



## Boilers and Pressure Vessels Safety Division

**Technical Standards & Safety Authority**  
14th Floor, Centre Tower  
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Toronto, Ontario  
Canada M8X 2X4  
[www.tssa.org](http://www.tssa.org)

# **DESIGN REGISTRATION GUIDELINES FOR NUCLEAR PRESSURE RETAINING SYSTEMS AND COMPONENTS**

## **1. Scope:**

This document contains guidelines for the registration of pressure retaining systems and components in CANDU nuclear power plants, and may also be used for the registration of pressure retaining systems and components in research reactors and isotope producing reactors and for offshore nuclear power plants where an agreement for the registration services by the Technical Standards and Safety Authority (TSSA) exists.

The design, fabrication, welding, quality assurance, installation, examination, testing and inspection of nuclear pressure retaining systems and components are governed by the following legislation, codes and standards:

- Canadian Nuclear Safety Act and Regulations for nuclear facilities in Canada
- Technical Standards and Safety Act, 2000, (Act) and Regulations for Boilers and Pressure Vessels (Regulations), and Boilers and Pressure Vessels Safety Code Adoption Document (CAD) dated June 1, 2001
- Canadian Standards Association Standards CAN/CSA-N285.0-95 and CSA B51-97
- American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Codes

The effective date of the Code and Standards must be established in accordance with CAN/CSA-N285.0-95.

The definitions of terms in this document are as per above CSA Standards.

This document explains these requirements and is not a substitute for the governing documents themselves. In case of conflict between the requirements of this document and the applicable Act, Standard or Code, the requirement of the applicable Act, Standard or Code shall take precedence.

## **2. General:**

Effective May 5, 1997, the Ministry of Consumer and Commercial Relations (MCCR) designated the Technical Standards and Safety Authority (TSSA) as the administrative authority for the administration and enforcement of the Act, Regulations and CAD. The services previously provided by the Technical Standards Division of MCCR are now being provided by TSSA. TSSA has introduced the use of a 'Services Agreement' which must be signed by the design registration applicant before a Canadian Registration Number (CRN) can be issued. The Agreement incorporates general industry practice and details the terms and conditions for which the services are provided by TSSA to the applicant. Where services provided by TSSA are limited to design registration only, the applicant must utilize an authorized inspection agency for third party fabrication inspection and quality assurance program verification.

The design registration application should be submitted to:

Technical Standards and Safety Authority (TSSA)  
Boilers and Pressure Vessels Safety Division  
Attn: Design Registration Coordinator  
3300 Bloor Street West  
14th Floor, Centre Tower  
Toronto, Ontario M8X 2X4

To obtain a copy of the Services Agreement and accredited inspection agencies list, you may log onto our website at [www.tssa.org](http://www.tssa.org), or call (416) 734-3299, or by fax at (416) 231-6183.

### **3. Documentation:**

Two sets of supporting documents describing and demonstrating the acceptability of the design must be included with a design registration submission. Table 1 of CAN/CSA-N285.0-95 should be consulted. Documents which may be required are listed below:

1. System Classification List (SCL) or Classification Form approved by the Canadian Nuclear Safety Commission (CNSC)
2. System Flow Sheet
3. Drawings or Catalogue
4. System Design Documents or Design Specifications
5. Design Report
6. Statutory Declaration
7. Capacity Certification Test Report
8. Load Capacity Data Sheet
9. Overpressure Protection Report (OPPR)

For example, for the registration of Nuclear Class 1, 2 and 3 systems, only the documents numbered 1, 2, 4, 5 and 9 are required. The submitter should ensure that the contents and the certification of these documents conform with the requirements of CAN/CSA-N285.0-95 and the applicable sections of the ASME Boiler and Pressure Vessel Code. For Class 6 piping system registration refer to Appendix B attached.

The registration application, for piping systems, must be made by the licensee. When the application is not from the licensee, a transmittal letter must be supplied by the licensee identifying the applicant is acting on behalf of the licensee.

Designs submitted to TSSA for registration are reviewed, and if accepted, a CRN is issued with one set of stamped documents returned to the applicant. Reasons for rejection are discussed with the applicant.

### **4. Quality Assurance:**

The manufacturer must maintain a quality assurance program meeting the requirements of CAN/CSA-N285.0-95. The quality assurance program must have been verified by an acceptable authority. ASME and TSSA certificate holders within the scope of their certificate of authorization or accreditation are acceptable.

### **5. Reconciliation for Previously Registered Components & Component Supports**

Registered items can continue to be fabricated under the CRN issued provided:

1. The terms of the registration, that is the organization the CRN has been issued to, design criteria, and location if specified remain unchanged,

2. and the manufacturer's quality assurance program remains valid under the terms in section 4 of this document.

An item which was previously registered for a specified location may be accepted for a new location primarily on the basis of prior documentation provided there is no change to the design conditions as listed below. In such cases, a reconciliation statement shall be provided by the organization to which the CRN was issued in a format attached with this document, along with one set of the revised documentation (see Appendix 'A').

The following design conditions must be considered:

- Code effective date; if the code effective date is not the same, a full evaluation of code changes must be performed
- Design loading, including seismic requirement(s)
- Environmental requirement(s)
- Interfacing system(s)
- Operability, maintainability, and reliability requirements

For other changes, a revision to the original registration is required. Two sets of revised documents including identification of the original CRN and a description of the revision are to be submitted.

Appendices: 'A' and 'B'

Attachments: None

file: Nuclear pressure retaining systems gde.doc

## Appendix 'A'

### Registered Component/Component Support Design Reconciliation Statement

I, the undersigned, being a registered professional engineer, competent in the applicable field of design and related nuclear plant requirements, hereby certify to the best of my knowledge and belief that the following documentation, referenced in the design submission registered under

CRN \_\_\_\_\_ for plant location \_\_\_\_\_.

•Design specification \_\_\_\_\_

•Design drawing \_\_\_\_\_

•Design report \_\_\_\_\_

•Certified capacity test report \_\_\_\_\_

•Other \_\_\_\_\_

and is revised and referenced in the following documents for plant location \_\_\_\_\_,

•Design specification \_\_\_\_\_

•Design drawing \_\_\_\_\_

•Design report \_\_\_\_\_

•Certified capacity test report \_\_\_\_\_

•Other \_\_\_\_\_

have been duly evaluated. The changes meet the requirements of CSA Standard N285.0-95, and with the relevant requirements of the ASME Boiler and Pressure Vessel Code. There is no change in the classification, and the original design conditions envelope the conditions of the new location. The component/component support shall be fabricated in a facility with a valid quality assurance program as required in CAN/CSA-N285.0-95.

Certified and Signed by: \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix 'B'

### GUIDELINES FOR REGISTRATION OF CLASS 6 PIPING SYSTEMS FOR A CNSC NUCLEAR LICENSED FACILITY LOCATED IN ONTARIO

#### **Submissions:**

Design submittals for Class 6 piping systems registrations, in accordance with CSA B51 shall include the following documents:

- Letter of application;
- CNSC approved System Classification List (SCL);
- Flow diagrams (in triplicate);
- General arrangement or isometric piping drawings;
- Specifications;
- Calculations.

#### **Letter of Application:**

Application for registration must be made by the licensee. When the application is not from the licensee, a transmittal letter must be supplied by the licensee identifying the applicant is acting on behalf of the licensee.

The letter of application must include a return address, the name and telephone number of a person who can be contacted for information, the location of the installation and a list of drawings submitted. Also, an estimate of the overall length of piping being installed should be indicated.

#### **Drawings:**

General information required on these drawings shall include, but is not limited to, the following:

- Construction Code Information i.e. ASME B31.1 or B31.3 latest Edition and Addenda;
- Design Pressure;
- Design Temperature;
- Test Pressure and Type of Test;
- Service Fluid Information (e.g. Air, Water, Steam or specific Gas or Liquid);
- Safety/Relief Valve Setting and Location, or statement regarding overpressure protection.

#### **Specifications:**

Pipe specification shall indicate, as a minimum, the following:

- Pipe line identification;
- Pipe size and schedule;
- Pipe material (in accordance with ASME or ASTM material specification);
- Fitting(s) classification, identification and rating;  
(For details see TSSA's Guidelines for the Registration of Non-Nuclear fittings in the Province of Ontario. Also note Appendix "E" of this Guideline, for the requirements for flexible hose assemblies)
- Statement attesting that only registered fittings are used;
- Pipe joining methods and details (welding, brazing, or others);
- Non-destructive examination (NDE);
- Statement describing maximum support spacing and type, and anchor location.

## Appendix 'B' Continued

### Calculations:

Calculations need to address:

- Flexibility;
- Thermal expansion/contraction;
- Vibration;
- Seismic; and
- Any other applicable loads.

### General Information:

To help expedite registration, folded and relevant drawings should be submitted. Reproducible, e.g. mylars or originals should not be sent; non-relevant drawings to the piping system being registered should not be included. Submitter should be aware that, in the case of a large number of drawings involved, TSSA will determine which ones are relevant for registration. The remainder will be disposed of or returned, if so requested, at the submitter's expense.

For submissions that include a large number of drawings or systems, the submitter must send along a line list and drawings list. For piping systems, which contain multiple services where some are subject to registration and others are not, those systems' part(s), subject to registration, must be highlighted on all 3 sets of submitted drawings. Also, additions or modifications to existing systems should be identified (highlighted) on all 3 sets of drawings.

### Installer:

The installer of the piping system must have a Certificate of Authorization from TSSA for piping installations.

### Inspection:

The local TSSA Authorized Inspector must be notified prior to commencement of the installation.

Shop fabricated piping must be registered and inspected during fabrication and a Piping Installation and Test Data Report Form must be prepared and signed by fabricator and countersigned by the Authorized Inspector and submitted to the owner of the installation.