CSA STANDARDS

N287.5-11
(reaffirmed 2016)

Examination and testing requirements for concrete containment structures for nuclear power plants

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Preface

This is the third edition of CSA N287.5, *Examination and testing requirements for concrete containment structures for nuclear power plants*. It supersedes the previous editions, published in 1993 and 1981 under the title *Examination and Testing Requirements for Concrete Containment Structures for CANDU Nuclear Power Plants*. The title has been changed to reflect a scope change, from addressing CANDU® reactors to including any nuclear power plant.

Note: *CANDU (CANada Deuterium Uranium) is a registered trademark of Atomic Energy of Canada Limited (AECL).*

This Standard specifies examination and testing requirements that will ensure that concrete containment structures are built using techniques and work practices that meet the quality and standards commensurate with the safety principles necessary to comply with the Canadian nuclear safety philosophy.

The Standards in the CSA N287 series of Standards were initiated in response to a recognition by the utilities and industries concerned with nuclear power plant structures in Canada of a need for consistent standards for the design, construction, and testing of concrete containment structures for nuclear power plants.

The CSA N287 series of Standards consists of seven Standards. The objectives of each Standard are summarized as follows:

(a) CSA N287.1-93 (R2009), *General requirements for concrete containment structures for CANDU nuclear power plants,* specifies general requirements for the design, construction, testing, and commissioning of concrete containment structures for CANDU nuclear power plants designated as class containment and is directed to the owners, designers, manufacturers, fabricators, and constructors of the concrete components and parts*;*

(b) CSA N287.2-08, *Material requirements for concrete containment structures for CANDU nuclear power plants,* specifies requirements for materials used in concrete containment structures;

(c) CSA N287.3-93 (R2009), *Design requirements for concrete containment structures for CANDU nuclear power plants,* specifies requirements for the design of concrete containment structures;

(d) CSA N287.4-09, *Construction, fabrication, and installation requirements for concrete containment structures for CANDU nuclear power plants,* specifies requirements for construction, fabrication, and installation requirements that apply to concrete containment structures of a containment system designated as class containment components, parts, and appurtenances for CANDU nuclear power plants;

(e) CSA N287.5-11, *Examination and testing requirements for concrete containment structures for nuclear power plants,* specifies examination and testing requirements that apply to the work of any organization participating in the construction, fabrication, or installation of parts or components of concrete containment structures for nuclear power plants;

(f) CSA N287.6-11, *Pre-operational proof and leakage rate testing requirements for concrete containment structures for nuclear power plants,* specifies requirements for proof by demonstration, before first criticality, that the design and construction of a concrete containment structure are satisfactory with respect to quality and performance; and

(g) CSA N287.7-08, *In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plants,* specifies uniform requirements whereby, through systematic and periodic examination, the structural and leak-tight integrity of concrete containment structures can be assessed.

Users of this Standard are reminded that the design, manufacture, construction, commissioning, operation, and decommissioning of nuclear facilities in Canada are subject to the provisions of the *Nuclear Safety and Control Act* and its Regulations. Thus, requirements additional to those specified in this Standard may be imposed by the Canadian Nuclear Safety Commission.

The CSA N series of Standards provides an interlinked set of requirements for the management of nuclear facilities and activities.

CSA N286-05 (R2010), *Management system requirements for nuclear power plants*, provides overall direction to management to develop and implement sound management practices and controls, while the other CSA nuclear Standards provide specific technical requirements and guidance that support the management system.

This Standard was prepared by the Subcommittee on Examination and Testing Requirements for Concrete Containment Structures for Nuclear Power Plants, under the jurisdiction of the Technical Committee on Concrete Containment and Safety-Related Structures and the Strategic Steering Committee on Nuclear Standards, and has been formally approved by the Technical Committee.

May 2011

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 publication 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 publication.*

(4) *To submit a request for interpretation of CSA Standards, please send the following information to* ***inquiries@csa.ca*** *and include "Request for interpretation" in the subject line:*
(a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;
(b) provide an explanation of circumstances surrounding the actual field condition; and
(c) where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.
Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization *and are published in CSA's periodical* Info Update*, which is available on the CSA website at* ***http://standardsactivities.csa.ca****.*

(5) *CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee. To submit a proposal for change to CSA Standards, please send the following information to* ***inquiries@csa.ca*** *and include "Proposal for change" in the subject line:*
(a) Standard designation (number);
(b) relevant clause, table, and/or figure number;
(c) wording of the proposed change; and
(d) rationale for the change.

N287.5-11
Examination and testing requirements for concrete containment structures for nuclear power plants

1 Scope

1.1
This Standard specifies examination and testing requirements that apply to the work of any organization participating in the construction, fabrication, or installation of parts or components of concrete containment structures for nuclear power plants that are designated as class containment.

1.2
This Standard specifies personnel qualification requirements for work pertaining to the examination and testing of concrete containment structures for nuclear power plants in accordance with this Standard.

1.3
This Standard may be applied, as appropriate, to nuclear facilities under the jurisdiction of the Government of Canada's *Nuclear Safety and Control Act*.

1.4
In CSA standards, "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.

Annexes are designated normative (mandatory) or informative (nonmandatory) to define their application.

2 Reference publications
This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto.

CSA (Canadian Standards Association)

A23.1-09/A23.2-09
Concrete materials and methods of concrete construction/Test methods and standard practices for concrete

A3000-08
Cementitious materials compendium