CSA Group

N285.0-17/N285.6 Series-17

General requirements for pressure-retaining systems and components in CANDU nuclear power plants/Material Standards for reactor components for CANDU nuclear power plants

REVISED DECEMBER 2018

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Preface

This is the third edition of CSA N285.0/N285.6 Series, *General requirements for pressure-retaining systems and components in CANDU nuclear power plants/Material Standards for reactor components for CANDU nuclear power plants.* It supersedes the previous editions of the CSA N285.0/N285.6 Series published in 2012 and 2008, the previous editions of CSA N285.0 published in 2006, 1995, 1991, and 1981, and the previous editions of the CSA N285.6 Series published in 2005 and 1988.

CSA N285.0 provides general requirements for pressure-retaining systems, components, and supports in CANDU® nuclear power plants.

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The CSA N285 series of Standards specifies requirements applicable to nuclear power plants in Canada and references the applicable requirements of the ASME *Boiler and Pressure Vessel Code* (*BPVC*). The specific objectives of these Standards are as follows:

- to establish technical requirements for pressure boundary items of CANDU power reactors, in a format that regulatory authorities can reference;
- to establish requirements for each class of system, component, or support, consistent with the *Nuclear Safety and Control Act* (Act) and its Regulations;
- to reference applicable requirements of the ASME *BPVC* where they are appropriate to CANDU power reactors;
- to specify rules and material requirements for the design, fabrication, installation, quality assurance, and inspection of those pressure-retaining components and supports for which the ASME *BPVC* does not specify requirements; and
- to establish rules for the periodic inspection of pressure-retaining components in CANDU nuclear power plants.

The CSA N285 series consists of the following Standards and commentary document:

- CSA N285.0 — *General requirements for pressure-retaining systems and components in CANDU nuclear power plants;*
- CSA N285.0.1 — *Commentary on N285.0-12, General requirements for pressure-retaining systems and components in CANDU nuclear power plants;*

  Note: *This commentary is an informative document and provides background, rationale, and context concerning certain clauses and requirements in CSA N285.0.*
- CAN/CSA-N285.1 — this Standard no longer exists as a separate publication; it was incorporated into CAN/CSA-N285.0-95;
- CAN/CSA-N285.2 — this Standard no longer exists as a separate publication; it was incorporated as Annex I of CSA N285.0-08;
- CAN/CSA-N285.3 — this Standard no longer exists as a separate publication; it was incorporated as Annex J of CSA N285.0-08*;*
- CSA N285.4 — *Periodic inspection of CANDU nuclear power plant components*;
- CAN/CSA-N285.5 — *Periodic inspection of CANDU nuclear power plant containment components;*
- CSA N285.6 Series — *Material Standards for reactor components for CANDU nuclear power plants* (published with CSA N285.0); and

  Note: *CSA N285.6.5 was withdrawn in the 2005 edition of the CSA N285.6 Series as the material that it covered (heat-treated Zr-2.5Nb-0.5 Cu wire for fuel-channel spacers) is no longer used for new spacers.*
- CSA N285.7 — *Periodic inspection of CANDU nuclear power plant balance of plant systems and components;*

- CSA N285.8 — *Technical requirements for in-service evaluation of zirconium alloy pressure tubes in CANDU reactors.*

The CSA N-Series Standards provide an interlinked set of requirements for the management of nuclear facilities and activities. CSA N286 provides overall direction to management to develop and implement sound management practices and controls while the other CSA Group nuclear Standards provide technical requirements and guidance that support the management system. This Standard works in harmony with CSA N286 and does not duplicate the generic requirements of CSA N286; however, it might provide more specific direction for those requirements.

Users of this Standard are reminded that the design, fabrication, installation, commissioning, and operation of nuclear facilities in Canada are subject to the provisions of the Act and its Regulations. The Canadian Nuclear Safety Commission (CNSC) specifies regulatory and administrative requirements for pressure-retaining systems in their Regulations and regulatory documents. Where CNSC documents conflict with the requirements of this Standard, the CNSC documents take precedence. In this Standard, the CNSC is referred to as the regulatory authority.

The Act and Regulations normally require the following items for a nuclear power reactor: a construction licence, an operating licence, and other licences, certificates, and permits specified by the regulatory authority. These licences and certificates can require the licensee to have the following:

- registered designs for systems, components, and supports;
- registered welding and brazing procedures;
- an accepted overpressure protection report;
- accepted code classifications, including applicable standards;
- accepted record-keeping systems;
- accepted quality assurance programs; and
- accepted periodic inspection programs.

When a licence references this Standard for another type of nuclear reactor facility, Clause 5 of CSA N285.0 should not be considered relevant unless

- the facility has a defined exclusion zone;
- access to the facility is controlled, permitting entry only by authorized personnel; and
- the reactor is inside a containment structure that is capable of limiting releases to the environment in the event of the failure of a pressure-retaining component.

These Standards were prepared by the supporting N285 Task Forces, under the jurisdiction of the Technical Committee on CANDU Nuclear Power Plant Pressure-Retaining Systems and Components and the Strategic Steering Committee for Nuclear Power Plants, and have been formally approved by the Technical Committee.

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
3) *This Standard was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*
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   c) *wording of the proposed change; and*
   d) *rationale for the change.*

N285.0-17

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N285.0-17
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1 Scope

① **1.1**

This Standard establishes requirements for pressure-retaining systems, components, and their supports over the service life of a CANDU nuclear power plant. The requirements of this Standard address:

a) construction activities; and
b) in-service inspection, modification, repair, and replacement activities.

1.2

This Standard applies to all pressure-retaining systems, including their components and supports, in a CANDU nuclear power plant.

① **1.3**

This Standard applies to containment components, but does not apply to containment structures which are covered in the CSA N287 Series of Standards.

1.4

This Standard does not apply to portable assemblies of pressurized items that are temporarily connected to a system or component to enable testing, venting, draining, calibration, or other maintenance activities, provided that they

a) do not reduce the ability of a system to perform its design safety function;
b) are under surveillance when connected and are removed upon completion of their function; and
c) are constructed to Standards deemed by the licensee to be suitable for the application.

Note: *Safety analysis, environmental qualification programs, or seismic qualification may be used to satisfy the conditions in this Clause.*

1.5

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.