inspector find that a manufacturer is supplying fittings that do not fully comply with the requirements of these regulations, the registration may be cancelled immediately.

**403** Fees for surveying designs of fittings for registration are as specified in the schedule of fees and shall be paid in Canadian funds upon the request of the department.

**404** When the Chief Inspector considers it necessary, sample fittings shall be forwarded to the department at the expense of the party wishing to register same and may be retained by the department or returned at the registering party's expense.

**405** The Chief Inspector may select any registered fitting in an agents stock for test purposes and, should a number of fittings made to a registered design prove to be faulty, the Chief Inspector may cancel the registration.

19 Jly 57 SR 262/67 s4; 8 May 70 SR 96/70.

## SECTION 5 REGISTRATION NUMBERS FOR SASKATCHEWAN

**501** The registration number issued by the department to an approved and registered design shall be as specified in Section 5 of C.S.A. Code B51 for Saskatchewan and shall be allotted as follows:

(a) for a boiler or pressure vessel design not previously registered in any other province the department will allot the next number on its registration files followed by the figure 3 after a decimal point, thus 6739.3, the .3 designating Saskatchewan;

(b) for a boiler or pressure vessel design previously registered in another province the department will use the number allotted in the previous registration followed by the figure 3 after the decimal point thus, 7325.53, the .3 designating Saskatchewan;

(c) for any apparatus to be registered as a fitting under Section 4 the same procedure shall be followed in allotting a registration number as set forth in (a) and (b) provided also that the number shall be preceded by zero, thus 06739.3;

(d) where a boiler, pressure vessel or fitting has been previously approved and registered in another province but changes have since been made in the design by the manufacturer or where changes are necessary in the design to obtain approval and registration in Saskatchewan, any registration number previously allotted the design by another province shall be ignored and a Saskatchewan registration number shall be allotted thereto.

**502** When a design is submitted for approval and registration it shall be the responsibility of the manufacturer to inform the department respecting any registration numbers previously allotted the design by any other province also the previous registration date and where this information is not given, full registration fees may be charged for any changes required at a later date in the registration number allotted.

**503** The provinces are indicated by the following decimal figures for registration purposes:

British Columbia .....	.1	Quebec .....	.6
Alberta .....	.2	New Brunswick .....	.7
Saskatchewan .....	.3	Nova Scotia .....	.8
Manitoba .....	.4	Prince Edward Is. ....	.9
Ontario .....	.5	Newfoundland .....	.0

19 Jly 57 SR 262/67 s5.

## SECTION 6 IDENTIFICATION AND STAMPING

**601** Every boiler or pressure vessel built under these regulations shall conform to them in every detail and shall be distinctly stamped as follows denoting that the boiler or pressure vessel has been constructed in accordance with an approved and registered design for the Province of Saskatchewan:

(a) For Power and Heating Boilers.

- Saskatchewan Registration number (C.R.N.).
- National Board number (if manufactured in U.S.A.).
- Manufacturer and manufacturer's serial number.
- A.S.M.E. or A.S.T.M. material specification number and tensile strength.
- Maximum working pressure with "S" for steam or "W" for water or both.
- Heating surface in square feet and year built.
- Initials or symbol of authorized shop inspector.

Sample stamping for boiler:

C.R.N. ....	5608.236
Dom-Bridge .....	Sr. No. B-6431
Stelco SA 285C .....	T.S. 55000
Max. W.P. 15 lb. S .....	30 lb. W
H.S. 1500 Ft. ....	1957
J.W.C.	

(b) For Unfired Pressure Vessels (except L.P. Gas and Anhydrous Ammonia vessels).

- Saskatchewan Registration number (C.R.N.).
- National Board number (if manufactured in U.S.A.).
- Manufacturer and manufacturer's serial number.
- Plate specification number and tensile strength for shell.
- Plate specification number and tensile strength for heads.
- Thickness of shell and heads.

Maximum working pressure and temperature.  
A.S.M.E. Code paragraph number and year built.  
Initials or symbol of authorized shop inspector.

Sample stamping for unfired pressure vessel:

C.R.N .....	8805.349
Fab-weld .....	Sr. No. 26951
U.S. Steel SA 201 .....	T.S. 55000
Max. W.P. 200 lb. ....	Temp. 400
T. Shell .375 .....	T.Heads .4375
UW-52 .....	1957
N.H.	

(c) For Propane Storage Containers.

The stamping shall be as designated in Saskatchewan Regulations for L.P. Gas Pressure Vessels.

(d) For Anhydrous Ammonia Containers.

The stamping shall be as designated in Saskatchewan Regulations for Anhydrous Ammonia Pressure Vessels.

**602(a)** The figures and letters of the stamping shall be at least 3/8 inch in size and shall be located in accordance with the A.S.M.E. Code requirements unless otherwise approved by the Chief Inspector. When placed upon a permanently attached brass plate the figures and letters may be not less than 1/8 inch in size;

(b) The letters and figures shall be legible and stamped fully into the plate of the boiler or pressure vessel (not of the smoke box) provided that for cast iron boilers the stamping shall be cast into the boiler or stamped on a permanently attached plate. For pressure vessels made of light gauge material, the stamping may be upon a permanently attached plate.

(c) The stamping area shall be painted and outlined in a contrasting colour and worded "This area not to be covered" provided that this requirement may be omitted in the case of fire tube boilers where the stamping is on the front head exposed to the products of combustion and accessible through the smoke box door.

(d) Exemptions: Boilers and pressure vessels manufactured outside Canada for installation in Saskatchewan may be stamped by the manufacturer with the stamping required by the A.S.M.E. Code in lieu of the stamping required in this Section. The Saskatchewan Registration number (C.R.N.) shall be stamped on the vessel in addition to the stamping required by the A.S.M.E. Code.

This exemption is limited to unfired pressure vessels up to 5 cubic feet capacity, to low pressure heating boilers up to 50 square feet of heating surface and to miniature boilers (high pressure type) up to 20 square feet of heating surface.

**603** Any identification or stamping as required herein shall be kept free of insulation or other covering so that the stamping is plainly visible at all times to the field inspector and where this is impracticable the identification shall also be stamped upon a permanently attached plate, in addition to the stamping on the vessel, which plate shall be kept free of covering.

**604** “Hot water storage tanks”, “hydropneumatic tanks” and “expansion tanks” as defined in these regulations shall be identified or stamped as required in Rule 601. (b) of this Section except that the plate manufacture, the working temperature, and thickness of heads and shell may be omitted.

19 Jly 57 SR 262/67 s6.

SECTION 7

BLOW-OFF TANKS AND PIPING

**701** When the blow-down from any boiler having a working pressure exceeding 15 pounds per square inch is discharged into a closed sewer system, or where an inspector otherwise believes it necessary, an approved blow-off tank shall be placed between the boiler and the sewer, or otherwise used, for the purpose of reducing the pressure and temperature of the water discharged from the boiler or entering the sewer.

**702** Where blow-off tanks are provided, they shall be of approved and registered designs, and have a minimum capacity or volume equivalent to the following:

Nominal HP	Size of Blow-off Tank (Inches)	Minimum Plate Thickness (Inches)
5 to 20 .....	18x24 .....	1/4
21 to 50 .....	24x30 .....	1/4
51 to 100 .....	30x36 .....	3/8
101 to 200 .....	36x36 .....	3/8
201 to 400 .....	36x42 .....	3/8
401 to 800 .....	42x48 .....	3/8
801 and over .....	48x60 .....	3/8

In a battery of boilers the largest size boiler shall establish the size of the blow-off tank.

**Note:** The lengths referred to are overall lengths.

**703** The outlet shall be at least three times the area of the inlet pipe to the blow-down tank and made to extend internally by means of a tee-pipe to within 6 inches of the bottom and top of the tank. A vent pipe of at least equal diameter to the outlet connection shall lead to the atmosphere from the top of the tank, and a drain connection having a minimum size of 1 1/4 inches shall be connected at the bottom. For convenience in cleaning the tank, a man- hole not less than 11 inches by 15 inches shall be provided.

**704** All designs submitted and allotted a registration number shall be built with a factor of safety of 5 to carry a pressure not less than 30 per cent of the maximum boiler pressure. Such tank may be constructed of C.S.A. G40 or A.S.T.M. 283C plate or equivalent as a minimum requirement.

**705** Blow-down tanks shall be installed so as to permit free access for external and internal inspection. They shall not be bedded in solid concrete.

**706** All pipe, pipe connections and fittings between the boiler and tank shall be designed for the maximum boiler pressure, and made as direct as possible. The blow-down tank shall be installed so that wherever possible or practicable the lines from the boiler shall slope towards the tank. Where the elevation of the tank precludes the above condition, a drain shall be provided at the lowest point of the blow-off line.

**707** Every boiler having a working pressure exceeding 15 pounds per square inch shall be equipped with two blow-off valves one of which shall be of an approved slow opening type. Where plug-cock type valves are used they shall have bolted covers with proper packing glands and be designed especially for blow-off service.

**708** Each boiler in a battery of boilers shall have its blow-off line connected in such a manner that the boiler can be isolated from the other boilers under pressure. It is also recommended that for the purpose of blowing down, boilers when set in batteries shall be numbered both back and front.

19 Jly 57 SR 262/67 s7.

## SECTION 8

### BOILER SUSPENSION AND SUPPORT

**801** The following rules shall be observed in the setting of horizontal return tubular boilers:

(a) No boiler shall be suspended from the crown or allowed to stand on a pedestal at the back end.

(b) Every boiler, up to and including 12 feet in length and less than 48 inches in diameter, may be supported upon 4 cast iron or steel brackets resting upon substantial plates set in the brickwork, the back lugs resting upon rollers between the lugs and plate to provide for free expansion and contraction of the boiler.

(c) Every boiler over 12 feet long, and 48 inches and over in diameter shall be suspended at the front and back by side lugs set in pairs, or by approved double-wing, single hangers. The design of the suspension lugs or hangers and their attachment shall meet the requirements of the A.S.M.E. Code.

(d) Suspension, when required, shall be from steel beams, which shall be carried by and secured to steel columns having bases bolted to substantial foundations.

(e) Suspension beams or supporting columns shall not rest on the side walls of the brick setting. Recommended sizes of beams and columns are shown in Table 1.



- (f) The maximum fibre stress for suspension beams shall not exceed 15,000 pounds per square inch. The maximum fibre stress for suspension rods computed at the minimum next section at the bottom of the thread shall not exceed 10,000 pounds per square inch for iron rods or 12,500 pounds per square inch for steel rods.
- (g) In case of boilers suspended from 4 points, since any slackening of one support throws the whole weight of the boiler on 2 rods, each suspension rod shall be sufficiently strong to carry one-half the total weight of the boiler when filled with water without exceeding the fibre stress specified in (f). If a link arrangement is used, the link is subjected to bending and shearing stresses in addition to the direct pull on the rods and, consequently, in calculating the size of link required, allowance shall be made for these stresses.
- (h) Supporting columns shall not be enclosed within brickwork or any part of the setting which is subject to the heat from the furnace. Columns shall be placed not less than 1 inch clear of the outer walls of the boiler or battery of boilers, so that the columns and the brickwork behind them can be readily inspected.
- (i) Stacks and breeching shall, in general, be supported independently of the weight of the boiler. If, however, these components are permitted by the Chief Inspector to be supported on the boiler suspension, the suspension shall be made heavier, if necessary, to take care of the increased vertical loads and horizontal wind loads, if any, without exceeding the permissible unit stresses. The boiler brickwork shall not be considered effective for resisting horizontal loads.

**802** The following rules shall be observed in the design of the supporting steelwork for the pressure parts of water tube and other type boilers not covered by Rule 801:

- (a) The several parts of the structure shall be so proportioned that the maximum stresses will not exceed those permitted by C.S.A. Specification S16, Steel Structures for Buildings.
- (b) Where the steel work is restrained or partially restrained from contracting or expanding due to temperature changes, the stresses so induced shall be combined with those from other sources in proportioning the material. Cautionary Note: The maximum stresses and length/depth ratios established by C.S.A. Specification S16, while adequate for the strength of beams, may need to be decreased in many cases to keep the deflections to practical limits or to reduce vibration.
- (c) Wherever practicable, supporting beams and columns shall be kept clear of the setting to provide access for inspection and to provide air circulation and cooling. Where these members form part of the boiler casing the setting shall be so constructed that the temperature of the steel will not exceed 350 degrees F.

DESIGN, CONSTRUCTION, INSTALLATION AND  
USE OF BOILERS AND PRESSURE VESSELS

Table 1 - RECOMMENDED SIZES OF SUSPENSION BEAMS AND COLUMNS  
FOR HORIZONTAL RETURN TUBULAR BOILERS

Diameter of Boiler "A"	48"	10'-0" 12'-0" 14'-0"	7" @ 9.8 #	9" @ 21.8 #	9" @ 21.8 #	4" @ 13.8 #
	54"	12'-0" 14'-0"	8" @ 11.5 #	10" @ 25.4 #	12" @ 31.8 #	5" @ 18.9 #
60"	12'-0" 14'-0"	12'-0" 14'-0"	9" @ 13.4 #	12" @ 31.8 #	12" @ 40.8 #	5" @ 18.9 #
	16'-0"	16'-0"	9" @ 13.4 #	12" @ 40.8 #	12" @ 40.8 #	
66"	14'-0"	14'-0"	10" @ 15.3 #	12" @ 40.8 #	15" @ 42.9 #	5" @ 18.9 #
	16'-0"	16'-0"	10" @ 15.3 #	15" @ 42.9 #	15" @ 42.9 #	
72"	14'-0"	14'-0"	10" @ 15.3 #	15" @ 42.9 #	18" @ 54.7 #	6" @ 20 #
	16'-0" 18'-0"	16'-0" 18'-0"	12" @ 20.7 #	18" @ 54.7 #	18" @ 65 #	
	20'-0"	20'-0"	12" @ 20.7 #	18" @ 65 #	18" @ 65 #	
78"	16'-0" 18'-0"	16'-0" 18'-0"	12" @ 20.7 #	20" @ 65.4 #	20" @ 65.4 #	6" @ 20 #
	20'-0"	20'-0"	12" @ 25 #	20" @ 65.4 #	20" @ 65.4 #	
84"	18'-0" 20'-0"	18'-0" 20'-0"	15" @ 33.9 #	24" @ 79.9 #	24" @ 79.9 #	8" @ 32.6 #
Diameter of Boiler "A"			Cross Channels for Single Setting	Cross Beams for Double Setting		"H" Columns for Either Single or Double Setting

Note: Cross channels and cross beams referred to in this table shall be installed in pairs.

## SECTION 9

## SUPPLEMENTARY CONSTRUCTION AND INSTALLATION REQUIREMENTS

**901(a)** Stop valves of straightway type and approved design of the outside screw and yoke type with rising spindle shall be fitted in both steam and water connecting pipes between the water column and the boiler. The piping to the boiler shall be as short as possible, and conveniently arranged with crosses, having suitable plugs for clean-out and inspection purposes. A waste-pipe and blow-down valve, with a diameter of at least half the diameter of the connecting pipes from the boiler to the column shall be fitted at the bottom of the column. In the case of low pressure heating boilers the valves in the water column connections between the boiler and the water column may be omitted. Drain valves shall be provided on the base of the water- column and water gauge.

(b) Where it is found necessary that the water column connecting pipes exceed fifteen feet, approval for same shall be obtained from the Chief Inspector.

(c) Plans and specifications, and amendments to same, for all new installations and major rebuilding of old installations of boilers, pressure vessels and refrigerating plants shall be submitted to the department for approval.

**902** Where the top connection is above 7 feet and under 20 feet from the floor or working-platform of the boiler-room, water gauges shall be fitted with rods or chains so that they may be operated from the floor or working-platform, and where the water-gauge is 20 feet or more from the operating-floor level they shall be of the inclined or other approved type.

**903(a)** Safe and effective means, including adequate lighting, shall be provided to permit the water-level in the gauge glass to be distinctly seen at all times. Where considered necessary by the Inspector, tubular water-gauges shall be encased within a suitable guard to provide against accidents.

(b) Where 2 gauge glasses are required on large boilers as specified in the ASME Code, both shall be visible from the floor or working-platform of the boiler room. Mirrors may be used to obtain visibility.

**904** Water-gauges shall be provided with approved gauge fittings equipped with shut-off valves, having packing glands designed to prevent the possibility of the packing obstructing the opening in the glass or otherwise interfering with its free action.

**905** Water-gauges of the remote indicator type shall be of an approved design. Such water-gauges, where used, shall be in addition to standard equipment.

**906(a)** Every steam boiler, both high pressure and low pressure which is not under continuous attendance by a certified operator, when automatically fired, shall be equipped with an approved low-water cut-off device, designed to shut off the fuel feed and air supply in the event of low water, installed in such a manner that it cannot be rendered inoperative by the manipulation of any manual control or regulating apparatus. The low-water cut-off device shall be housed in either the water column or a separate chamber which shall be provided with a blow-off pipe and valve not less than  $\frac{3}{4}$  inch pipe size. The arrangement shall be such that when the column or chamber is blown down, the water level in it will be lowered sufficiently to actuate the low-water cut-off.

(b) Every automatically fired hot water heating boiler when installed in a forced circulation system and not under continuous attendance by a certified operator, shall be equipped in the manner described in Rule 906(a).

(c) In a steam boiler, when a combination device incorporating the low-water fuel cut-off and a feed water supply control switch is used, the boiler shall also be equipped with a separate low-water fuel cut-off device installed as described in Rule 906(a), and with a separate water connection to the boiler.

**907** Every fire tube boiler operating at a pressure of over 15 pounds to the square inch shall be provided with an approved fusible plug unless specifically exempted by the Chief Inspector which shall be located as recommended by the ASME Code, except where a change in location is allowed or required by the Chief Inspector.

**908(a)** Every heating boiler, with the exception of a vertical boiler, shall, at the time of manufacture, be provided with a permanently attached marker, indicating the lowest permissible low water level. The marker shall be located in a prominent position and designed so that it will not be covered over by lagging of normal thickness. The marker shall be located as follows:

(1) For boilers where the upper row of tubes is in the first pass and exposed to primary temperature combustion gases, not lower than 2 inches above the top of the upper row of tubes;

(2) For boilers where the upper row of tubes is in the second or subsequent pass and hence not exposed to primary temperature combustion gases, not lower than level with the top of the upper row of tubes.

(b) The lowest visible part of the waterglass shall in no case be lower than the marker required in Rule 908 (a).

**909** Every boiler having a working pressure exceeding 15 pounds to the square inch of 15 horsepower or more shall be equipped with two separate means capable of supplying feed water while carrying its maximum allowed pressure, but this does not necessitate two separate feed water connections to the boiler. In no case shall a boiler be fed water through its safety relief valve.

**910** Rules in the Section which are obviously not applicable to hot water boilers may be ignored but where doubt exists a ruling shall be obtained from the Chief Inspector.

**911(a)** Every heating boiler over 48 inches in diameter shall be equipped with a manhole above the tubes, and every heating boiler 48 inches and under shall be equipped with a 4 inch by 5 inch handhole above the tubes in each head. On a boiler not over 6 feet in length a handhole shall be required in one head only.

(b) In a water-leg boiler, inspection openings shall be provided near the bottom in each corner, placed alternately on the four sides of the fire-box each facing toward a different water leg. On boilers having water legs over 36 inches wide or 60 inches long, there shall be six inspection openings in the water legs with two on each alternate corners. Where screw-plugs are used, they shall be of brass and of a minimum size of 2 inches for boilers up to 300 square feet of heating surface. For boilers larger than 300 square feet of heating surface they shall be a minimum size of 2½ inches.

- (c) Every heating boiler shall be equipped below the tubes with a manhole or adequately sized handhole. On boilers over 39 inches in diameter such handhole shall be not less than 4 inches by 5 inches. Where a 4 inch by 5 inch handhole, placed on the center line of the boiler, is impracticable, two 2¾ inch by 3½ inch handholes may be used.
- (d) Wherever there is a combustion chamber head, crown sheet or similar construction on a heating boiler, there shall be provided adequate handholes for inspection and cleaning.
- (e) Where the requirements of (a), (c) and (d) are applicable to a Marine Type Boiler they shall be complied with, and in addition, this type of boiler shall be provided with:
- i) One handhole or approved inspection opening not less than 2¾ inches x 3½ inches or equivalent area along the centre line of the boiler at the bottom of the shell,
  - ii) Four adequately sized inspection openings on each side of the shell, one in each quarter except that the top openings may be omitted where a manhole is provided, and alternate handholes may be omitted on a boiler not over six feet in length.
- (f) All diameters referred to in (a), (b) and (c) are inside diameters.
- (g) Inspection openings in high-pressure boilers, where not specifically provided for in the ASME Code shall meet all the requirements of Rule 911 as minimum requirements.
- (h) (i) Every boiler and pressure vessel shall be installed in such a manner so as to provide adequate access to inspection openings.
- (ii) Except as provided in Rule 911(h)(iv) and (v) a passageway of at least 2 feet in width clear of all obstructions and appurtenances, shall be provided at each side and at the rear of each boiler. Where necessary, this clearance shall be further increased for the removal or opening of a closure, casing or cover.
  - (iii) To provide for inspection of external surfaces, a clearance of at least 12 inches shall be provided between the floor and the bottom drum of water tube boilers and the shell of fire tube boilers which are set horizontally. If the bottom drum or shell is insulated, this clearance shall apply to the lowest portion of the insulation.
  - (iv) Clearance for tube replacement and cleaning of fire tube boilers shall be equal to the length of the longest tube plus 1 foot. Upon approval of the Chief Inspector a door or other removable obstruction may be utilized to provide this clearance.
  - (v) A clearance of not less than 4 feet shall be provided to permit the servicing and removal of boiler fuel burning equipment.
  - (vi) Where it is impractical to provide adequate access for inspection of a boiler and with prior approval of the Chief Inspector, the vessel shall be installed so that it is readily removable.

**912(a)** All safety valves used on boilers and pressure vessels shall be rated valves, tested and listed in accordance with the requirements of the ASME Code. They shall be properly stamped with the rated capacity and the registration number. Manufacturers shall specify on the blueprints or specifications submitted for registration the number and capacity of the safety valves which shall be used for steam and hot water boilers.

(b) Safety valves, blow down valves, check valves, stop valves, water gauges, steam gauges and their respective fittings shall, for steam boilers, be supplied by the manufacturer unless an exemption from this requirement is made by the Chief Inspector.

(c) When a change in the relieving pressure of a safety valve is required a new spring shall be installed designed for the new pressure if such is more than 10% over or under the original relieving pressure.

**913** Manhole and handhole doors, cover plates, bridges and fittings shall comply fully with ASME Code requirements including the specifications of material used for their construction.

**914** Each main or auxiliary steam outlet from a boiler (except at safety valve connections) shall be fitted with a stop valve immediately at the boiler, in addition to any other stop valves which may be required on main or branch lines. Where two or more boilers carrying over 100 pounds to the square inch are connected to a common main, each boiler shall be equipped with an approved automatic stop-and-check valve located closest to the boiler in addition to the boiler stop valve located between the stop-and-check valve and the main steam header. The space between the stop-and-check valve and the boiler stop valve shall be provided with an adequate drain.

**915** Every boiler shall be provided with adequate provision for easy inspection of all parts of the heating surface both internally and externally. Where such is not provided, any authorized inspector may require the owner or operator to shut down the boiler immediately and to remove any casings, cover plates, attachments or other obstructions which, in his opinion, hinder a proper inspection.

**916** When a hot-water tank is heated indirectly by means of a steam coil or pipe, the pressure of the steam used shall not exceed the safe working pressure of the hot-water tank which shall be fitted with an approved hot water relief valve of not less than 1 inch size set to relieve at or below the safe working pressure of the tank.

**917** Where steam from a boiler exceeding 15 pounds to the square inch is used for low pressure heating, the pressure shall be reduced by an approved reducing valve. A by-pass shall be provided to allow the servicing of the reducing valve. A low pressure safety valve or valves, capable of relieving all the pressure that may be built up in the low pressure system over and above that for which the low pressure system is designed if the reducing valve should fail, and a pressure gauge, shall be installed on the low pressure line within 10 feet of the reducing valve.

**918** Where the aggregate boiler capacity exceeds 100 horsepower, calculated in accordance with Rule 109, there shall be at least one exit door from the boiler room leading directly to the outside of the building if practicable and except where boiler rooms are provided with sliding doors equipped with fusible links, all boiler room doors shall open outwards and shall not be locked when any boiler is in operation.

**919** Platforms, walkways, ladders and stairways equipped with suitable handrails and toe plates shall be installed to give access to and egress from all important parts of boilers and auxiliary equipment. They shall be of substantial fire-resistant construction.

**920** Every air receiver where the safety valve is not installed upon the tank but upon a connecting line with a check valve between the safety valve and the receiver, shall be equipped with a fusible plug, to relieve the pressure in the event the tank becomes overheated by fire.

**921** An inspector when making an inspection shall satisfy himself:

(a) By thorough examination that all provisions of the Act and these Regulations respecting the boiler or pressure vessel and its design, registration, construction, installation, operation and maintenance have been and are being complied with and that the boiler, pressure vessel or plant may be and is being safely used.

(b) That the safety valves are properly set and sealed and that the boiler, pressure vessel or plant is being operated at a working pressure which does not exceed the maximum working pressure allowed.

(c) That all engines, turbines, fly-wheels, pulleys and other machinery are operated at safe speeds; that proper safeguards have been installed throughout the entire plant where in the inspector's opinion such are required and that the operation and maintenance of the plant and all the equipment therein meet all the requirements of the Act and these Regulations.

**922(a)** Manually operated uptake dampers shall not be installed in oil or gas fired low pressure heating boilers.

(b) Power boilers, oil, gas, or pulverized-coal fired, shall have a minimum opening in the uptake damper of not less than 5 per cent of the total damper area unless specifically exempted by the Chief Inspector.

**923** Unless otherwise approved for registration in Saskatchewan, the following procedure for determining the reinforcement of openings, which is the equivalent of replacing the amount of material cut from a vessel in making the opening as reinforcement, shall be followed:

(a) Find actual minimum thickness of a blank head or seamless shell required for the design pressure in accordance with A.S.M.E. requirements and Rule 930.

(b) Determine the cross sectional area to be cut from the head or shell. (Use longest measurements of opening if in a head.)

(c) Replace this cross sectional area as a reinforcing ring or rings, either at right angles to or parallel to the openings, by replacing one half the area on each side of the opening.

(d) The effective width of a ring or flue attached at right angles to an opening shall be limited to 6 times the required thickness of the material as found in (a), and any additional reinforcing required shall be provided by an attached flat plate.

- (e) Where corrosion allowance is required, this shall be provided for separately from the above.
- 924** All welding for low pressure steel-plate heating boilers shall be in accordance with Rule 924 and figure 1 of CSA Code B51 minimum requirements.
- 930** Unless otherwise approved for registration the thickness of all types of concave heads for boilers and pressure vessels shall be no thinner than those based upon A.S.M.E. Code formula.
- 931** Except for use with miniature boilers, heads without flanges shall not be used on high pressure boilers.
- 932** Head to shell joints shall be butt welded on any air receiver to operate at more than 100 pounds to the square inch.
- 933** Firebox type boilers shall have the furnace fully stayed to the shell or other opposite parts with no credit allowed for the o-gee joint for high pressure boilers and a credit allowed of only 1 stay pitch for low pressure heating boilers.

19 Jly 57 SR 262/67 s9; 8 May 70 SR 96/70.

## SECTION 10 PRESSURE GAUGES

- 1001** All gauges used on boilers and pressure vessels subject to inspection shall be of an approved design which has been registered with the department and shall bear the manufacturer's name and Canadian Registration number.
- 1002** Applications made to the department for registration shall in addition to describing the design in detail be accompanied by the manufacturer's certification that the gauge has passed the following tests:
- (a) Withstood for 6 hours a pressure equal to the maximum pressure marked on the dial without the tube showing a permanent set of more than 0.5 per cent at the end of one hour, after the release of the pressure.
  - (b) When subjected to calibration tests, showed an accuracy within 2 per cent on the lower fifth and upper fifth of the graduated scale, and within one per cent on the other three-fifths of the scale.
- 1003** When making application for registration, if the gauge design has been previously submitted for approval to another province, the application shall state the registration number previously allotted the design.
- 1004** The dial of the steam gauge shall be graduated to approximately double the pressure at which the safety valve is set but in no case to less than 1½ times this pressure.
- 1005** All gauges shall be made of such materials that the service in which it is to be used will not appreciably deteriorate any part of the gauge, decrease its efficiency or affect its accuracy.

19 Jly 57 SR 262/67 s10.



## SECTION 11

DESIGN, CONSTRUCTION, AND INSTALLATION OF HOT WATER TANKS AND  
HYDROPNEUMATIC TANKS OF MORE THAN 24 INCH DIAMETER

**1101** The design, construction, and installation of hot water tanks shall be as follows:

- (a) All hot water tanks over 24 inches in diameter shall be of registered design, with separate drawings and specifications submitted for each diameter and pressure.
- (b) Such tanks may be constructed of CSA G40 or ASTM 283C plate or equivalent as a minimum requirement.
- (c) The minimum design factor of safety shall be 5 and minimum design pressure shall be subject to the particular location but in no case less than 100 pounds to the square inch. For non-ferrous vessels the factor of safety shall be such that it meets the requirements of Section 2 Rule 221.
- (d) All tanks shall be provided with inspection and access openings free of external attachments, as follows:
  - (1) For tanks over 24 inches to 36 inches inclusive, at least two 2½ inch by 3½ inch handhole openings or two 2½ inch threaded openings, one near each end on opposite sides of shell;
  - (2) For tanks over 36 inches, one manhole opening.
- (e) Bumped or dished heads without knuckles shall not be used.
- (f) Heads, convex to pressure, shall not be used.
- (g) Welded tanks shall be constructed only by tested and qualified pressure welders.
- (h) All tanks over 30 inches in diameter shall be built under shop inspection and the hydro-static test pressure shall be one and one-half times the design pressure. Tanks 30 inches and under in diameter may be built without shop inspection in which case the hydro-static test pressure shall be twice the design pressure.
- (i) Stamping and marking shall comply with that required for unfired pressure vessels as specified in Section 6 of these regulations or as specified on a Saskatchewan Manufacturer's Affidavit form except that the plate manufacturer, the working temperature, and thickness of heads and shell may be omitted.
- (j) A Manufacturer's Affidavit form shall be submitted for each tank constructed.
- (k) Each tank when installed shall be equipped with one or more officially rated and approved safety relief valves installed so that these valves cannot be isolated from the tank. The safety valve shall preferably be on a separate opening or may be on the cold water inlet line. Where temperature pressure relief valves are used they shall be installed within 2 inches of the tank in the hot water outlet line.

(l) The safety relief valve shall be of adequate capacity with a minimum size of  $\frac{3}{4}$  inch.

(m) Where the hot water tank is heated by a jacket heater which is isolated from the storage tank by shut-off valves a separate officially rated approved safety valve shall be installed on the jacket heater.

**1102** All hydropneumatic tanks over 24 inches in diameter for installation in premises frequented by the public or used in a commercial or industrial capacity shall meet all the rules outlined above for hot water tanks.

19 Jly 57 SR 262/67 s11.

## SECTION 12

### RULES FOR WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS

**1201** All welding and the testing of welding procedures and welding operators in connection with boilers, pressure vessels or pressure piping for use in the province shall be strictly in accordance with Saskatchewan Regulations Respecting the Welding of Boilers, Pressure Vessels and Pressure Piping.

**1202** The following rules shall be complied with to ensure the interchangeability of boilers and pressure vessels, also fabricated piping and fittings throughout the Canadian provinces and other jurisdictions using the ASME Boiler and Pressure Vessel Construction Code:

(a) Every welding procedure and performance test shall conform to or be the equivalent of those specified in Section 9 "Welding Qualifications" of the ASME Code, and those of the ASA Code for Pressure Piping;

(b) Approval and/or registration of welding procedures and the testing of welders shall be performed by the Provincial Boiler Inspection Branch under the Provincial Boiler and Pressure Vessel Act, provided that for vessels properly approved and registered and shipped into the province from outside Canada, the Chief Inspector of the province may accept tests conducted by an inspector employed by an approved insurance company commissioned for the purpose by the National Board;

(c) Welders shall be retested, preferably annually, but in no case shall the interval between retests be longer than eighteen months;

(d) Manufacturers, prior to commencing any welded construction, shall submit tested and proven welding procedures to the department for approval and registration which shall show that not less than one coupon was given a tensile test, one coupon a root bend test, one coupon a face bend test and one coupon a nick break or x-ray test for each welding position;

(e) Manufacturers when completing Manufacturer's Affidavit forms required by the department, shall give all details asked for in the affidavit including the date of last weld tests and the name of the inspector witnessing the tests, and failure to do this may result in non-acceptance of the vessel.

**1203** Where a boiler or pressure vessel has been welded by welders who have not been tested within an 18 months period as required in this section and is shipped into the province for use, the Chief Inspector may require that all or any welded seams be x-rayed, trepanned or the vessel be given a proof pressure test amounting to 3 times the design pressure.

**1204** The testing of welders and of procedures by department inspectors for the welding of pipe-lines not subject to the requirements of the Boiler and Pressure Vessel Act may be arranged with the Chief Inspector who together with the contractor or engineering agency responsible for the pipe-line construction shall specify the standard to be used for such tests which as far as is practicable shall be in accordance with ASA Code B31.1.8 and Appendix 4 of Saskatchewan Pressure Welding Regulations. In such tests the contractor or engineering agency shall supply all test materials.

19 Jly 57 SR 262/67 s12; 8 May 70 SR 96/70.

## SECTION 13

### HOT WATER HEATING BOILERS

**1301** Expansion or cushion tanks.

The design, construction and installation of expansion tanks for use with hot water heating boilers or systems shall be as follows:

- (a) All expansion tanks over 24 inches in diameter or to operate at more than 30 pounds to the square inch shall be designed and constructed in accordance with the ASME Unfired Pressure Vessels Code with separate drawings and specifications submitted for registration for each diameter and pressure.
- (b) Expansion tanks of 24 inches in diameter or less if to operate at not more than 30 pounds to the square inch need not be of registered design and may be constructed with dished heads without flanges having a maximum head radius not greater than the tank diameter.
- (c) All expansion tanks shall be constructed of not less than No. 10 U.S. gauge material which may be CSA G40 or ASTM 283C or the equivalent as a minimum requirement.
- (d) Heads convex to pressure shall not be used for tanks over 24 inches in diameter.
- (e) Welded tanks shall be constructed only by tested and qualified pressure welders in accordance with Section 12 of these Regulations.
- (f) All expansion tanks over 30 inches in diameter shall be built under shop inspection and the hydro-static test pressure shall be one and one-half times the design pressure. Tanks 30 inches and under in diameter may be built without shop inspection in which case the hydro-static test pressure shall be twice the design pressure.
- (g) All expansion tanks constructed in accordance with a registered design shall be stamped or marked as specified in Section 6 of CSA Code B51 and in these Regulations.

(h) A Manufacturer's Affidavit form shall be submitted for each tank constructed in accordance with a registered design.

**1302 Safety Relief Valve Requirements.**

(a)(1) Every hot-water heating boiler or hot-water supply boiler and operating in a closed system shall be equipped with one or more approved and registered safety relief valves having an aggregate relieving capacity of not less than 5,000 B.T.U. per hour or 5 pounds of steam per hour, for each square foot of boiler heating surface. Such relief valves shall meet all the requirements of Rule 1303.

(2) Where the capacity rating of the boiler in B.T.U. or pounds of steam as specified by the manufacturer exceeds the capacity of safety relief valves as required in (a)(1), the boiler shall be equipped with valves capable of relieving the full boiler capacity as specified by the manufacturer.

(b) If any unregistered valve is used in any installation, its capacity shall not be considered as relieving capacity required in rule (a) and its installation shall in no manner interfere with the safe operation of the required registered valve or valves.

(c) No safety-relief valve required by these rules shall be smaller than 3/4 inch pipe size or larger than 4 1/2 inch pipe size and any combination of such sizes may be used provided their installation meets the requirements of these rules.

(d) Every safety-relief valve required under these rules shall be set to relieve at or below the maximum allowable working pressure of the boiler as approved by the department provided that where more than one valve is used they may be set as follows:

(1) a valve or valves having at least 25 per cent of the relieving capacity of the boiler as required in rule (a) shall be set to relieve at or below the maximum allowable working pressure;

(2) the additional valve or valves require may be set to relieve at not more than 10 psi above the maximum allowable working pressure.

**Note:** Approximately 90 per cent of all such boilers are approved and registered by the department for a working pressure of 30 p.s.i.

(e)(1) For new installations all safety-relief valves required by these rules shall be installed directly upon the upper part of the boiler shell or its cast iron sections provided that where more than one valve is required an approved multiple connection may be used;

(2) For boilers in use before the coming into force of these rules, any additional safety-relief valves required to meet the relieving capacity specified in rule (a) may be installed upon piping immediately adjacent to the upper part of the boiler provided that such piping is of a size that will adequately serve its original purpose if any, and in addition allow the valve or valves to discharge their full relieving capacity at all times. There shall be no intervening stop-valve or similar device in such piping by which the safety-relief valve or valves may be isolated from the boiler.

(3) Discharge pipes shall be provided on all safety-relief valves required herein which shall be of such size that the valves will discharge their full capacity and shall be so arranged that there is no danger of scalding attendants.

(f) No newly installed hot water boiler to which these rules apply shall be put into service unless it is equipped with approved safety-relief valves as specified herein and any used boiler required by the department to be thus equipped shall be made to comply with these requirements within 30 days or the boiler may be sealed and its use prohibited.

**1303 Relief Valve Registration and Design.**

(a) Every safety relief valve required under rule (1302) shall have its design approved and registered by the department who shall allot thereto a registration number and each valve constructed to an approved and registered design shall have stamped thereon or on a permanently attached plate the following:

- (i) the name or identifying trademark of the manufacturer;
- (ii) the pipe size of the valve inlet;
- (iii) the pressure at which it is set to relieve;
- (iv) the capacity in B.T.U. per hour or pounds of steam per hour or both;
- (v) the provincial registration number as allotted by the department or the ASME safety valve symbol as authorized by the ASME Boiler Code Committee.

(b) Every safety relief valve design submitted to the department for approval and registration shall include the following:

- (i) two sets of drawings and specification sheets giving all design detail;
- (ii) a facsimile showing all markings and identification required in rule (a) which facsimile may be upon the design drawings or upon separate sheets;
- (iii) a certification or photostatic copy of same showing that the valve design has been capacity tested and rated by the National Board of Boiler and Pressure Vessel Inspectors in accordance with the requirements of the ASME Low Pressure Heating Boiler Code;
- (iv) particulars, including registration numbers, of prior registration in other provinces.

(c) The design of every safety-relief valve submitted for registration shall meet the following requirements:

- (i) the valve shall be spring loaded, especially designed for hot-water boiler service;
- (ii) there shall be no wing guides on the pressure side of the disc;
- (iii) the seat and discs shall be capable of withstanding a temperature of 275 degrees F without deterioration;
- (iv) the valve shall be constructed with a substantial lifting device which will positively lift the pressure relieving disc from its seat for testing purposes;
- (v) provision shall be made for an inspectors seal to prevent alteration to or tampering with the relieving pressure;
- (vi) the design shall meet all requirements of the ASME Low-Pressure Heating Boiler Code.

**1304** Other Safety Devices.

(a) Every hot-water heating boiler or hotwater supply boiler to which these rules apply, if gas, oil or stoker fired and equipped with automatic control shall in addition to being equipped with safety-relief valves as specified herein be fitted as follows:

- (1) with at least one temperature control device and,
- (2) if having more than 100 square feet of heating surface with a low water cut-off device.

(b) Every device used as specified in (1) and (2) shall be of an approved design capable of shutting off the fuel fire in the event of excessive temperature or low water, and the low water cut-off device shall be installed in a column or chamber separate from the boiler in such a manner that its proper operation may be tested by thoroughly blowing down the column or chamber

**1305** Every hot-water heating boiler shall be fitted with a pressure or altitude gauge, a hot-water thermometer and a bottom blow-off or drain connection of not less than  $\frac{3}{4}$  inch pipe size.

19 Jly 57 SR 262/67 s13; 8 May 70 SR 96/70.

## SECTION 14

## FEES

**Repealed.** 8 May 70 SR 96/70.