

ASME QME-1–2023
(Revision of ASME QME-1–2017)

Qualification of Active Mechanical Equipment Used in Nuclear Facilities

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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FOREWORD

Federal regulations applicable to nuclear power plants require that measures be established to ensure that certain equipment operates as specified. This Standard sets forth requirements and guidelines that may be used to ensure that active mechanical equipment is qualified for specified service conditions. As determined by federal regulators and/or nuclear power plant licensees, this Standard may be applied to future nuclear power plants or existing operating nuclear power plant component replacements, modifications, or additions.

In the early 1970s, initial development of qualification standards was assigned to the N45 Committee of the American National Standards Institute (ANSI). The N45 Committee in turn established a task force to prepare two series of standards to ensure that pumps and valves used in nuclear plant systems would function as specified. The N45 Committee's valve task force (N278) was reassigned in 1974 to the American National Standards Committee B16 and designated Subcommittee H. The first qualification standard to be issued for valves was ANSI N278.1-1975, which covered the preparation of functional specifications. In 1982, the task force was reassigned to The American Society of Mechanical Engineers (ASME) Committee on Qualification of Mechanical Equipment Used in Nuclear Power Plants (QME) and designated the Subcommittee on Qualification of Valve Assemblies. As an interim measure, in 1983, ANSI B16.41 was issued to cover functional qualification requirements for power-operated active valve assemblies for nuclear power plants.

The N45 Committee's pump task force (N551), established in 1973, was assigned to ASME Nuclear Power Codes and Standards along with N278 as part of the Subcommittee QNPE, Qualification of Nuclear Plant Equipment. Both N551 and N278 operated as Subcommittee QNPE until 1982, when they were reassigned to the QME Committee and designated as, respectively, the Subcommittee on Qualification of Pump Assemblies and the Subcommittee on Qualification of Valve Assemblies. In June 1977, an agreement between the Institute of Electrical and Electronics Engineers (IEEE) and ASME was formulated, giving primary responsibility for qualification standards to IEEE and for quality assurance standards to ASME. This arrangement remained in effect until ASME established the Committee on Qualification of Mechanical Equipment Used in Nuclear Power Plants, now known as the Committee on Qualification of Mechanical Equipment Used in Nuclear Facilities.

The various parts of ASME QME-1-1994 were approved by ANSI on the following dates: [Section QP](#), September 22, 1992; [Section QR](#), June 8, 1993; [Section QR](#), Nonmandatory Appendix A, October 7, 1993; [Section QR](#), Nonmandatory Appendix B, May 14, 1993; and [Section QV](#) and its Nonmandatory Appendix A, February 17, 1994. [Section QV](#) was a revision and redesignation of ANSI B16.41-1983.

ASME QME-1-2002 was published in 2003. In September 2003, it was recognized that the Standard had aspects, such as the process for valve qualification, that could better use new computer analytical techniques and that were proscriptive in nature. In addition, seismic qualification needed to be updated to recognize new industry guidance. New sections were needed on standardization of experience-based seismic equipment qualification and the qualification of dynamic restraints. At the time, industry experience had demonstrated that qualification to ASME QME-1 was required without the specification of the parameters for which equipment needed to be qualified. The use of this Standard requires that a Qualification Specification be provided.

ASME QME-1-2007 was endorsed by the Nuclear Regulatory Commission (NRC) and was the first edition of ASME QME-1 to be so endorsed. It was approved as an American National Standard on June 25, 2007.

The 2012 edition of this Standard was approved as an American National Standard on September 17, 2012.

The 2017 edition of this Standard was approved as an American National Standard on March 21, 2017.

Following approval by the ASME QME Committee, ASME QME-1-2023 was approved by ANSI as an American National Standard on January 13, 2023.

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Revisions and Errata. The committee processes revisions to this Standard on a continuous basis 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 in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. 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 background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Standard.

(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number(s)

(4) the edition(s) of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

Interpretations. Upon request, the committee will issue an interpretation of any requirement of this Standard. An interpretation can be issued only in response to a request submitted through the online Interpretation Submittal Form at <https://go.asme.org/InterpretationRequest>. Upon submitting the form, the inquirer will receive an automatic e-mail confirming receipt.

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 information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers can track the status of their requests at <https://go.asme.org/Interpretations>.

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.

Interpretations are published in the ASME Interpretations Database at <https://go.asme.org/Interpretations> as they are issued.

Committee Meetings. The QME Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at <https://go.asme.org/QMEcommittee>.

ORGANIZATION OF ASME QME-1

1 GENERAL

ASME QME-1 is divided into sections that are designated by capital letters: the letter “Q,” which stands for *qualification*, followed by one or more letters that generally indicate the subject matter of the section. This Standard consists of four major sections as follows:

- (a) **Section QR:** Qualification Requirements
- (b) **Section QDR:** Qualification of Dynamic Restraints
- (c) **Section QP:** Qualification of Active Pump Assemblies
- (d) **Section QV:** Qualification Requirements for Active Valve Assemblies for Nuclear Facilities

2 SECTIONS

Sections are divided into articles, subarticles, subsubarticles, paragraphs, and, where necessary, subparagraphs and subsubparagraphs.

3 ARTICLES

Articles are designated by the applicable letters indicated above for the sections, followed by Arabic numbers in units of 1,000, such as **QR-1000**, **QP-2000**, or **QV-6000**. Whenever possible, articles dealing with the same topic are given the same number in each section in accordance with the general scheme that follows:

Article Number	Title
1000	Scope
2000	Purpose
3000	References
4000	Definitions
5000	Qualification Principles and Philosophy
6000	Qualification Specification Criteria
7000	Qualification Program
8000	Documentation

The numbering of the articles and the material contained in the articles may not, however, be consecutive. Due to the fact that the complete outline may cover phases not applicable to a particular section or article, the rules have been prepared to allow gaps in the numbering.

4 SUBARTICLES

Subarticles are numbered in units of 100, such as **QR-7100** or **QV-7200**. When more than nine subarticles are required, numbering is done by paragraph and units of 1 starting with 10.

5 SUBSUBARTICLES

Subsubarticles are numbered in units of 10, such as QR-8310 or QR-8320.

6 PARAGRAPHS

Paragraphs are numbered in units of 1, such as QR-8321 or QV-8322.

7 SUBPARAGRAPHS

Subparagraphs, when they are major subdivisions of a paragraph, are designated by adding a decimal followed by one or more digits to the paragraph number, such as QR-8321.1 or QV-8321.2. When they are minor subdivisions of a paragraph, subparagraphs may be designated by lowercase letters in parentheses, such as QR-8321(a) or QV-8321(b).

8 SUBSUBPARAGRAPHS

Subsubparagraphs are designated by adding lowercase letters in parentheses to the major subparagraph numbers, such as QR-8321.1(a) or QV-8321.1(b). When further subdivisions of minor subparagraphs are necessary, subsubsubparagraphs are designated by adding Arabic numbers in parentheses to the subsubparagraph designation, such as QR-8321.1(a)(1) or QV-8321.1(a)(2).

9 REFERENCES

(23)

References used within this Standard generally fall into one of the following three categories:

(a) *References to Other Portions of This Standard.* When a reference is made to another article, subarticle, or paragraph, all numbers subsidiary to that reference shall be included. For example, reference to **QR-5000** includes all material in **article QR-5000**; reference to **QR-7300** includes all material in **subarticle QR-7300**; reference to **QR-7320** includes all material in **subsubarticle QR-7320**.

(b) *References to the Boiler and Pressure Vessel Code (ASME BPVC) and to Other Standards.* When a reference is made to any section of the BPVC, or to other standards, it