ERRATA ISSUED

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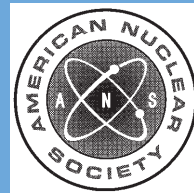# American Nuclear Society

containment system leakage testing requirements

an American National Standard

ANSI/ANS-56.8-2002

ERRATA

ANSI/ANS-56.8-2002 (R2016)
Containment System Leakage Testing Requirements

Several typographical errors were identified in Appendix F, Termination Limit Criteria. The errors and corrections are as follows:

The column headings and rows 1-5 of Table F.1, Sample problem, on page 32 read as follow:

Data point	Time (h)	Mass (lbm)	MP UCL (%/day)	G2.1 Limit (<1)	G2.2 Limit (>0)	G2.3 Limit (<1)	G3 Limit (>1)
1	00:00	173825.2857	a	a	a	a	0.0000
2	00:15	173814.0484	a	a	a	a	1.0000
3	00:30	173813.8596	1.7956	-0.1153[b]	a	a	0.8102
4	00:45	173817.0412	0.5153	0.0881[b]	56.8316	463.8451	0.5177
5	01:00	173813.5221	0.2913		21.3352	151.5345	0.7347

The correction is provided below:

Data point	Time (h)	Mass (lbm)	MP UCL (%/day)	F2.1 Limit (<1)	F2.2 Limit (>0)	F2.3 Limit (<1)	F3 Limit (>1)
1	00:00	173825.2857	a	a	a	a	0.0000
2	00:15	173814.0484	a	a	a	a	1.0000
3	00:30	173813.8596	1.7956	a	a	a	0.8102
4	00:45	173817.0412	0.5153	0.1153[b]	56.8316	463.8451	0.5177
5	01:00	173813.5221	0.2913	0.0881[b]	21.3352	151.5345	0.7347

Equation (F.8) on page 33 reads as follows:

$$F = \frac{(B' - B)\sum W_i + (A - A')\sum t_i W_i + C'\sum t_i^2 W_i}{\sum W_i^2 - B'\sum W_i - A'\sum t_i W_i - C'\sum t_i^2 W_i} \, (n - 3) \,.$$

The correction is provided below:

$$F = \frac{(B' - B)\sum W_i + (A' - A)\sum W_i \, t_i + C'\sum W_i \, t_i^2}{\sum W_i^2 - B'W_i - A'\sum W_i \, t_i - C'\sum W_i \, t_i^2} \, (n - 3) \,.$$

April 16, 2018

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American National Standard Containment System Leakage Testing Requirements

Secretariat
American Nuclear Society

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Working Group ANS-56.8

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American National Standard

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This standard was developed under procedures of the Standards Committee of the American Nuclear Society; these procedures are accredited by the American National Standards Institute, Inc., as meeting the criteria for American National Standards. The consensus committee that approved the standard was balanced to ensure that competent, concerned, and varied interests have had an opportunity to participate.

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Comments on this standard are encouraged and should be sent to Society Headquarters.

Foreword

(This foreword is not part of American National Standard for Containment System Leakage Testing Requirements, ANSI/ANS-56.8-2002.)

This standard provides a basis for determining leakage rates through the primary reactor containment systems of light-water-cooled nuclear power plants. This revision is intended for use with Option B of 10 CFR 50, Appendix J, and is not suitable for use with Option A of Appendix J.

The leakage rate tests performed on the primary reactor containment system simulate some of the conditions (e.g., penetrations vented, flooded, or in operation) that exist during a design-basis accident. The test methodology and the associated requirements for both whole containment (integrated) and individual pathway (local) leakage rate testing are contained in this document.

The appendices contain Type A and verification test methods, formula derivations, containment atmosphere stabilization criteria, and test termination criteria.

The regulatory requirements for containment leakage rate testing are contained in Title 10, "Energy," Code of Federal Regulations (CFR), Part 50, "Domestic Licensing of Production and Utilization Facilities," Appendix J, "Primary Reactor Containment Leakage Testing For Water-Cooled Power Reactors."

The previous revision to this standard was issued in 1994. 10 CFR 50, Appendix J, underwent a major revision in 1995. The content of 10 CFR 50, Appendix J, as it was before the revision, was retained in the new revision; only now it is known as "Option A—Prescriptive Requirements." The revision also added a second option, "Option B—Performance-Based Requirements," which contains risk-informed, performance-based requirements for containment leakage rate testing. The most significant changes embodied in Option B allow much longer intervals between tests, based on good performance of the structure or component being tested.

The U.S. Nuclear Regulatory Commission has also issued Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995, to provide guidance on complying with Option B of 10 CFR 50, Appendix J. Regulatory Guide 1.163 endorses, with several exceptions, NEI 94-01, "Industry Guideline For Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," Revision 0, which in turn endorses the 1994 edition of this standard, with certain changes due to the nonperformance-based nature of the 1994 standard.

This revision of the standard has been written to consolidate into one document guidelines for testing under Option B. This will eliminate the need to refer to three separate documents (Regulatory Guide 1.163, NEI 94-01, and ANSI/ANS-56.8-1994) and the attendant inefficiency and confusion such a situation can cause. Option B requires a reference in each plant's Technical Specifications to the implementation document used to develop the leakage testing program; this revision to the standard has been written so that it may be referenced in Technical Specifications as the implementation document rather than Regulatory Guide 1.163 and its chain of subordinate documents.

Working Group ANS-56.8 of the Standards Committee of the American Nuclear Society had the following membership at the time it approved this standard:

J. Glover, *Chair, Graftel, Inc.*

H. Hill, *BCP Technical Services*
M. Jennex, *San Diego State University Foundation for Knowledge Management*
D. Lurie, *U.S. Nuclear Regulatory Commission*
M. Hutcheson, *Duke Energy Company*
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K. Clark, *Tennessee Valley Authority*
P. Chang, *Southern California Edison*
W. Brown, *Duke Energy Company*
D. Oakley, *Exelon Corporation*

This standard was processed and approved for submittal to ANSI by the American Nuclear Society's Nuclear Facilities Standards Committee (NFSC). Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the NFSC committee had the following members:

D. J. Spellman, Chair, *Oak Ridge National Laboratory*
S. Ahmad, Standards Administrator, *American Nuclear Society*

C. K. Brown, *Southern Nuclear Operating Company*
R. H. Bryan, Jr., *Tennessee Valley Authority*
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J. D. Stevenson, *Individual*
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G. P. Wagner, *Individual*
J. A. Wehrenberg, *Southern Company*
M. J. Wright, *Entergy Operations*

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Containment System Leakage Testing Requirements

1   Introduction

1.1   Purpose

This standard provides a basis for determining leakage rates through the primary containment of light water reactor nuclear power plants and for implementation of an acceptable performance-based leakage testing program.

The examples given in various sections of this standard do not contain or modify any requirements. These examples are for illustration only and are provided to clarify the intent of the text. Furthermore, the examples are not meant to be all-inclusive. Examples of alternative methods or exceptions to general requirements do not constitute permission to categorically apply the exceptions. Each alternative or exception needs to be evaluated to determine its validity and effect.

1.2   Scope

This standard specifies acceptable primary containment leakage rate test requirements to assure valid testing. The scope includes

(1) leakage test requirements;
(2) test instrumentation;
(3) test procedures;
(4) test methods;
(5) acceptance criteria;
(6) data analysis;
(7) inspection and recording of test results.

2   Definitions[1)]

The following terms are for general use in this standard:

acceptance criteria: The standards against which test results are to be compared for establishing the functional acceptability of the primary containment as a leakage limiting boundary.

accuracy: Conformity of an indicated value to an accepted standard value or true value.

active failure: A malfunction of a component that relies on mechanical movement or change of state to complete its intended function upon demand. Examples of active failures include the failure of a valve or a check valve to move to its correct position, or the failure of a pump, fan, or diesel generator to start. Spurious action of a power-operated component originating within its actuation or control system shall be regarded as an active failure unless specific design features or operating restrictions preclude such spurious action. An example is the unintended energization of a power-operated valve to open or close.

administrative limit: Leakage limit assigned to each Type B or Type C component as an indication of potential valve or penetration degradation and used to establish Type B and Type C test performance-based intervals.

as-found leakage rate: The leakage rate prior to any repairs or adjustments to the barrier being tested.

as-found testing: Leakage rate testing after some period of normal service conditions, performed prior to any repairs or adjustments.

as-left leakage rate: The leakage rate following any repairs or adjustments to the barrier being tested.

as-left testing: Leakage rate testing performed following repair or adjustment.

confidence level: The probability that the true leakage rate does not exceed the upper confidence limit (UCL).

[1)] Specialized definitions used in the appendices are defined in the appendix where they are used.

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