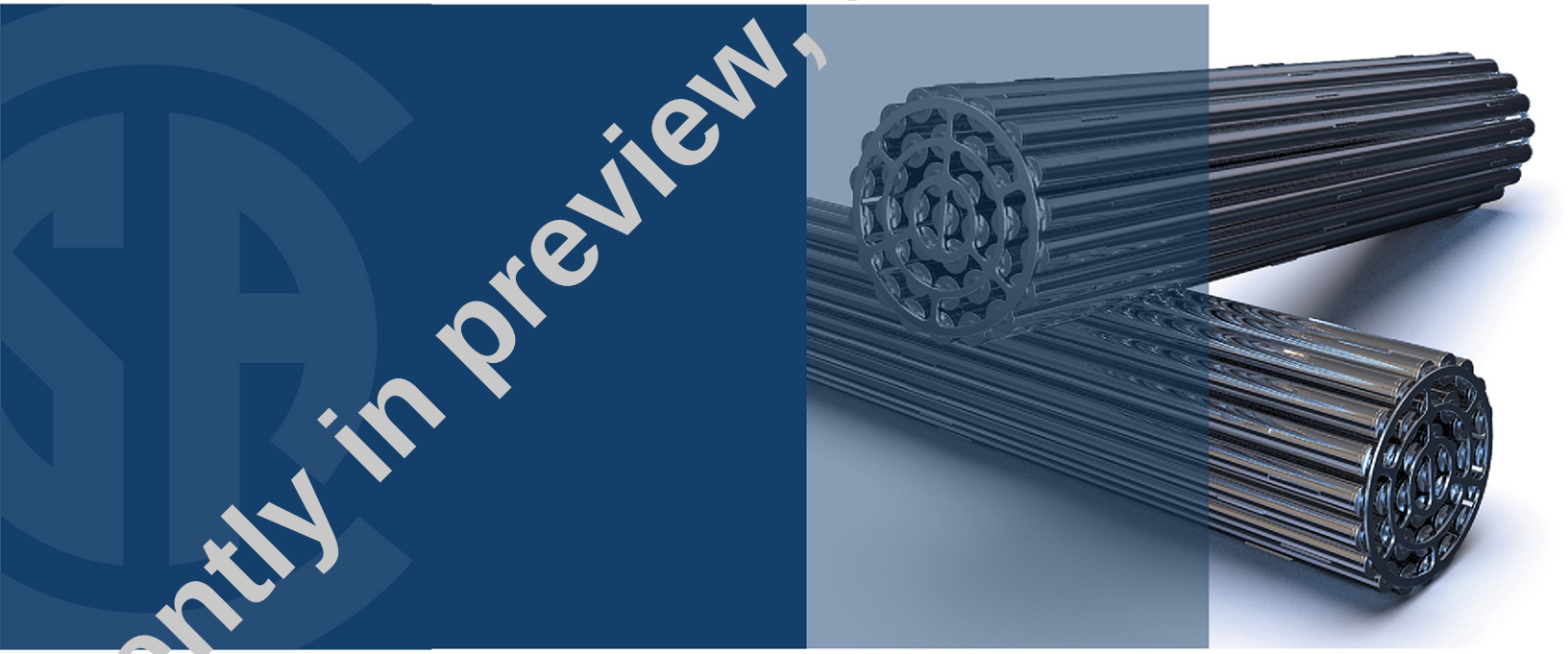
CSA N285.8:23

Technical requirements for in-service evaluation of zirconium alloy pressure tubes in CANDU reactors



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Preface

This is the fifth edition of CSA N285.8, *Technical requirements for in-service evaluation of zirconium alloy pressure tubes in CANDU reactors*. It supersedes the previous editions, published in 2021, 2015, 2010, and 2005.

This Standard specifies mandatory technical requirements and non-mandatory evaluation procedures for fitness-for-service assessments. Pressure tubes in Canadian CANDU® nuclear power plants are inspected in accordance with CSA N285.4, *Periodic inspection of CANDU nuclear power plant components*. When a detected flaw indication does not satisfy the criteria of acceptance by examination, or when pressure tube to calandria tube contact is detected or predicted, Clause 12 of CSA N285.4 permits a fitness-for-service assessment to determine acceptability. Also, Clause 12 of CSA N285.4 requires evaluation of the results of specified material property surveillance measurements.
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The major changes to this edition include the following:
a) revisions to Clause D.5.4 to implement a revised procedure for predicting the resistance to crack initiation due to hydrided region overloads;
b) guidelines for flaw evaluation for DHC initiation based on flaw-tip stress relaxation due to creep under hydride ratcheting conditions;
c) revisions to Clause D.10.3 to implement a revised procedure for predicting the axial DHC growth rate;
d) provided requirements for application of acceptance criteria in cases where core assessments are done probabilistically for one mechanism and deterministically for another;
e) added a reference to CSA N285.6.1 for pressure tubes for use in CANDU fuel channels;
f) removal of the contents of Clause C.2.3 on the probabilistic method for evaluation of service conditions for protection against fracture;
g) added a new Clause 4.5.1.4 for requirements when model or methodology is determined to have a deficiency;
h) general terminology cleanups to provide consistency throughout the Standard:
    1) Hi, Hig, Hall-ig, and Hall terms;
    2) hydrogen and deuterium concentration terminology;
    3) DHC velocity;
    4) changed “uptake rate” to “rate of change”; and
    5) Clause A.1.4 symbols and abbreviations;
i) revisions to Clause C.3.3 and Table C.1 for clarification of allowable failure frequency in reactor core assessments; and
j) revisions to use of the term “degradation mechanisms” including related revisions to Clause 7.3 and Annex C.

This Standard is one of a series of CSA N285 Standards that provide consistent rules for the design, fabrication, installation, inspection, and assessment of pressure-retaining systems and components in CANDU nuclear power plants. The series outlines requirements that are particularly applicable to nuclear power plants in Canada and references the appropriate requirements of the ASME *Boiler and Pressure Vessel Code*. Users of this Standard are reminded that the site selection, design, manufacture, construction, installation, commissioning, operation, and decommissioning of nuclear facilities in Canada are subject to the *Nuclear Safety and Control Act* and its Regulations. The Canadian Nuclear Safety Commission might impose additional requirements to those specified in this Standard.