AWS B5.16:2025
An American National Standard

# Specification for the Qualification of Welding Engineering Personnel




American Welding Society®



**AWS B5.16:2025**
**An American National Standard**

**Approved by the**
**American National Standards Institute**
**June 28, 2024**

# Specification for the Qualification of Welding Engineering Personnel

**3rd Edition**

**Revises AWS B5.16:2006**

Prepared by the
American Welding Society (AWS) Qualification and Certification Committee

Under the Direction of the
AWS Technical Activities Committee

Approved by
AWS Board of Directors

## Abstract

This specification establishes the requirements for qualification of Welding Engineering Technologists and Welding Engineers employed in the welding industry. The minimum experience, examination, application, qualification, and requalification requirements and methods are defined herein. This specification is a method for engineering personnel to establish a record of their qualification and abilities in welding industry work such as development of procedures, processes controls, quality standards, problem solving, etc.

American Welding Society®

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# Personnel

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# Foreword

This foreword is not part of this standard but is included for informational purposes only.

The Qualification and Certification Committee of the American Welding Society was formed in 1973. In 1996, it was divided into two committees. The Personnel and Facilities Qualification Committee (PFQC) was assigned responsibility for creating American National Standards for welding personnel and welding facility qualification requirements. The AWS Certification Committee was assigned responsibility for creating certification programs from these and other recognized Standards. The PFQC was formed and assigned the task of creating an American National Standard for the qualification of welding engineers. This new subcommittee was comprised of welding industry professionals that included AWS Past Presidents; representatives of academic institutions with welding engineering/technology programs; petrochemical, power generation, automotive, aerospace, and ship building industry representatives and consultants; and AWS staff members. The first edition of AWS B5.16, *Specification for the Qualification of Welding Engineers*, was published in 2001. The second edition was published in 2006 after completing an extensive review process under the AWS Technical Activities Committee Rules of Operation.

In 2016, the PFQC and Certification subcommittees were again joined and identified as the Qualification and Certification Committee.

This is the third edition of this specification and changes have been made to implement a competency taxonomy between welding engineering technologists and welding engineering roles and align these competencies to job tasks of experienced graduates from Accreditation Board for Engineering and Technology (ABET) accredited engineering colleges. The changes are widespread enough that clear markup of the changes is difficult and therefore not shown. The taxonomy provides a qualification structure to clearly differentiate the competencies between Welding Engineering Technologist and Welding Engineer. This standard for the qualification of welding engineering personnel was developed to provide a qualification basis which defines minimum requirements for welding engineering technologists and welding engineers to demonstrate competence through a combination of education, experience, and examination.

Bloom's taxonomy is used to differentiate the cognitive levels and competencies between the following roles:

| | |
|---|---|
| Welding Engineering Technologist | Remember, Understand, Apply, Analyze |
| Welding Engineer | Remember, Understand, Apply, Analyze, Evaluate, Create |

Action verbs associated with Bloom's taxonomy are used to differentiate job duties, bodies of knowledge, and exam structures.

The Welding Engineering Technologist (WET) is able to understand, apply, and analyze welding and allied technologies including design, materials, processes, quality, and economic considerations for defined welding applications. For advanced welding applications that require engineering analysis to evaluate, design, and develop the application, the WET coordinates requirements between engineering and production or fabrication. The WET shall be familiar with various codes, standards, specifications, base materials, filler materials, heat treatment, mechanical properties, welding processes and procedures, welding equipment, quality assurance systems, inspection methods, acceptance standards, various test methods, welder and welding operator qualification, welding procedure qualification requirements, fabrication tolerances, and other aspects of fabrication and assembly with which the welding technologist may be involved. The WET prepares and reviews written instructions to produce weldments. The WET shall also prepare and produce reports which reflect professional judgments. For the WET to be effective, the activities performed shall be consistent with specified requirements, technical and ethical principles. The WET must be able to work with the engineer, technician, inspector, welder, and others involved in the project; and appreciate the role of each in the development of weldments.

The Welding Engineer (WE) is a person who understands, applies, analyzes, and evaluates weld requirements which may be governed under a specific code, contract, drawing, specification, purchase order, or other documents. The WE either prepares or reviews written instructions for the production of welded joints. The WE must be familiar with various codes, specifications, other standards, base materials, filler materials, heat treatment, mechanical properties, welding and joining processes, procedures, weld joint design, welding equipment, thermal cutting, inspection methods, acceptance criteria, tests, welding qualification requirements, fabrication tolerances, and other aspects of fabrication and assembly. The WE shall also prepare and produce reports which accurately reflect professional judgment. For the welding engineer to be effective, activities shall be performed in a manner consistent with specified requirements and technical and ethical principles. The WE must be able to work with management representatives, engineers of various disciplines, engineering technologists, welding coordinators, technicians, inspectors, welding, and trade personnel and should be able to understand the role of each in the development of weldments.

**Errata.** It is the Qualification and Certification Committee's Policy that all errata should be made available to users of this document. Therefore, any significant errata will be published in the Society News Section of the *Welding Journal* and posted on the AWS web site at: http://www.aws.org/standards/page/errata.

**Suggestions.** Your comments for improving AWS B5.16, *Specification for Qualification of Welding Engineering Personnel* are welcome. Submit comments to the Secretary of the Qualification and Certification Committee, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

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# Specification for Qualification of Welding Engineering Personnel

## 1. General Requirements

**1.1 Scope.** This specification establishes qualification requirements for Welding Engineering Technologists (WET) and Welding Engineers (WE). It describes how qualifications are determined, and the manner by which qualification may be attained and maintained.

**1.1.1** This specification establishes the qualification requirements for these individuals and specifies the bodies of knowledge for examinations that will test their comprehension of engineering fundamentals and their ability to apply the principles of welding engineering.

**1.1.2** This specification is intended to supplement the minimum requirements of employers, codes, other standards, or documents and shall not be construed as a preemption of the employer's responsibility for the work or for the performance of the work.

**1.1.3** Employers shall be responsible for determining that their employees, having qualified as WETs or WEs, are capable of performing the specific duties involved in their work assignments.

**1.2 Units of Measurement.** This standard does not require units of measure. Therefore, no equivalents or conversions are contained except when they are cited in examples.

**1.3 Safety.** Safety and health issues and concerns are beyond the scope of this standard and therefore are not addressed herein.

Safety and health information is available from the following sources:

American Welding Society

(1) ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*

(2) AWS Safety and Health Fact Sheets

(3) Other safety and health information on the AWS website

Material or Equipment Manufacturers

(1) Safety Data Sheets supplied by materials manufacturers

(2) Operating Manuals supplied by equipment manufacturers

Applicable Regulatory Agencies

Work performed in accordance with this standard may involve the use of materials that have been deemed hazardous and may involve operations or equipment that may cause injury or death. This standard does not purport to address all safety and health risks that may be encountered. The user of this standard should establish an appropriate safety program to address such risks as well as to meet applicable regulatory requirements. ANSI Z49.1 should be considered when developing the safety program.

**1.4** As used in this specification, the word ***shall*** denotes a requirement, the word ***should*** denotes a guideline, and the word ***may*** denotes a choice.

## 2. Normative References

The documents listed below are referenced within this publication and are mandatory to the extent specified herein. For undated references, the latest edition of the referenced standard shall apply. For dated references, subsequent amendments or revisions of the publications may not apply since the relevant requirements may have changed.

American Welding Society (AWS) documents:

AWS A3.0M/A3.0, *Standard Welding Terms and Definitions*

AWS B2.1/B2.1M, *Specification for Welding Procedure and Performance Qualification*

AWS D1.1/D1.1M, *Structural Welding Code—Steel*

AWS D14.0/D14.0M, *Machinery and Equipment Welding Specification*

AWS QC1, *Specification for AWS Certification of Welding Inspectors*

ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*

American Society of Mechanical Engineers (ASME) documents:

ASME *Boiler and Pressure Vessel Code, Section VIII, Division 1*

ASME BPVC B31.3, *Process Piping*

## 3. Terms and Definitions

AWS A3.0M/A3.0, *Standard Welding Terms and Definitions*, provides the basis for terms and definitions used herein. However, the following terms and definitions are included below to accommodate usage specific to this document.

**certification.** A credential attesting to a type or level of qualification.

**contact hour.** A measure representing a minimum fifty (50) minute period of scheduled instruction.

**continuing education unit** (CEU). A measure used in continuing education programs to assist a WET or WE to maintain certification. A CEU is equivalent to ten (10) contact hours.

**qualification.** Process of demonstrating whether an entity or individual is capable of fulfilling specified requirements.

## 4. Qualification

This standard defines the qualification requirements for two (2) levels of welding engineering personnel as follows:

**4.1 Welding Engineering Technologist (WET).** An individual with the required education, experience, and knowledge specified in Part A—Clauses 6 and 7, and who successfully passes the required examinations described in Part A—Clause 8, shall be considered qualified as a WET.

**4.2 Welding Engineer (WE).** An individual with the demonstrated education, experience, and knowledge specified in Part B—Clauses 11 and 12, and who successfully passes the required examinations described in Part B—Clause 13, shall be considered qualified as a WE.

**4.2.1** Qualification as a WE in accordance with this specification alone may not legally qualify these personnel for provision of technical services to the public when contract documents, building, or jurisdiction laws require such services be performed under the direction and responsibility of a registered and licensed Professional Engineer (PE). As such, designation as a Welding Engineer **DOES NOT** imply the status of a registered PE under the laws of any state or other governmental entity.