Abstract

This standard describes the requirements for qualification as a Welding Supervisor. The requirements include education, experience, and a written examination. This standard also covers the job functions a qualified Welding Supervisor should be able to perform.
Statement on the Use of American Welding Society Standards

All standards (codes, specifications, recommended practices, methods, classifications, and guides) of the American Welding Society (AWS) are voluntary consensus standards that have been developed in accordance with the rules of the American National Standards Institute (ANSI). When AWS American National Standards are either incorporated in, or made part of, documents that are included in federal or state laws and regulations, or the regulations of other governmental bodies, their provisions carry the full legal authority of the statute. In such cases, any changes in those AWS standards must be approved by the governmental body having statutory jurisdiction before they can become a part of those laws and regulations. In all cases, these standards carry the full legal authority of the contract or other document that invokes the AWS standards. Where this contractual relationship exists, changes in or deviations from requirements of an AWS standard must be by agreement between the contracting parties.

AWS American National Standards are developed through a consensus standards development process that brings together volunteers representing varied viewpoints and interests to achieve consensus. While AWS administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in its standards.

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This standard may be superseded by the issuance of new editions. Users should ensure that they have the latest edition.

Publication of this standard does not authorize infringement of any patent or trade name. Users of this standard accept any and all liabilities for infringement of any patent or trade name items. AWS disclaims liability for the infringement of any patent or product trade name resulting from the use of this standard.

Finally, AWS does not monitor, police, or enforce compliance with this standard, nor does it have the power to do so.

On occasion, text, tables, or figures are printed incorrectly, constituting errata. Such errata, when discovered, are posted on the AWS web page (www.aws.org).

Official interpretations of any of the technical requirements of this standard may only be obtained by sending a request, in writing, to the Managing Director, Technical Services Division, American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126 (see Annex B). With regard to technical inquiries made concerning AWS standards, oral opinions on AWS standards may be rendered. However, such opinions represent only the personal opinions of the particular individuals giving them. These individuals do not speak on behalf of AWS, nor do these oral opinions constitute official or unofficial opinions or interpretations of AWS. In addition, oral opinions are informal and should not be used as a substitute for an official interpretation.

This standard is subject to revision at any time by the AWS Personnel and Facilities Committee. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn. Comments (recommendations, additions, or deletions) and any pertinent data that may be of use in improving this standard are required and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS Personnel and Facilities Committee and the author of the comments will be informed of the Committee’s response to the comments. Guests are invited to attend all meetings of the AWS Personnel and Facilities Committee to express their comments verbally. Procedures for appeal of an adverse decision concerning all such comments are provided in the Rules of Operation of the Technical Activities Committee. A copy of these Rules can be obtained from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.
Personnel

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*Advisor
Foreword

This foreword is not a part of AWS B5.9:2006, Specification for the Qualification of Welding Supervisors, but is included for informational purposes only.

This is the second edition of this document. Editorial changes were made throughout the document. The Senior Welding Supervisor designation was deleted and a new section on welding economics and productivity was added (see 5.11). 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 Facility Qualification Committee is now responsible for creating American National Standards for welding personnel and welding facility qualification requirements. The AWS Certification Committee is now responsible for creating certification programs from these and other recognized standards. In 1996, the B5I Subcommittee was formed to prepare a specification for qualification of welding supervisors.

Welding is a complex technology requiring qualified supervisors to achieve and maintain a defined level of weld quality. Such supervising personnel should be able to manage practical and theoretical aspects of welding operations as they apply to the day-to-day supervision of welding fabrication, construction, or maintenance. Qualifying as a Welding Supervisor indicates that the holder has a high degree of knowledge of the theory and practice of welding, and also has the ability and capacity to direct and supervise welding in accordance with the appropriate requirements of a standard.

The Welding Supervisor directs welding activities and personnel, prepares work plans, provides work instructions, and evaluates worker performance. The Welding Supervisor must be thoroughly familiar with welding processes, welding procedures, welder qualifications, materials, safe practices, and the limitation of weld testing. This individual must be able to read drawings, prepare and maintain records, prepare and make reports, and make responsible judgments. For the Welding Supervisor to be effective, the activities performed must be technically correct, ethically proper, and be consistent with the job requirements. The Welding Supervisor should be able to work with either the management or the welder with ease, and appreciate the role of each.

This standard was developed to define minimum standards for those persons performing welding-supervision tasks, and to provide a means of recognition for those who have the knowledge, qualification, experience, and expertise in the field of welding supervision.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS Personnel and Facility Qualification Committee, American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

Official interpretations of any of the technical requirements of this standard may be obtained by sending a request, in writing, to the Managing Director, Technical Services Division, American Welding Society (see Annex B). A formal reply will be issued after it has been reviewed by the appropriate personnel following established procedures.
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Specification for the Qualification of Welding Supervisors

1. Scope

1.1 This standard establishes requirements for the qualification of Welding Supervisors. It describes how personnel are qualified, the principles of conduct, and the practice by which qualification may be maintained.

1.2 This specification does not address all safety issues associated with welding. It is the responsibility of the employer to establish appropriate safety and health practices and to determine the applicability of any regulatory limitations prior to welding. The requirements of ANSI Z49.1, Safety in Welding, Cutting, and Allied Processes, plus the cautionary notes contained in the Material Safety Data Sheets (MSDSs) supplied by the material supplier should be part of each employer’s safety program. Additional safety information is available in the Safety and Health Fact Sheets published by the American Welding Society (AWS).

1.3 As used in this specification, the word shall denotes a requirement; the word should denotes a guideline or recommendation; and the word may denotes a choice. As used in this specification the word welding includes brazing. As used in this specification the word welders includes welding operators, brazers, and brazing operators.

1.4 In the qualification process, the candidate must have general knowledge of the theory and practice of welding and of the responsibilities and duties of a Welding Supervisor. During the examination process, the candidate shall be evaluated on welding-related qualifications and experience and on knowledge of the requirements of general applications of codes and specifications. The employer shall maintain all qualification records.

1.5 This standard is intended to supplement the requirements of an employer, or other agency and shall not be construed as preemption of an employer’s responsibility for all work performed. Hence, it is the responsibility of the employer to determine a supervisor’s qualifications other than those stated in 1.4 above, and confirm the capability of performing duties assigned by the employer. The standard is not intended to supersede or contradict local, state, or national regulations.

2. Referenced Documents

1. AWS A3.0, Standard Welding Terms and Definitions; and

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

3. AWS Safety and Health Fact Sheets.

3. Qualification

3.1 Welding Supervisor (WS). Welding supervisor qualification is determined by training and practical experience to fulfill the basic supervision tasks. The WS shall meet the applicable qualification requirements of Clause 5, Functions, and Clause 6, Education and Experience Requirements.

4. Definitions

The terms used in this standard are defined in AWS A3.0, Standard Welding Terms and Definitions. Other terms used herein are defined below.

acceptance criteria. Specified limits placed on characteristics of an item, process, or service as defined in codes, other standards, or other documents.

AWS. The American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

1 AWS standards and ANSI Z49.1 are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.
candidate. The person attempting to qualify to this standard.

contact hour. One contact hour is equivalent to one classroom hour. Ten (10) contact hours are equivalent to one (1) CEU (continuing education unit).

independent third party. An assessor who is qualified for the task of performing the assessment and is not employed by the candidate’s employer.

inspection. The performance of an examination or measurement to verify whether an item or activity conforms to specified requirements.

inspector. A person who performs inspection activities to verify conformance to specified requirements.

qualification. The characteristics or abilities gained through education, training, and/or experience, as measured against established requirements, such as standards or tests that qualify a person to perform a required function.

standard. A document that governs and guides a specific activity.

verification. The act of reviewing, inspecting, testing, checking, auditing, or otherwise determining and documenting whether items, processes, services, or documents conform to specified requirements.

5. Functions

The Welding Supervisor shall be responsible for directing and performing operations to ensure that all welding-related activities meet the applicable requirements. A Welding Supervisor shall be able to perform all of the tasks identified in Annex A of this standard.

The detailed activities that a Welding Supervisor shall be capable of performing and/or demonstrating, according to the level of approval, include:

5.1 Knowledge of Welding Supervision. The supervisor shall be able to supervise personnel, evaluate job performance, coordinate jobs, and advise on the instruction of welding personnel.

5.2 Understanding of Drawings and Specifications. This includes reading drawings, applying specifications, and directing others in this skill. It further requires a knowledge of welding symbols, welding definitions, and terminology.

5.3 Knowledge of Base Material and Welding Materials. This includes a basic understanding of welding metallurgy and base materials including their weldability characteristics, as well as an understanding of welding filler metal types and characteristics. This also requires a basic knowledge of material testing and material specifications.

5.4 Familiarity with Welding, Brazing, Cutting Equipment, Theory, and Application. This includes familiarity with the characteristics of various power sources and other associated equipment for the intended process(es), and with basic welding and cutting safety requirements in order to demonstrate the proper use of equipment.

5.5 Knowledge of Safety Requirements. This includes training, coordination, and maintenance of safety-related functions and personnel.

5.6 Welding Instructions. The Welding Supervisor should review the written welding instructions to ensure that all assigned personnel are familiar with the requirements of these instructions. The Welding Supervisor may write welding instructions, be required to define testing requirements to qualify welders, and/or be responsible to prepare reports for conformance to codes, other standards, or other documents. The responsibility for welding instructions including compliance with codes or other standards rests with the welding engineer, quality assurance personnel, or quality control personnel.

5.7 Knowledge of Welding Practices and Production Controls. This includes the application and storage of filler metals, the influence of welding parameters, and the factors affecting variables, such as stress and distortion. The Welding Supervisor helps plan and coordinate welding preparations and activities, and then ensures that control, corrections, and documentation are performed per requirements.

5.8 Welding Inspection. The Welding Supervisor shall ensure that all welding meets the specified requirements before inspection is initiated. Inspection tasks are performed, and evaluated by qualified inspection personnel.

5.9 Work Reports and Records. The Welding Supervisor prepares clear and concise reports, and maintains records of the reviews, inspection results, and performance documentation.

5.10 Understanding the General Applications of Welding Standards. This includes applying the requirements of codes and other standards correctly in order to properly perform all the activities above.

5.11 Welding Economics and Productivity. The Welding Supervisor shall be knowledgeable in the area of increasing welding productivity by using proper weld sizing, accurate fit-ups, effective weld station design, proper use of welders, and the elimination of rework and scrap. The Welding Supervisor shall be able to calculate
the economic factors important to welding productivity using deposition rates, weld volumes, amperages, and operating factors.

6. Education and Experience Requirements

In order to qualify as a Welding Supervisor (WS), a candidate:

6.1 Shall be a high school graduate; or hold a state or military approved high school equivalency diploma.

6.2 Shall have a minimum of three (3) years of practical welding experience in a fabrication, construction, or welding-related industry (see Clause 7).

6.3 As an alternative to 6.2, three years of relevant teaching experience may be substituted for one year of the practical experience requirement with proper documentation (e.g., photocopied summaries of subjects taught, teaching certificates, and letters of reference). Relevant experience shall be considered on the following basis:

1. Teaching full-time (or teaching part-time at a full-time equivalence) in a trade, technical school, college, or university, the occupational skill of welding or subjects relating to welding, its application, control, materials, and processes; or

2. Employment in the manufacturing industry in a position for which the teaching of welding skills and the application of theory, control, materials, and process is a responsibility.

7. Definition of Experience

7.1 Practical experience as required in Clause 6 is an occupational function that has a direct relationship with weldments fabricated to a code, specification, or other standard, and is directly involved in at least one of the following:

7.1.1 Design. Preparation of plans and drawings for weldments.

7.1.2 Production. Planning and control of welding materials, welding procedures, and welding operations for weldments.

7.1.3 Construction. Welding, fabrication, and erection of weldments.

7.1.4 Inspection. Detection and measurement of weld discontinuities and verification of fabrication requirements.

7.1.5 Repair. Repair of defective welds.

7.2 A candidate shall be familiar with and understand the fundamentals of the following processes:

1. Shielded Metal Arc Welding (SMAW),
2. Gas Tungsten Arc Welding (GTAW),
3. Arc Stud Welding (SW),
4. Thermal Cutting (TC),
5. Submerged Arc Welding (SAW),
6. Flux Cored Arc Welding (FCAW),
7. Brazing (B),
8. Mechanical Cutting,
9. Oxyfuel Gas Welding (OFW), and
10. Gas Metal Arc Welding (GMAW).

Note: Cutting processes refer only to those that are applied to the fabrication and repair of weldments.

8. Body of Knowledge

The tasks designated in Annex A constitute the body of knowledge for the Welding Supervisor. The Welding Supervisor shall demonstrate competence in the activities shown in Annex A.

9. Examination Requirements

Candidates for Welding Supervisor shall pass a written examination based on the essential tasks designated for the Welding Supervisor as listed in Annex A. The percentages listed relate to the examination structure and do not reflect the balance of responsibilities that a Welding Supervisor might be expected to perform in his/her employment.

10. Maintenance of Qualification

The Welding Supervisor shall demonstrate his/her continuing ability to perform the functions in Clause 5. Maintenance of qualification shall be no more than five years. He/she shall have completed continued formal education in supervisor or management subject areas equivalent to 40 contact hours taken while qualified as a Welding Supervisor.
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Annex A (Normative)

Task Description

This annex is a part of AWS B5.9:2006, Specification for the Qualification of Welding Supervisors, and includes mandatory elements for use with this standard.

A1. Personnel Management
A1.1 Supervision—10%
1. Coordination of jobs and personnel
2. Provision and maintenance of adequate instructions
3. Advise welding personnel on welding instructions (e.g., welding/NDE symbols)
4. Supervision of job performance

A1.2 Codes/Quality Management (QM) Requirements—10%
1. Coordination of jobs and personnel in accordance with welding-related qualifications
2. Initiating and maintaining welder qualification records
3. Coordination and internal supervision of welder qualification tests

A1.3 Qualification of Personnel—5%
1. Planning and coordination of training/qualification of welding-related personnel

A1.4 Safety—5%
1. Training of personnel on welding safety requirements
2. Coordination of safety-related functions and personnel
3. Feedback and liaison with designer/client/other concerned parties
4. Development of welding procedures (including heat treatment, welding sequence, distortion control, etc.)
5. Planning and coordination of welding-related work (jobscheduling/outside contracts such as NDE)
6. Coordination of safety requirements (hot working permit/fume control and confined space training)
7. Coordination of personnel, production, workplace, and material requirements

A2. Welding Preparation and Fabrication
A2.1 Planning—14%
1. Assessment of weldability and practical application (joint design, stresses, materials, jigs, and fixtures required)
2. Feedback and liaison with designer/client/other concerned parties
3. Development of welding procedures (including heat treatment, welding sequence, distortion control, etc.)
4. Planning and coordination of welding-related work (jobscheduling/outside contracts such as NDE)
5. Coordination of safety requirements (hot working permit/fume control and confined space training)
6. Coordination of personnel, production, workplace, and material requirements

A2.2 Control—14%
1. Welding quality (control that specified weld quality is met)
2. Welding-related documentation
3. Economy of process application
4. Correct application of welding procedures, materials, personnel, and equipment
5. Control of job schedules (also contractors)
6. Consumables (stock control/ordering)
7. Budget and cost

A2.3 Equipment/Consumables—7%
1. Condition (maintenance/calibration)
2. Consumables storage and issue
3. Safety equipment (protective clothing, etc.)
A3. Quality Management and Quality Control Requirements

A3.1 Personnel—5%
1. Coordination of code or internal QM requirements and welder qualification (also subcontractors)

A3.2 Procedure—5%
1. Coordination of code requirements, welding procedures, NDE and quality plans
2. Control of correct application of procedures (including joint preparation, preheat, and postheat treatment, welding sequence)

A3.3 Procedure Testing—5%
1. Coordination of welding procedure qualification test
2. Internal supervision of welding procedure testing

A3.4 Materials/Prefabrication—5%
1. Ensure that parent material and consumables meet specifications
2. Control quality of prefabrication (dimensions, joint preparations) so it meets specifications

A3.5 Welding Inspection—5%
1. Ensure that all welding meets the specified requirements before inspection is initiated
2. Ensure that all welding inspection (e.g., NDT) tasks are performed

A3.6 Documentation—5%
1. Recording of required documentation
2. Filing/distribution of required documentation

Note: Test percentages are less than 100% to allow some flexibility to the organization administering the exam.
Annex B (Informative)
Guidelines for the Preparation of Technical Inquiries

This annex is not a part of AWS B5.9:2006, Specification for the Qualification of Welding Supervisors, but is included for informational purposes only.

B1. Introduction
The American Welding Society (AWS) Board of Directors has adopted a policy whereby all official interpretations of AWS standards are handled in a formal manner. Under this policy, all interpretations are made by the committee that is responsible for the standard. Official communication concerning an interpretation is directed through the AWS staff member who works with that committee. The policy requires that all requests for an interpretation be submitted in writing. Such requests will be handled as expeditiously as possible, but due to the complexity of the work and the procedures that must be followed, some interpretations may require considerable time.

B2. Procedure
All inquiries shall be directed to:

Managing Director
Technical Services Division
American Welding Society
550 N.W. LeJeune Road
Miami, FL 33126

All inquiries shall contain the name, address, and affiliation of the inquirer, and they shall provide enough information for the committee to understand the point of concern in the inquiry. When the point is not clearly defined, the inquiry will be returned for clarification. For efficient handling, all inquiries should be typewritten and in the format specified below.

B2.1 Scope. Each inquiry shall address one single provision of the standard unless the point of the inquiry involves two or more interrelated provisions. The provision(s) shall be identified in the scope of the inquiry along with the edition of the standard that contains the provision(s) the inquirer is addressing.

B2.2 Purpose of the Inquiry. The purpose of the inquiry shall be stated in this portion of the inquiry. The purpose can be to obtain an interpretation of a standard’s requirement or to request the revision of a particular provision in the standard.

B2.3 Content of the Inquiry. The inquiry should be concise, yet complete, to enable the committee to understand the point of the inquiry. Sketches should be used whenever appropriate, and all paragraphs, figures, and tables (or annex) that bear on the inquiry shall be cited. If the point of the inquiry is to obtain a revision of the standard, the inquiry shall provide technical justification for that revision.

B2.4 Proposed Reply. The inquirer should, as a proposed reply, state an interpretation of the provision that is the point of the inquiry or provide the wording for a proposed revision, if this is what inquirer seeks.

B3. Interpretation of Provisions of the Standard
Interpretations of provisions of the standard are made by the relevant AWS technical committee. The secretary of the committee refers all inquiries to the chair of the particular subcommittee that has jurisdiction over the portion of the standard addressed by the inquiry. The subcommittee reviews the inquiry and the proposed reply to determine what the response to the inquiry should be. Following the subcommittee’s development of the response, the inquiry and the response are presented to the entire committee for review and approval. Upon approval by the committee, the interpretation is an official
interpretation of the Society, and the secretary transmits the response to the inquirer and to the *Welding Journal* for publication.

**B4. Publication of Interpretations**

All official interpretations will appear in the *Welding Journal* and will be posted on the AWS web site.

**B5. Telephone Inquiries**

Telephone inquiries to AWS Headquarters concerning AWS standards should be limited to questions of a general nature or to matters directly related to the use of the standard. The AWS Board of Directors’ policy requires that all AWS staff members respond to a telephone request for an official interpretation of any AWS standard with the information that such an interpretation can be obtained only through a written request. Headquarters staff cannot provide consulting services. However, the staff can refer a caller to any of those consultants whose names are on file at AWS Headquarters.

**B6. AWS Technical Committees**

The activities of AWS technical committees regarding interpretations are limited strictly to the interpretation of provisions of standards prepared by the committees or to consideration of revisions to existing provisions on the basis of new data or technology. Neither AWS staff nor the committees are in a position to offer interpretive or consulting services on (1) specific engineering problems, (2) requirements of standards applied to fabrications outside the scope of the document, or (3) points not specifically covered by the standard. In such cases, the inquirer should seek assistance from a competent engineer experienced in the particular field of interest.