ASME QME-1–2017

(Revision of ASME QME-1–2012)

Qualification of Active Mechanical Equipment Used in Nuclear Facilities

AN AMERICAN NATIONAL STANDARD

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Two Park Avenue • New York, NY • 10016 USA

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

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The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

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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.

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 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 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.

Requests for interpretation or suggestions for improvement of this Standard should be addressed to the Secretary of the ASME Committee on Qualification of Mechanical Equipment Used in Nuclear Facilities, The American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.

COMMITTEE ON QUALIFICATION OF MECHANICAL EQUIPMENT USED IN NUCLEAR FACILITIES

(The following is the roster of the Committee at the time of approval of this Standard.)

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SUBCOMMITTEE ON QUALIFICATION OF PUMP ASSEMBLIES

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A. M. Kouvolo, Consultant

ORGANIZATION OF 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: General 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 following general scheme:

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

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 shall be understood to mean the designated article, paragraph, figure, or table in the designated document. All such references shall be identified in the text of this Standard by the document's issuing source and the document's unique identification number, e.g., ASME BPVC, Section III, Subsection NF; IEEE Std 627; or

10CFR50 Part A. If required, further reference to unique articles or paragraphs of the referenced document may also be described, e.g., ASME BPVC, Section III, Subsection NF, subpara. NF-3211.1(a). Each short reference made in the text shall be described in more complete detail in Article 3000 by issuing source, unique identification number, year of publication being referenced, and full title, e.g., IEEE Std 382-1980, Standard for Qualification of Safety Related Valve Operators. References listed without the year of publication suggest that the latest version of the reference was used in the development of this Standard. It should be noted by users of this Standard that regulatory requirements and Codes of Record for a particular nuclear power plant may take precedence over references used within this Standard. Section QR references applicable for both pumps and valves shall be described in Article QR-3000, while references unique to Section QP or Section QV only will be described in Article QP-3000 or Article QV-3000, as applicable.

(c) References to Appendices. Two types of appendix are included in this Standard, designated Mandatory and Nonmandatory. Both types of appendix are designated by the prefix Q. This is followed by letter(s), which are the same used by the section to which the appendix applies, e.g., QR. Mandatory appendices contain requirements that must be followed in qualification; such references are uniquely identified by a roman numeral, e.g., Mandatory Appendix QR-I and its specific title. Nonmandatory appendices provide information or guidance; such references are designated by a capital letter, e.g., Nonmandatory Appendix QR-A, and its specific title.