



Boilers and Pressure Vessels Safety

Technical Standards & Safety Authority
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GUIDELINES FOR THE REGISTRATION OF NON-NUCLEAR FITTINGS IN THE PROVINCE OF ONTARIO

1. **Preamble:**

The following notes set out the requirements for the registration and manufacture of non-nuclear fittings in compliance with the Technical Standards and Safety Act, 2000, (Act), Regulations for Boilers and Pressure Vessels (Regulations), Code Adoption Document and CSA Standard B51-97. This document is intended to explain these requirements, and is not meant to serve as a substitute for the governing documents themselves.

- 1.1 Fittings used in pressure retaining systems designed for a pressure greater than 15 psi shall be registered. [Reference to the Regulations and Code Adoption Document must be made for other applicable exemptions.]

2. **Registration Procedure:**

- 2.1 All Fittings* shall be registered in the name of the Manufacturer** only.

***FITTING**

The term Fitting as used in this document pertains to an item categorized under Appendix "A".

****MANUFACTURER**

Manufacturer means an individual or organization that affixes or causes to be affixed its name, trade name or trademark to the product thereby assuming full product liability.

- 2.2 The Manufacturer shall submit an original Statutory Declaration (see attached form) with a duplicate copy together with two sets of drawings or catalogues containing the technical information required by item 2.7.
- 2.3 Each category of fittings shall be initially registered separately with the regulatory authority in the province of manufacture. (See Appendix "B", Explanatory Note #1).
- 2.4 Fittings manufactured outside Canada shall be registered in the province of first use.
- 2.5 The Statutory Declaration must be accompanied by a copy of the certificate of registration/authorization or correspondence from an organization identified in paragraph 3.2 showing acceptance of the manufacturer's quality system.
- 2.6.1 Subsequent to the initial registration with one regulatory authority, the registration may be accepted by the province of Ontario provided an accepted copy of the Statutory Declaration together with a copy of the registration documents are submitted to the Boilers and Pressure Vessels Safety program of TSSA.

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2.7 Technical information required:

- A) Standard Fittings (For Mechanical Pipe Couplings, see Appendix "B", Explanatory Note #2)
- Designation of the Applicable Standard
 - Material Specifications
 - Dimensions
 - Pressure - Temperature Ratings
- B) Non-Standard Fittings (for Flexible Hose Assemblies, see Appendix "E")
- Design Code or Standard
 - Material Specifications
 - Maximum Allowable Working Pressure and Temperature
 - Overall dimensions and the detailed dimensions of all the pressure parts
 - Detailed calculations or copy of the proof test report witnessed by an authorized third party inspector. (See Appendix "D" and "Accredited Inspection Agencies" list attached)

Note : If the material specification is other than ASME or ASTM, the registrant is required to submit the material specification details including mechanical properties and a statement indicating the nearest ASME or ASTM equivalent.

- C) Category G-safety valves, relief valves, safety relief valves and rupture discs
- Rating sheets certified by a testing laboratory holding an ASME Certificate of Acceptance for capacity certification of pressure relief devices

3. Quality System/Program Requirements:

- 3.1 The manufacturer shall fabricate the fittings under a quality system as provided by the requirements of CSA B51: ISO 9000 series, CSA/CAN3 Z299 series (minimum level 3), or CSA B51, Appendix "H" (see Appendix "C"). Category "G", primary overpressure protection services must hold a valid certificate of authorization from ASME.

Other acceptable quality system standards are as follows:

- 1) Category "F": Certified by Underwriter Laboratories
- 2) Category "G": ASME "UV", "V", or "HV" code symbol stamp holders
- 3) Category "H": ASME "U" or "UM" code symbol stamp holders

- 3.2 The Manufacturer's quality system shall be audited and accepted by one of the following organizations (see "Accredited Inspection Agencies" list):

- A) Canadian Provincial or Territorial Boiler and Pressure Vessel Jurisdictions
- B) US State Boiler and Pressure Vessel Jurisdictions in the US
- C) US Boiler and Pressure Vessel Insurers in the US
- D) ISO 9000 Registrars performing audits to ISO 9000 system standards with the following documentation:

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- Valid quality system certificate issued to the manufacturer for the manufacture of products including those applied for in the registration application;
- Valid certificate for the registrar identifying accreditation as an ISO 9000 registrar by a national accreditation body that is internationally recognized with a scope of accreditation which would include manufacturers of pressure fittings.

F) Inspection agencies accredited by ASME outside Canada

G) Accredited inspection agencies (see “Accredited Inspection Agencies” list)

4. Marking:

Each fitting shall be marked in accordance with the provisions of CSA B51. The Canadian Registration Number (CRN) shall be identified whenever physically possible.

Appendices: ‘A’; ‘B’; ‘C’; ‘D’

Attachments: Statutory Declaration Form

FILE: Fitting Guidelines, Jan 17, 2007, Rev. 4

APPENDIX "A"

CATEGORIES OF FITTINGS

(Regardless of sizes, materials, end connections, ratings, schedules and methods of fabrication of "A" - "G" inclusive)

Category	Type of Fitting
A	Piping fittings: including couplings, tees, elbows, Y's, plugs, unions, nipples, pipe caps or reducers.
B	Flanges: all flanges.
C	Valves: all line valves.
D	Expansion joints, flexible connections, and hose assemblies: all types.
E	Strainers, filters, separators and steam traps.
F	Measuring devices: including pressure gauges, level gauges, sight glasses, level or pressure transmitters
G	Certified capacity-rated pressure relief devices acceptable as primary overpressure protection on boilers, pressure vessels, piping and fusible plugs
H	Pressure-retaining components that do not fall into one of the above categories.

Note: Category "H" may include a series of components (including piping components) joined together to form a single fitting when the diameter/volume limitations of Figure 1 of CSA B51 are not exceeded.

APPENDIX "B"

**EXPLANATORY NOTE #1: THE REGISTRATION OF CATALOGUES
CONTAINING MORE THAN ONE CATEGORY OF FITTINGS.**

Some manufacturer's catalogues contain several fitting categories (e.g. flanges, valves and pipe fittings). The following will set out to explain the registration of such catalogues:

- 1) Each fitting category shall be registered separately.
- 2) For each category, a Statutory Declaration in duplicate shall be submitted.
- 3) The CRN issued to each category of fitting will have the same number but will identify its own category:

i.e.,	Pipe fittings:	0A0675.5
	Flanges:	0B0675.5
	Valves:	0C0675.5

- 4) The registrant will be invoiced for each CRN issued.

EXPLANATORY NOTE #2: THE REGISTRATION OF MECHANICAL PIPE COUPLINGS

INTRODUCTION

Couplings for grooved and shouldered end pipes and plain end type couplings are not covered in the ASME or ANSI Codes in terms of a listed standard nor are they covered in detail with regard to design. However, these type of connections are allowed under the category of Proprietary Pipe Joints and may be used subject to certain pressure, temperature and service limitations. These couplings are covered by recognized standards such as CSA Standard B242-M1980 "Groove and Shoulder Type Mechanical Pipe Couplings" and ANSI/AWWA C606-81 "AWWA Standard for Grooved and Shouldered Type Joints".

ASME SECTION I - POWER BOILERS

Mechanical Pipe Couplings shall not be used on piping falling within the jurisdiction of this Code. On piping used in conjunction with these boilers but coming under the jurisdiction of ANSI B31.1, Power Piping, Mechanical Pipe Couplings may be used provided the liquid temperature does not exceed 250^oF. Mechanical Pipe Couplings shall not be used on steam.

ASME SECTION IV - HEATING BOILERS

Mechanical Pipe Couplings may be used on external piping which can be considered to fall within the jurisdiction of the ANSI Power Piping Codes. Mechanical Pipe Couplings shall not be used on Steam services.

ASME SECTION VIII - PRESSURE VESSELS

Mechanical Pipe Couplings shall not be used as a closure device, that is a device intended to provide access to a pressure vessel, however, Mechanical Pipe Couplings may be used to connect external piping to the vessel.

APPENDIX “B” Continued

ANSI B31.1 - POWER PIPING

Use of Mechanical Piping Couplings is limited to a temperature range of -20^oF to 350^oF. Mechanical Pipe Couplings shall not be used on steam service nor on hot liquid service above 250^oF. The use of Malleable Iron products is limited to a maximum working pressure of 350 psi.

Mechanical Pipe Couplings may be fabricated from Carbon Steel, Stainless Steel or Aluminum. This is acceptable provided these couplings meet the design and fabrication requirements of the Code and are used subject to the pressure and service limitations of Chapter III - Materials.

Mechanical Pipe Couplings shall not be used in toxic services nor on systems containing explosive or flammable fluids.

ANSI B31.3 CHEMICAL PLANT AND PETROLEUM REFINERY PIPING

Mechanical Pipe Couplings are limited to a temperature range of -20^oF to 350^oF. Mechanical Pipe Couplings shall not be used in steam or hot liquid service above 250^oF.

Mechanical Pipe Couplings shall not be used in flammable, toxic, or lethal services.

In addition, Malleable Iron and Ductile Iron products shall not be used at temperatures below -20^oF nor shall Malleable Iron products be used in flammable fluid services at temperatures above 300^oF nor at gauge pressures above 400 psi.

ANSI B31.5 - REFRIGERATION PIPING

Mechanical Pipe Couplings are limited to a temperature range of -20^oF to 300^oF.

Mechanical Pipe Couplings made of Nodular Iron are limited to a maximum working pressure of 1,000 psi.

Couplings made of Malleable Iron shall not be used on flammable, toxic or lethal fluid services and products made of Malleable Iron shall not be used in Hydrocarbon or other flammable services at temperatures above 300^oF nor at pressures above 300 psi.

APPENDIX “C”

QUALITY PROGRAM REQUIREMENTS FOR FITTING MANUFACTURERS

H1. General

The manufacturer shall have and maintain a quality programme which will establish that all requirements of this standard and referenced standards will be met. The programme the manufacturer uses must be one suitable for their own circumstances and reflect the complexity of the products produced. A written description of the programme shall be available which addresses as a minimum the requirements of Clauses H2 to H10.

H2. Authority and Responsibility

The authority and responsibility of those in charge of the quality programme shall be clearly established. Persons performing quality functions shall have sufficient and well-defined responsibility, the authority and organizational freedom to identify and correct quality problems.

H3. Organization

An organization chart showing the relationship between management, engineering, purchasing, manufacturing, inspection, and quality control is required.

H4. Drawing, Design Calculations, and Specification Control

Measures shall be established to ensure that fittings produced are in accordance with the required drawing specifications.

H5. Material Control

Measures shall be established to ensure that only proper and certified material is used.

H6. Welding

Measures shall be established to ensure that any welding utilized in the production or repair of fittings conforms to the requirements of Section IX of the ASME Boiler and Pressure Vessel Code and the referenced standards.

H7. Heat Treatment

Measures shall be established to ensure that any heat treatment meets the requirement of the material specifications and the referenced standards.

H8. Calibration of Measurement and Test Equipment

Measures shall be established for the calibration of examination, measuring, and test equipment used in production.

H9. Examination, Inspection, and Testing Programme

Measures shall be established to provide for examination, inspection, and testing. Such measures shall meet the requirements of the referenced standards. As a minimum, a sample inspection programme shall meet the lowest level of MIL Standard 105D requirements.

H10. Correction of Non-conformities

Measures shall be established which will provide for a systematic review and correction of nonconformities.

NOTE: This Appendix is entitled ‘Appendix "H"’ in CSA Standard B51.

APPENDIX “D”

PROOF TEST REQUIREMENTS

The proof test shall normally be carried out in accordance with ASME Code Section VIII, Division 1, Paragraph UG-101, and the proof test report shall be signed by an inspector from the Canadian provincial/territorial or the U.S. state jurisdiction, a National Board commissioned inspector, or the inspector employed by the applicant’s quality system registrar. Other third-parties may be considered and are subject to the approval of TSSA.

As a minimum the following factors of safety shall be used to calculate the maximum allowable working pressure from the burst pressure. The MAWP shall be corrected for the reduction in allowable stress of the material from the proof test temperature to the maximum operating temperature.

Factor of Safety:

- for all materials not listed below: 4
- cast iron: 6
- glass: 10
- non-metallic, non-automated fabrication process: 10

APPENDIX "E"

FLEXIBLE HOSE ASSEMBLIES

This Appendix provides additional detail for design registration of flexible hose assemblies.

Flexible hose assemblies are registered as category "D" fittings per CSA B51. The design registration includes the assembly of the flexible hose material with the attached end fittings or connectors. The flexible hose material is considered material and as such is not registered independently. The manufacturer or registrant of the flexible hose assembly, to be identified on the Statutory Declaration Form is the assembler of the flexible hose and end fittings. The assembler must have an acceptable quality system that is required for fitting manufacturers.

The registration submission must include the description of the hose material and configuration of the end fittings, and joining method. Verification of the hose assembly must also be provided.

The design of the flexible hose assembly is verified by proof test. Proof tests are conducted as described in Appendix "D" with the exception of "Factor of Safety" which is given as follows:

Factor of Safety

- ◆ Non-metallic, hose material (no metallic reinforcement): 10
- ◆ Assemblies manufactured in accordance with The 1996 Hose Handbook¹ published by the Rubber Manufacturers Association (RMA) and all metallic reinforced hose:
 - Liquid, Air or Gas Service: 4
 - Liquid Media that immediately changes into gas under standard atmospheric conditions: 5
 - Steam: 10

The length of hose material to be used in the proof test is 18" - 36" using water as the test medium. During the test the hose should be straight but not kinked.

Caution: Ends should be protected so that a blown out fitting will be stopped and the hose secured to prevent whipping in the event of failure.

Site Assembled – Flexible Hose Assemblies

All technical documentation as required by this guideline including the assembly procedure and witnessed proof test (s), and excluding the Statutory Declaration form shall be compiled by the responsible party of the site and submitted for design registration. The flexible hose assembly can be included in the registration of the piping system or alternatively, if required for future installations at the site, the flexible hose assembly is registered under a P-STD number. Installations are carried out by appropriately trained personnel in accordance with the documented assembly procedure and in accordance with manufacturers' recommendations.

¹ The 1996 Hose handbook can be obtained from: The Mail Room
P.O. Box 3147 Medina, Ohio 444258
TEL: 1(800) 325-5095 or (330) 723-2978 FAX: (216) 725-0576

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Note: The Act and Regulations exempts compressed air piping systems that are $\frac{3}{4}$ " nominal pipe size and smaller. This exemption would also exempt $\frac{3}{4}$ " nominal pipe size and smaller flexible hose assemblies within this type of piping system.



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Show facsimile of manufacturer's logo or trademark, as it will appear on the fitting, in the space below

**STATUTORY DECLARATION
 Registration of Fittings**

I, _____
 (Name & Position, e.g. President, Plant Manager, Chief Engineer)

of _____
 (Name of Manufacturer)

Located at _____
 (Plant Address) (Telephone Number) (Fax Number)

do solemnly declare that the fittings listed hereunder, which are subject to the Technical Standards and Safety Act, 2000, and Regulations for Boilers and Pressure Vessels comply with all of the requirements of

_____ (Title of recognized North American Standard)
 which specifies the dimensions, materials of construction, pressure/temperature ratings, identification marking the fittings and service;

or are not covered by the provisions of a recognized North American standard and are therefore manufactured to comply with _____ as supported by the attached data which identifies the dimensions, material of construction, pressure/temperature ratings and the basis for such ratings, the marking of the fitting for identification and service.

I further declare that the manufacture of these fittings is controlled by a quality system meeting the requirements of _____ which has been verified by the following authority, _____
 _____. The items covered by this declaration, for which I seek registration, are category _____ type fittings. In support of this application, the following information and/or test data are attached as follows:

 (drawings, calculations, test reports, etc.)

Declared before me at _____ in the _____ of _____
 the _____ day of _____ AD 20_____.

Commissioner for Oaths:

 (Printed name)

 (Signature) (Signature of Declarer)

FOR OFFICE USE ONLY

To the best of my knowledge and belief, the application meets the requirements of the Technical Standards and Safety Act, 2000, and Regulations for Boilers and Pressure Vessels and CSA Standard B51 and is accepted for registration in Category _____.

CRN Number Issued: _____

Registered by: _____

Date Registered: _____

This registration expires on: _____