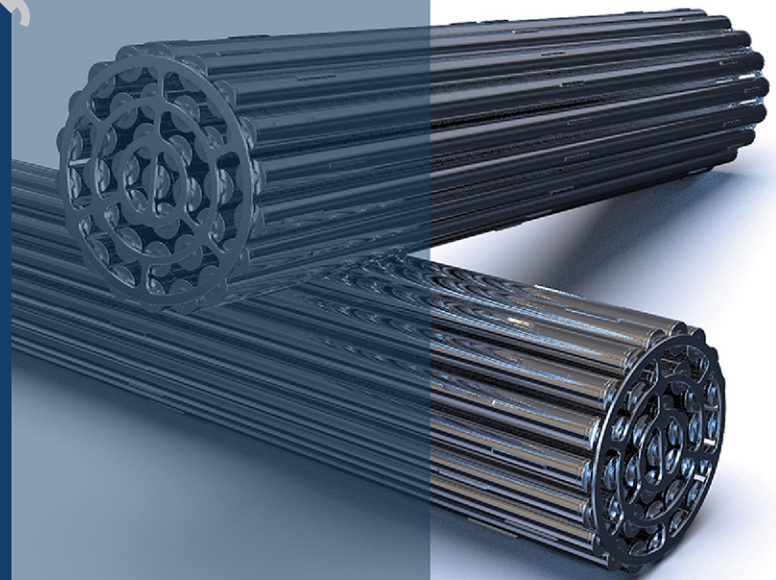




Technical requirements for in-service evaluation of zirconium alloy pressure tubes in CANDU reactors



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Contents

Technical Committee on In-Service Evaluation of Pressure Retaining Components in Nuclear Power
Plants 4

Working Group 1 — General Requirements 7

Working Group 2 — Evaluation of Pressure Tube Flaws 8

Working Group 3 — Evaluation of Pressure Tube to Calandria Tube Contact 9

Working Group 4 — Assessment of Reactor Core (Including Probabilistic Assessments) 10

Working Group 5 — Material Properties and Derived Quantities 11

Preface 12

0 Introduction 14

1 Scope 14

2 Reference publications 15

3 Definitions, abbreviations, and symbols 16

3.1 Definitions 16

3.2 Abbreviations 21

3.3 Symbols 21

4 General requirements 24

4.1 Scope 24

4.2 Evaluation of in-service inspection results 24

4.2.1 Evaluation of flaws detected by in-service inspection and evaluation of repair 24

4.2.2 Evaluation of pressure tube to calandria tube contact for inspected fuel channels 24

4.3 Assessment of reactor core 25

4.3.1 Applicability 25

4.3.2 Assessment of reactor core for flaws 25

4.3.3 Evaluation of reactor core for pressure tube to calandria tube contact 25

4.4 Evaluation of material surveillance measurements 26

4.5 Requirements of evaluations 26

4.5.1 Evaluation methods 26

4.5.2 Inspection uncertainty 26

4.5.3 Hydrogen equivalent concentration 27

4.5.4 Material properties 27

4.5.5 Loading conditions 27

4.6 Operating conditions 28

4.7 Records and notification 28

5 Evaluation of pressure tube flaws 28

5.1 General 28

5.2	Flaw characterization	28
5.2.1	General	28
5.2.2	Characterization of planar and laminar flaws	28
5.2.3	Characterization of volumetric flaws	29
5.3	Evaluation of planar and laminar flaws	30
5.3.1	General	30
5.3.2	Flaw growth evaluation	30
5.3.3	Fracture initiation evaluation	30
5.3.4	Plastic collapse evaluation	30
5.4	Evaluation of volumetric flaws	31
5.4.1	General	31
5.4.2	Fatigue crack initiation evaluation	31
5.4.3	Hydrided region overload and DHC initiation evaluations	32
5.4.4	Plastic collapse evaluation	37
6	Evaluation of pressure tube to calandria tube contact	37
6.1	General	37
6.2	Classification of operating conditions	37
6.3	Evaluation of pressure tubes left in contact with calandria tubes	37
6.3.1	General	37
6.3.2	Evaluation for sustained operating conditions	38
6.3.3	Evaluation for limited operating conditions	38
6.4	Evaluation of pressure tubes removed from contact with calandria tubes	39
6.4.1	General	39
6.4.2	Evaluation for sustained operating conditions	39
6.4.3	Evaluation for limited operating conditions	39
6.5	Evaluation of annulus spacer movement	40
6.5.1	General	40
6.5.2	Condition monitoring assessment	40
6.5.3	Operational assessment	40
7	Assessment of reactor core	41
7.1	General	41
7.2	Evaluation of service conditions for protection against fracture	42
7.2.1	General	42
7.2.2	Deterministic evaluation	42
7.2.3	Probabilistic evaluation	42
7.3	Assessment of flaws and pressure tube to calandria tube contact in the reactor core	42
7.3.1	General	42
7.3.2	Assessment of flaws in the reactor core	43
7.3.3	Assessment of pressure tube to calandria tube contact	43
7.4	Evaluation of LBB	43
7.4.1	General	43
7.4.2	Deterministic evaluation	44
7.4.3	Probabilistic evaluation	44
8	Evaluation of material surveillance measurements	45
8.1	General	45
8.2	Evaluation of hydrogen equivalent concentration	45

- 8.3 Evaluation of fracture toughness 46
 - 8.4 Evaluation of DHC growth rate 46
 - 8.5 Evaluation of threshold stress intensity factor for DHC 47
-

- Annex A (informative) — Procedures for the evaluation of pressure tube flaws 71
- Annex B (informative) — Procedures for the evaluation of pressure tube to calandria tube contact 188
- Annex C (informative) — Procedures for the assessment of a reactor core 195
- Annex D (informative) — Material properties and derived quantities 214
- Annex E (informative) — Notification of in-service evaluation form 282
- Annex F (informative) — Guidance on calculating the maximum allowable pressure tube failure frequencies for use in probabilistic assessments for the reactor core 281
- Annex G (informative) — Uncertainty analysis in probabilistic evaluations 285
- Annex H (informative) — Acceptable number of simulations for probabilistic assessments performed by repeated random sampling 293

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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.