ASME N511-2022

(Revision of ASME N511-2017)

In-Service Testing of Nuclear Air-Treatment, Heating, Ventilating, and Air-Conditioning Systems

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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Two Park Avenue • New York, NY • 10016 USA

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This Standard will be revised when the Society approves the issuance of a new edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically certain actions of the ASME Committee on Nuclear Air and Gas Treatment may be published as Cases. Cases and interpretations are published on the ASME website under the Committee Pages at http://cstools.asme.org/ as they are issued.

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FOREWORD

This Standard covers the requirements for in-service testing of nuclear air-treatment, heating, ventilating, and air-conditioning systems in nuclear facilities that are designed, built, and acceptance tested in accordance with ASME AG-1.

This Standard provides a basis for the development of test programs, in-service test procedures, and corrective action requirements.

In 1971, what is now the ASME Committee on Nuclear Air and Gas Treatment was organized as ANSI N45.8 to develop standards for high-reliability air-cleaning equipment for nuclear facilities and corresponding tests to confirm performance of the equipment. In 1976, under the accredited organization rules, the Committee was reorganized as the ASME Committee on Nuclear Air and Gas Treatment. The scope of responsibility was broadened to include the development of codes and standards for design, fabrication, inspection, and testing of air-cleaning and air-conditioning components and appurtenances, as well as air-cleaning components used in engineering safety systems in nuclear facilities.

The first edition of ASME N511 was approved by the ASME Committee on Nuclear Air and Gas Treatment and the ASME Board of Nuclear Codes and Standards, and was subsequently approved as an American National Standard by the American National Standards Institute (ANSI) on October 30, 2007. ASME N511-2017 was approved by ANSI on November 1, 2017. ASME N511-2022 was approved by ANSI on June 22, 2022.

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CORRESPONDENCE WITH THE COMMITTEE ON NUCLEAR AIR AND GAS TREATMENT

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions or a case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, Standards Committee on Nuclear Air and Gas Treatment
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Proposing a Case. Cases may be issued to provide alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard and the paragraph, figure, or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the Standards Committee on Nuclear Air and Gas Treatment (CONAGT) will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of CONAGT.

Requests for interpretation should preferably be submitted through the online Interpretation Submittal Form. The form is accessible at http://go.asme.org/InterpretationRequest. Upon submittal of the form, the Inquirer will receive an automatic e-mail confirming receipt.

If the Inquirer is unable to use the online form, he/she may mail the request to the Secretary of CONAGT at the above address. The request for an interpretation should be clear and unambiguous. It is further recommended that the Inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry in one or two words.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. Please provide a condensed and precise question, composed in such a way that a "yes" or "no" reply is acceptable.
Proposed Reply(ies):	Provide a proposed reply(ies) in the form of "Yes" or "No," with explanation as needed. If entering replies to more than one question, please number the questions and replies.
Background Information:	Provide the Committee with any background information that will assist the Committee in understanding the inquiry. The Inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in the format described above may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

Moreover, ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the inquiry information submitted, it is the opinion of the Committee that the Inquirer should seek assistance, the inquiry will be returned with the recommendation that such assistance be obtained.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. CONAGT regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of CONAGT.

ASME N511-2022
SUMMARY OF CHANGES

Following approval by the ASME N511 Committee and ASME, and after public review, ASME N511-2022 was approved by the American National Standards Institute on June 22, 2022.

Throughout this Standard, the term "flow rate" has been changed to "airflow." In addition, ASME N511-2022 includes the following changes identified by a margin note, **(22)**.

Page	*Location*	*Change*
1	1.1	Revised
1	1.5	(1) First paragraph revised
		(2) Note added to definition of *challenge aerosol*
		(3) Definitions of *acceptance test*; *adsorbent*; *adsorber*; *aerosol*; *challenge aerosol*; *HEPA filter (high-efficiency particulate air filter)*; *preconditioning*; *pressure, maximum operating*; and *reference value(s)* revised
		(4) Definition of system test added
2	2	Updated
4	Table 3.1-1	Revised, and Note (3) added
3	3.1.4.1	Revised
3	3.2.1	First sentence editorially revised
3	3.2.2	Second sentence editorially revised
4	3.3.1	Last sentence revised
4	3.3.4	Revised
4	Table 3.3.4-1	Notes deleted
5	4.1	First sentence revised
5	Table 5.2.1-1	Revised, and General Note added
5	5.1.1	Added
5	5.1.2	Added
6	Table 5.3.1-1	Note (1) revised, and General Note added
7	Table 5.4.1-1	Note (1) revised, and General Note added
7	5.5.3.1	Revised
7	5.5.3.2	Revised
7	Table 5.5.1-1	(1) Revised
		(2) Note (1) revised, and General Notes added
7	5.5.4	Paragraphs 5.5.4.3 and 5.5.4.4 deleted
7	5.5.5	Paragraphs 5.5.5.1, 5.5.5.2, and 5.5.5.5 deleted and subsequent paragraphs redesignated
8	Table 5.6.1-1	(1) Revised
		(2) Note (1) revised, and General Note added
8	5.7.1-1	Note (1) revised, and General Note added
9	5.7.1	Second sentence revised

Page	*Location*	*Change*
9	5.8	Title and paragraph revised
9	Table 5.8.1-1	Title and Note (1) revised
9	5.8.2	Revised
10	5.9.2	Third sentence revised
10	5.10.1	Second sentence editorially revised
10	5.10.2	First sentence revised
10	5.11	Second sentence editorially revised
10	6.2	Revised
10	7	Last sentence editorially revised
11	9.2	Revised
13	I-7	Subparagraphs (c) and (d) revised
13	I-8	Title revised
14	II-2	Revised
15	II-5.2	Steps 4 and 6 revised
15	II-5.3	Revised
16	III-5	Steps 1, 4, and 8 revised
17	IV-2	First sentence revised
17	IV-3	Second sentence editorially revised
17	IV-4	Revised in its entirety
19	Nonmandatory Appendix B	(1) First paragraph revised (2) Subparagraphs (a), (b), and (c) revised
20	C-1	First sentence revised
20	C-3	(1) Second sentence revised (2) Note editorially revised
20	C-4	In first paragraph, first and last sentences revised
21	C-5	Revised
22	Table C-5.3-2	Revised and General Note added
21	C-6	Added
24	Nonmandatory Appendix D	Revised

IN-SERVICE TESTING OF NUCLEAR AIR-TREATMENT, HEATING, VENTILATING, AND AIR-CONDITIONING SYSTEMS

1 INTRODUCTION

(22) ### 1.1 Scope

This Standard covers the requirements for in-service testing of nuclear air-treatment, heating, ventilating, and air-conditioning systems within nuclear facilities.

1.2 Purpose

The purpose of this Standard is to provide requirements for in-service testing, the results of which are used to verify that the nuclear air-treatment, heating, ventilating, and air-conditioning systems perform their intended functions.

1.3 Applicability

This Standard applies to the in-service testing of nuclear air-treatment, heating, ventilating, and air-conditioning systems that have been designed, built, and acceptance-tested in accordance with ASME AG-1. Sections of this Standard may be used for technical guidance when testing air-treatment, heating, ventilating, and air-conditioning systems designed and built to other standards.

1.4 Use of This Standard

This Standard provides a basis for the development of test programs and does not include acceptance criteria, except where the results of one test influence the performance of other tests. Based on the system design and its function(s), the owner shall develop a test program and acceptance criteria.

Nonmandatory Appendices A through D provide additional information and guidance.

(22) ### 1.5 Definitions

These definitions are consistent with the ASME AG-1 Divisions I through IV and supplement those listed in ASME AG-1, Article AA-1000.

abnormal incident: any event or condition that may adversely affect the function of the nuclear air-treatment, heating, ventilating, and air-conditioning systems.

acceptable preconditioning: the alteration, variation, manipulation, or adjustment of the physical condition of a component before in-service testing for the purpose of protecting personnel or equipment or meeting the manufacturer's recommendations. This may include routine and scheduled maintenance for optimum equipment and system performance. Preconditioning for purposes of personnel protection or equipment preservation should outweigh the benefits gained by testing only in the as-found condition. This preconditioning may be based on the equipment manufacturer's recommendations or industry-wide operating experience to enhance equipment and personnel safety. This preconditioning should be evaluated and documented prior to the in-service test.

acceptance test: a test made upon completion of fabrication, installation, repair, or modification of a unit, component, or part to verify to the user or owner that the item meets specified performance requirements.

adsorbent: a solid of high specific surface area having the ability to attract and concentrate gaseous phase substances on its surface.

adsorber: a device or vessel containing adsorbent that is used to remove and hold back substances in a gaseous phase from an air or gas stream.

adsorber bank or filter bank: one or more filters or adsorbers secured in a single mounting frame, or one or more side-by-side panels containing poured or packed air-treatment media, confined within the perimeter of a duct, plenum, or vault cross section, sometimes referred to as a stage.

aerosol: a stable suspension of particles, solid or liquid, in air or gas.

as-found condition: the condition of a component between in-service tests without preconditioning.

challenge: to expose a filter, adsorber, or other air-treatment device to an aerosol or gas of known characteristics under specified conditions for the purpose of performance testing.

challenge aerosol: an aerosol used for in-place leak testing of installed HEPA filter systems.

NOTES:

(1) Acceptable aerosol liquid materials for the Q-76 or the Q-107 penetrometer are dicoctylphthalate (DOP), dioctylsebacate (DOS/DEHS), and 4 centistoke polyalphaolefin (PAO). If