# Specification for AWS Certification of Resistance Welding Technicians



American Welding Society®

AWS QC20:2020

## Specification for AWS Certification of Resistance Welding Technicians

**2nd Edition** 

Supersedes AWS QC20:2011

Prepared by the American Welding Society (AWS) Subcommittee on Resistance Welding Personnel

Under the Direction of the AWS Qualification and Certification Committee

Approved by the AWS Board of Directors

### Abstract

This specification defines the requirements and program for the American Welding Society to certify resistance welding technicians (CRWT). This certification requires documentation of education, experience, and satisfactory completion of an examination. The examination tests the CRWT's knowledge of welding processes, welding procedures, destructive and nondestructive tests, welding terms, definitions, symbols, reports, safety, quality assurance and responsibilities, machine setup, and other related subjects. Successful completion of all requirements constitutes the basis for awarding a certification as a Resistance Welding Technician.



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Official interpretations of any of the technical requirements of this standard may only be obtained by sending a request, in writing, to the appropriate certification committee. Such requests should be addressed to the American Welding Society, Attention: Managing Director, Certification Department, 8669 NW 36th St., #130, Miami, FL 33166 (see Annex A). With regard to technical inquiries made concerning AWS standards, oral opinions on AWS standards may be rendered. These opinions are offered solely as a convenience to users of this standard, and they do not constitute professional advice. 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 Qualification and Certification Committee. 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 Qualification and Certification 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 Qualification and Certification 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 Qualification and Certification Committee. A copy of these rules can be obtained from the American Welding Society, 8669 NW 36th St., #130, Miami, FL 33166.

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### Foreword

#### This Foreword is not a part of AWS QC20:2020, *Specification for AWS Certification of Resistance Welding Technicians*, but is included for informational purposes only.

The purpose of this "Specification for AWS Certification of Resistance Welding Technicians" is to establish the requirements for AWS certification of resistance welding technicians. It describes how personnel are certified and the principles of conduct and practice by which certification may be maintained.

AWS QC20, Specification for AWS Certification of Resistance Welding Technicians, was first published in 2011. This specification meets or exceeds the requirements of AWS C1.5:2019, Specification for the Qualification of Resistance Welding Technicians.

This 2nd Edition reflects substantial effort throughout the years following certifying industry best practices. The most significant change is in how AWS developed the exam which was aligned with certification industry best practices including conducting a job task analysis and establishing the passing score via the Modified Angoff procedure, a statistical procedure commonly used by certification bodies to set the passing score (or "standard") for the exam.

This edition contains extensive revisions approved by the AWS Qualification and Certification Committee. The statement on safety includes additional references on safety and health information. The most significant change is with the Test Specifications which reflect testing industry accepted standard setting methods.

Additionally, reference sources have been refreshed and the Code of Ethics has also been updated.

Due to the numerous substantive and other changes in this edition, there are no mark-ups showing changes from the prior edition.

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### Specification for AWS Certification of Resistance Welding Technicians

#### 1. Scope

**1.1** This specification establishes the requirements for AWS certification of resistance welding technicians. It describes how personnel are certified, and the principles of conduct and practice by which certification may be obtained and maintained. Any oral or written claim of certification under the guidelines established herein shall be made only by the individual Certified Resistance Welding Technicians (CRWTs) who are, at the time of the claim, current and in compliance with all clauses of this specification. This specification meets or exceeds the requirements of AWS C1.5:2019, *Specification for the Qualification of Resistance Welding Technicians*. This specification supersedes AWS QC20:2011.

**1.2** In the certification process, AWS conducts an examination to determine a person's general knowledge of the resistance welding processes and related technical areas. No determination is made of an individual's capabilities in applying that knowledge within a specific work environment, nor under actual working conditions.

**1.3** In the certification process, the employer is responsible for determining that a person has specific capabilities required for a given work assignment and other qualifications as stated herein.

**1.4** It shall be the responsibility of the employers to determine if the CRWT is capable of performing the duties involved in their particular welding environment.

**1.5** This specification is intended to supplement the requirements of an employer, code, or other documents and shall not be construed as a preemption of the employer's responsibility for the work or for the performance of the work.

**1.6 Statement on Safety.** Safety and health issues and concerns are beyond the scope of this specification 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<sup>1</sup>
- (2) AWS Safety and Health Fact Sheets
- (3) Other safety and health information on the AWS web site

Material or Equipment Manufacturers:

- (1) Safety Data Sheets supplied by materials manufacturers
- (2) Operating Manuals supplied by equipment manufacturers

**1.7 Verb Usage.** As used in this specification, the word *shall* denotes a requirement; the word *should* denotes a guide-line; and the word *may* denotes an obligation to make a choice.

<sup>&</sup>lt;sup>1</sup> ANSI Z49.1 is published by the American Welding Society, 8669 NW 36th St., #130, Miami, FL 33166.

### 2. Levels of Certification

There is one level of AWS certification, as detailed in AWS C1.5, and is titled Certified Resistance Welding Technician (CRWT).

### 3. Definitions

The welding terms used in this specification are defined in AWS A3.0.<sup>2</sup> Other terms used in this specification are defined as follows:

applicant. A person who applies for a certification to the AWS.

AWS Certification Department. The department that administers the certification activities of the AWS.

certificate. The official document issued once an applicant has successfully completed all requirement for the certification.

**certification**. The act of determining, verifying, and attesting in writing to the qualification of personnel in conformance to specified requirements.

certified. Having met the AWS certification requirements.

**code**. A standard consisting of a set of conditions and requirements relating to a particular subject and indicating appropriate procedures by which it can be determined that the requirements have been met. A standard suitable for adoption in whole or part by a governmental authority as a part of a law or regulation or specified by other mandatory documents.

Committee. The Qualification and Certification Committee of the American Welding Society.

**qualification**. Demonstrated training, skill, knowledge, and experience required for personnel to perform the duties of a specific job.

**specification**. A standard detailing the essential technical requirements for material, fabrication, product, system, or service. It includes the procedures, methods, qualifications, or equipment necessary to verify compliance. This specification is considered cited by a mandatory document or when agreed upon by parties, such as for procurement purposes.

**standard**. A document providing rules or guidelines, produced by consensus, and approved by a recognized body. The term standard encompasses five AWS categories: code, specification, method, recommended practice, and guide.

#### 4. Functions

The duties and capabilities of the Certified Resistance Welding Technician are defined in AWS C1.5.

#### 5. Education and Experience Requirements

The education and experience requirements for certification as a CRWT are defined in AWS C1.5, *Specification for the Qualification of Resistance Welding Technicians*.

**5.1** The application submitted by the applicant shall include a listing of all relevant work and employment. The work history shall include a listing of all relevant employers and their contact information when available, the nature of the work performed, the dates of employment, and an affidavit with the applicant's signature (physical signature or AWS-approved digital signature) attesting to accuracy of the information provided. The work history is subject to verification by the AWS Certification Department. False information may cause to reject the application and will disqualify the applicant from testing to become a CRWT.

<sup>&</sup>lt;sup>2</sup> AWS standards are published by the American Welding Society, 8669 NW 36th St., #130, Miami, FL 33166.

**5.2** Experience claimed by applicants for certification or recertification shall be documented by one or more of the following:

**5.2.1** Completion of the employment verification section of the application.

**5.2.2** A letter of employment on company letterhead from present and former employers indicating applicant's name, social security number (optional), job title(s), start and end (if applicable) date, company name, company address and telephone number, immediate supervisor's name, and the name and title of the person completing the letter.

**5.2.3** A letter on organizational letterhead from the applicant's associated or affiliated organizational representative containing information relevant to the organization in which they were employed, accompanied by official copies of work assignment sheets, books, or records.

**5.2.4** Two (2) letters of reference on company letterhead from separate clients attesting to the nature of work assignments during the period of performance required for certification for self-employed or contract applicants.

**5.2.4.1** If letters of reference cannot be practically obtained, applicants shall submit an affidavit on an AWS form describing what type of work activity they performed and indicating the time frame of that activity for a sufficient number of clients to establish the length of activity required in AWS C1.5. Additional supporting documentation, such as lesson plans, letters, billing invoices, or check stubs also may be submitted.

**5.3** All applicants shall be responsible for using the most current applications as provided by the AWS Certification Department. Use of obsolete forms may delay the certification process.

NOTE: Inadequately documented experience or education shall be a basis for denying certification.

#### 6. Examination Requirements

6.1 Applicants for certification as CRWT shall be required to meet the following written examination requirements:

**6.1.1** Passing scores shall be set using the testing industry accepted standard setting method and reviewed periodically for psychometric validity. The exam passing score will be published on the AWS website and will be on the applicant instructions.

**6.2** A closed-book, general knowledge test consisting of a minimum of one hundred (100) multiple choice questions on fundamental principles.

Test Specifications (Domain)	# of Questions on Exam
01 Weld Equipment Setup including Machine/Tooling Design	15%
02 Welding Processes and Schedules	15%
03 Weld Quality and Testing including Destructive and Non-destructive	12%
04 Definitions and Terminology	10%
05 Welding Symbols	3%
06 Materials	13%
07 Conversion and Calculations	5%
08 Welding Procedures	15%
09 Maintenance	12%
Total	100%

The test specifications are as follows:

6.2.1 The test questions will be drawn from the following references:

- (1) AWS C1.1M/C1.1 Recommended Practices for Resistance Welding
- (2) AWS RWPH (RW Pocket Handbook)
- (3) RWMA Resistance Welding Manual
- (4) AWS A2.4 Standard Symbols for Welding, Brazing, and Nondestructive Examination

6.3 Examination scoring shall be as follows:

**6.3.1** Applicants scoring at or above indicated pass marks shall be considered certified at such time as all other requirements are met, and fees paid.

**6.3.2** Applicants who fail to meet the minimum score may apply for re-examination. The maximum number of retests taken in a calendar year starting with the original test date is three (3).

#### 7. Certification

**7.1 Documentation**. The American Welding Society shall issue to each CRWT applicant who complies with the requirements of Clauses 5 and 6, as applicable, a serialized (unique number) credential(s) stating that the applicant has met the AWS certification requirements. The credential(s) indicates both the date of certification (year and month found in the serialized number) and the expiration date. The credential(s) shall not be altered in any way. Replacement credential(s) may be requested for an additional administrative fee. Certification shall be valid for five years unless revoked for reasons defined in Clause 8, Revocation. The original, current credential(s) shall be surrendered upon request to the Committee, or the Executive Director of AWS upon a finding carrying the penalty of revocation against the credential holder.

**7.2 Verification**. The AWS shall issue to the CRWT applicant who complies with the applicable requirements of AWS C1.5, *Specification for the Qualification of Resistance Welding Technicians*, a serialized (unique number) credential(s) stating that the applicant has met the AWS certification requirements.

The American Welding Society shall release certification test results only to the applicant, or to a person or agency designated by the applicant CRWT upon written request. The exceptions to this requirement are members of American Welding Society staff and members and officers of the Committee, who may request and receive access to all information relating to program participants in the necessary pursuit of their duties on behalf of the program. Test results, in addition to those provided at the time of examination may require payment of a nominal administrative fee.

**7.2.1** Oral requests for verification of status and certification number of certified personnel shall be provided to requestors without charge. Only the certification number, date certified, and current status (current, revoked, etc.) shall be provided by American Welding Society staff members without the express, written approval of the credential holder.

NOTE: Any attempt to modify the information contained in any of the documents issued to the CRWT by AWS shall be considered an attempt to defraud, and punishable by probation, suspension, or revocation. The credential(s) are the Property of AWS.

#### 8. Code of Ethics, Rules of Conduct, and Practice

**Preamble**. In order to safeguard the health and well-being of the public and to maintain integrity and high standards of skills, practice, and conduct in the occupation of resistance welding; the AWS CRWT holders (certificants) shall be cognizant of the following principles and the scope to which they apply, with the understanding that any unauthorized practice is subject to the Committee's review and may result in suspension, reprimand, or revocation of certification.

#### 8.1 Integrity.

**8.1.1** The certificant shall act with complete integrity in professional matters and be forthright and candid to their employer, the regulator or employer's customer, and with the Committee or its representatives, on matters pertaining to this specification.

**8.1.2** The certificant shall neither falsify, exaggerate, nor indulge in the misinterpretation of personal academic and professional qualifications, past assignments, accomplishments and responsibilities, or those of the certificant's associates.

**8.1.3** Misrepresentation of current certification status at the time of, or subsequent to, submission of requested employment information, or in the solicitation of business contracts wherein current certification is either required or inherently beneficial (advertisements for training courses, consulting services, etc.) shall be a violation of this section.

**8.1.4** The certificant shall not claim that their credentials are suitable for anything outside of the field of resistance welding or for tasks outside of any other AWS certifications, including endorsements.

**8.2 Responsibility to the Public**. The certificant shall act to preserve the health and well-being of the public by performing duties required of resistance welding in a conscientious and impartial manner to the full extent of the certificant's moral and civic responsibility and qualification. Accordingly, the certificant shall:

**8.2.1** Undertake and perform assignments only when qualified by training, experience, and capability.

**8.2.2** Present credentials upon request to persons authorized to examine them.

**8.2.3** Will not falsely represent current status nor seek to misrepresent the certification by modification of certification documents or false verbal or written testimony of current certification status or utilize the certification number connected to a lapsed or terminated certification.

**8.2.4** Be completely objective, thorough, and factual in any written report, statement, or testimony of the work and include all relevant or pertinent testimony in such communiqués or testimonials.

**8.2.5** Neither associate with nor knowingly participate in a fraudulent or dishonest venture or activity.

#### 8.3 Public Statements

**8.3.1** The certificant shall issue no statements, criticisms, or arguments on resistance welding matters connected with public policy which were inspired or paid for by an interested party, or parties, without first identifying the party, the speaker, and disclosing any possible financial interest.

**8.3.2** The certificant shall publicly express no opinion on resistance welding subjects unless it is founded upon knowledge of the facts in issue, upon a background of technical competence pertinent to the subject, and upon honest conviction of the accuracy and propriety of the statement.

#### 8.4 Conflict of Interest

**8.4.1** The certificant shall avoid a conflict of interest with the employer or client and shall disclose any business association, or circumstance that might be so considered.

**8.4.2** The certificant shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed to all interested parties or their authorized agents.

**8.4.3** The certificant shall not solicit or accept gratuities, directly or indirectly, from any party, or parties, dealing with the client or employer in connection with the certificant's work.

**8.5** Nondisclosure. The certificant shall not disclose proprietary information (i.e., commercially valuable information not generally known) concerning business affairs or technical processes of a present or former client or employer, without their written consent, except as necessary to perform the duties of a certificant.

**8.6 Unauthorized Practice**. Any violation of any part of the standard of conduct prescribed by this specification if related to a certificant's occupation, including any violation of the Code of Ethics contained in this specification, shall constitute an unauthorized practice subject to the imposition of sanctions.

#### 9. Revocation

**9.1 Committee**. The Committee shall have the power to suspend, refuse renewal, revoke, place on probation, or reprimand the certificant for misrepresentation of facts regarding personal qualifications, status, assignments, etc., relating to the certificant's credentials whether such misrepresentation was made at the time of application or on subsequent applications (renewal, etc.). The Committee may suspend, refuse renewal, revoke, place on probation, or reprimand a certificate holder, if found guilty of any unauthorized practice (as outlined in 8.6 Unauthorized Practice) in a proceeding conducted in conformance to AWS QC9 *Administrative Procedures for Alleged Violations of AWS Certification Programs* (available from the AWS Certification Department).

**9.2** Courts. The Committee may apply to any court of competent jurisdiction for further enforcement of its administrative decisions and rulings.

#### 10. Reinstatement

Reinstatement of a revoked certification shall be allowed with no penalty or prejudice to the individual provided the reason for such revocation has been rectified to the Committee's satisfaction.

#### 11. Recertification

**11.1 Responsibilities**. The maintenance (recertification) of AWS certification is solely with the certificate holder. Failure to maintain a current address with the AWS Certification Department and subsequent failure of notification shall not be considered adequate justification to allow an extension of the certification validity date.

**11.2** Maintaining certification by submitting an approved recertification application to the AWS Certification Department by the expiration date of the current certification and no earlier than 11 months prior to the expiration date of that certification. AWS may send a renewal notice, but if not received, it remains the responsibility of the Resistance Welder to renew on time.

**11.3 Recertification Period.** The CRWT shall maintain his/her certification every five years by re-examination. The CRWT shall, upon expiration of his/her certification, cease to be certified and may not continue to advertise as such.

**11.3.1** The CRWT applying for recertification of an expired certification will be considered as a new applicant and should contact the AWS Certification Department for the correct procedure.

**11.3.2** Certification becomes effective on the first day of the month following the date of examination, and expires on the first day of that month, five (5) years later.

### Annex A (Informative Annex) Guidelines for Preparation of Inquiries for AWS Qualification and Certification Committees

This annex is not part of AWS QC20:2020, *Specification for AWS Certification of Resistance Welding Technicians*, but is included for informational purposes only.

#### A1. Introduction

The 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.

#### A2. Procedure

All inquiries shall be directed to:

Director, Certification Programs Certification Department American Welding Society 8669 NW 36th St., #130 Miami, FL 33166

All inquiries shall contain the name, address, and affiliation of the inquirer, and they shall provide enough information for the committee/subcommittee 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.

**A2.1 Scope.** Each inquiry shall address one single provision of the specification, 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 specification that contains the provision(s) the inquirer is addressing.

**A2.2 Purpose of the Inquiry.** The purpose of the inquiry shall be stated in this portion of the inquiry. The purpose can be either to obtain an interpretation of a specification's requirement, or to request the revision of a particular provision in the specification.

**A2.3** Content of the Inquiry. The inquiry should be concise, yet complete, to enable the committee to quickly and fully understand the point of the inquiry. Sketches should be used when appropriate and all paragraphs, figures, and tables (or the Annex), which bear on the inquiry shall be cited. If the point of the inquiry is to obtain a revision of the specification, the inquiry must provide technical justification for that revision.

**A2.4 Proposed Reply.** The inquirer should, as a proposed reply, state an interpretation of the provision that is the point of the inquiry, or the wording for a proposed revision, if that is what inquirer seeks.

#### A3. Interpretation of Provisions

Interpretations of specification provisions are made by the Qualification and Certification Committee. The secretary of the committee refers all inquiries to the chair of the particular subcommittee that has jurisdiction over the particular specification 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 Qualification and Certification 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.

#### A4. Publication of Interpretations

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

#### **A5.** Telephone Inquiries

Telephone inquiries to AWS Headquarters concerning the QC20:2020, *Specification for AWS Certification of Resistance Welding Technicians*, should be limited to matters directly related to the use of the specification. 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.

#### A6. The Qualification and Certification Committee

The activities of the Qualification and Certification Committee regarding interpretations are limited strictly to the interpretation of specification provisions or to consideration of revisions to existing provisions. Neither AWS staff nor the committees are in a position to offer interpretive or consulting services on: (1) specific engineering problems or (2) requirements that apply to topics outside the scope of the specification or points not specifically covered by the specification. In such cases, the inquirer should seek assistance from a competent engineer or consultant experienced in the particular field of interest.

Designation	Title
QC1	Standard for AWS Certification of Welding Inspectors
QC5	AWS Standard for Certification of Welding Educators
QC9	Administrative Procedures for Alleged Violations of AWS Certification Programs
QC13	Specification for the Certification of Welding Supervisors
QC14	Specification for the Certification of Welding Sales Representatives
QC15	Specification for the Certification of Radiographic Interpreters
QC17	Specification for AWS Accreditation of Certified Welding Fabricators
QC19	Specification for AWS Certification of Robotic Arc Welding Personnel
QC20	Specification for AWS Certification of Resistance Welding Technicians
QC47	Specification for AWS Certification of Welders and Accreditation of Test Facilities

#### List of AWS Documents on Certification