



# Specification for AWS Certification of Robotic Arc Welding Personnel



**American Welding Society**

---

*second printing, April 2009*



# *Specification for AWS Certification of Robotic Arc Welding Personnel*

**Prepared by:**

The AWS Certification Committee  
Under the Direction of AWS Standards Council

**Approved by:**

The American Welding Society  
Board of Directors

## **Abstract**

This standard defines the certification program for the American Welding Society for use in the Certification of Robotic Arc Welding (CRAW) Operators and Technicians. These certifications require documentation of experience, satisfactory completion of both written and practical examinations. The examination tests the CRAW's knowledge of welding processes, welding procedures, destructive and non-destructive tests, welding terms, definitions, symbols, reports, safety, quality assurance and responsibilities, robot programming and robot arc welding, and other related subjects. Successful completion of all requirements constitutes the basis for awarding a certification as a Robotic Arc Welding Technician or Robotic Arc Welding Operator.

International Standard Book Number: 978-0-87171-753-5  
American Welding Society  
550 N.W. LeJeune Road, Miami, FL 33126  
© 2002 by American Welding Society  
All rights reserved  
Printed in the United States of America  
Second Printing, April 2009

**Photocopy Rights.** No portion of this standard may be reproduced, stored in a retrieval system, or transmitted in any form, including mechanical, photocopying, recording, or otherwise, without the prior written permission of the copyright owner.

Authorization to photocopy items for internal, personal, or educational classroom use only or the internal, personal, or educational classroom use only of specific clients is granted by the American Welding Society provided that the appropriate fee is paid to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, tel: (978) 750-8400; Internet: <[www.copyright.com](http://www.copyright.com)>.

## **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 are developed through a consensus standards development process that brings together volunteers representing varied viewpoints and interests to achieve consensus. While the American Welding Society 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. Further, given the rapid changes in the field, AWS cannot warrant that the certification standard will at all times reflect the most current knowledge.

Certification is achieved by satisfying a combination of defined education, experience, and/or examination requirements. Certification is not an assurance of future competence or ability.

AWS disclaims liability for any injury to persons or to property, or other damages of any nature whatsoever, including special, indirect, consequential or compensatory damages, directly or indirectly resulting from the negligent conduct or other acts or omissions of any individual certified by AWS.

In issuing and making this standard available, AWS is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is AWS undertaking to perform a duty owed by any person or entity to someone else. Employers and other persons utilizing the services individuals certified by AWS are responsible for determining the qualifications, competence, and ability of those individuals.

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, the American Welding Society does not require that any member or other person become certified by AWS or utilize the services of one who is certified by AWS.

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](http://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, Certification Department, American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126. With regard to certification 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 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 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 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 Certification Committee. A copy of these Rules can be obtained from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

## Personnel

### AWS Certification Committee

<i>J. E. Greer, Chairman</i>	Moraine Valley Community College
<i>R. M. Nielsen, 1<sup>st</sup> Vice Chair</i>	Utah State University
<i>S. T. Snyder, 2<sup>nd</sup> Vice Chair</i>	STS Consultation
<i>W. S. Reeve, Secretary</i>	American Welding Society
<i>R. L. Arn</i>	WELDtech International Inc.
<i>E. R. Bohnart</i>	Welding Education and Consulting
<i>M. J. Brace</i>	Miller Electric Mfg. Company
<i>P. Burys</i>	Consultant
<i>N. H. Chapman</i>	Consultant
<i>M. L. Deckard</i>	Parsons Brinckerhoff Transit and Rail
<i>J. D. Hollison</i>	Performance Mechanical, Inc.
<i>J. P. Kane</i>	C O B E Welding
<i>D. A. Lang, Sr.</i>	FM Global Forest Products
<i>S. L. Raymond</i>	International Training Institute
<i>R. K. Wiswesser</i>	Welder Training and Testing Institute
<i>W. A. Rice, Ex Officio</i>	American Welding Society
<i>R. D. Messer, Ex-Officio</i>	Consultant

### Project Team Taskforce

<i>E. R. Bohnart, Chairman</i>	Welding Education and Consulting
<i>J. S. Noruk</i>	Servo Robot Corporation
<i>L. K. Gross</i>	Milwaukee Area Technical College
<i>W. R. Polanin</i>	Illinois Central College
<i>R. F. Noch</i>	Johnson Controls Inc.
<i>V. Mangold, Jr.</i>	ISS
<i>M. P. Vandenberg</i>	Miller Electric
<i>L. Barley</i>	AP Automotive Systems
<i>J. Lisell</i>	Northland Community and Technical College
<i>L. Nielson</i>	ABB

## Foreword

(This Foreword is not a part of AWS QC19:2002, *Specification for the AWS Certification of Robotic Arc Welding Personnel*, but is included for information purposes only.)

This standard was developed by the Certification Committee in response to an industry demand for certification of robotic arc welding operators and technicians.

The AWS Certification Committee was formed in 1975. The Committee is composed of representatives throughout industry and academia who have interests and experience in the certification of robotic arc welding operators and technicians. This is one of several documents produced by the committee covering welding personnel and facilities.

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

Official interpretations of any of the technical requirements of this standard may be obtained by sending a request, in writing, to the Certification Department, American Welding Society. A formal reply will be issued after it has been reviewed by the appropriate personnel following established procedures.

## Errata

The following Errata have been identified and incorporated into the current reprint of this document.

Title changed to “*Specification for AWS Certification of Robotic Arc Welding Personnel*” on front cover and all pages where noted.

Page 2—**Abstract**, first sentence—Changed “Automated Process” to “Robotic Arc Welding (CRAW).”

Page 6—**Foreword**—Changed “automated process” to “robotic arc welding” in two places.

Page 8—**1.1**, first sentence—Changed “automated process” to “robotic arc welding.”

Page 8—**1.6**, first sentence—Changed “CAWRP” to “CRAW.”

Page 10—**CRAW-O** and **CRAW-T**—Changed “Automated Process” to “Robotic Arc Welding.”

Page 11—**5. Function**, first sentence—Changed “automated process” to “robotic arc welding.”

## Table of Contents

	Page No.
<i>Personnel</i> .....	5
<i>Foreword</i> .....	6
1. Scope .....	8
2. Reference Documents .....	8
3. Levels of Certification .....	9
4. Definitions .....	9
5. Functions .....	11
6. Education and Experience Requirements .....	11
7. Examination Requirements .....	12
8. Certification .....	14
9. Revocation .....	15
10. Reinstatement .....	16
11. Upgrading of Certification .....	16
12. Renewal and Recertification .....	16

### Nonmandatory Annexes

- Annex A - Commentary
- Annex B - Certification Questions and Answers
- Annex C - Notes on the Examination
- Annex D - What to Bring to the Examination Site
- Annex E - What Not to Bring to the Examination Site

## Second Printing, April 2009

### ***AWS QC19:2002, Specification for AWS Certification of Robotic Arc Welding Robotic Personnel***

#### **1. Scope**

**1.1** This standard establishes the requirements for AWS certification of robotic arc welding operators and technicians. It describes how personnel are certified, and the principles of conduct and practice by which certification may be maintained. Any oral or written claim of certification under the guidelines established herein shall be made only by those individual Certified Robotic Arc Welding (CRAW - O/T) Operator or Technician who are, at the time of the claim, current and in compliance with all sections of this standard.

**1.2** In the certification process, AWS conducts an examination to determine a person's general knowledge of robotic arc welding operation and related technical areas. No determination is made of an individual's capabilities in applying that knowledge neither 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 other qualifications as stated herein.

**1.4** It shall be the responsibility of the employers to determine that the CRAW Technician or Operator is capable of performing the duties involved in their particular welding environment, and to provide or make available such training or indoctrination as may be required.

**1.5** This standard 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 Safety Precautions.** This document is not intended to address safety and health matters regarding certified CRAW Technician or Operator. Safety and health requirements are provided in ANSI Z49.1, *Safety in Welding and Cutting, and Allied Processes* (available from the American Welding Society) and RIA 15.06, *American National Standard of Industrial Robots and Robot Systems - Safety Systems* and other safety and health standards, and federal, state, and local government regulations. This document only covers the rules of personnel certification.

#### **2. Reference Documents**

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

AWS B1.10, *Guide for Nondestructive Inspection of Welds*

AWS B1.11, *Guide for Visual Welding Inspection*

AWS B5.1, *Qualification Standard for AWS Welding Inspectors*

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

AWS WI, *Welding Inspection*

AWS CM-00, *Certification Manual for Welding Inspectors*

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



AWS D8.8, *Specification for Automotive and Light Truck Weld Quality: Arc Welding*  
AWS D16.2, *Standard for Components of Robotic and Automatic Welding*,  
AWS D16.3, *Risk Assessment Guide for Robotic Arc Welding*  
AWS D16.4, *Specification for the Qualification of Robotic Arc Welding Personnel*  
ANSI Z49.1, *Safety in Welding, Cutting and Allied Processes* (published by the American  
Welding Society)  
NEMA EW-1, *Electric Arc Welding Power Sources*  
AWS Arc Welding with Robots, Do's and Don'ts  
Automating the Welding Process, Jim Berge, Industrial Press  
AWS Welding Handbook, Volume 1, 9<sup>th</sup> Edition  
AWS Welding Handbook Volume 2, 8<sup>th</sup> Edition  
Robot Programming Manual (published by robot manufacturer)  
AWS 058, *Arc Welding Automation*, Howard Cary  
AWS A2.4, *Standard Symbols for Welding Brazing, and Nondestructive Examination*  
Jefferson's Welding Encyclopedia 8<sup>th</sup> Edition (published by the American Welding Society)  
RIA 15.06, *American National Standard of Industrial Robots and Robot Systems - Safety  
Systems<sup>1</sup>*

### 3. Levels of Certification

There are two levels of AWS certification, the first level combines AWS D16.4 qualification levels 2 and 3 and is titled, Certified Robotic Arc Welding Operator (CRAW Operator). The next level is for AWS D16.4 qualification level 4 and is titled Certified Robotic Arc Welding Technician (CRAW Technician).

The qualification level 1 from AWS D16.4 is not addressed in this certification document. If an employer wishes to recognize this level of qualification they can develop their own program but it must not be construed as an AWS certification program.

### 4. Definitions

The welding terms used in this standard are defined in AWS A3.0, *Standard Welding Terms and Definitions*. Other terms used in this standard are defined as follows:

**approved.** To accept as satisfactory.

**acceptance criteria.** Specified limits placed on characteristics of an item or process defined in codes, specifications, or other documents.

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

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

**certificate.** The document issued to the applicant on successful completion of the requirements for certification.

---

<sup>1</sup> Robotics Industrial Association, 900 Victors Way, P.O. Box 3724, Ann Arbor, MI 48106

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

**Certification Department.** The Certification Department of the American Welding Society. code. A standard suitable for adoption by a governmental or other authority.

**Committee.** The Certification Committee of the American Welding Society.

**Continuing Education Unit (CEU).** A unit of credit customarily used for approved and accredited education courses.

**CWI.** AWS Certified Welding Inspector

**CRAW-O.** AWS Certified Robotic Arc Welding Operator

**CRAW-T.** AWS Certified Robotic Arc Welding Technician

**Operator.** In the context of an AWS Certified Arc Welding Robotic Operator is a person capable of dealing with all aspects of an arc welding robot cell. These aspects are as detailed in the D.I6.4 qualifications for a level 2 and 3 person.

**Professional Development Hour (PDH).** A unit of approved professional or education activity used to determine eligibility for re-certification under this program. A PDH means a contact hour of not less than 50 minutes of instruction, presentation, or activity, which meets the requirements of this specification. See Section 12.3.2 for further information.

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

**qualified.** Having complied with specific requirements.

**specification.** A standard suitable for adoption in procurement documents.

**standard.** A generic term incorporating codes, specifications, recommended practices, classifications, methods, and guides that have been prepared by a sponsoring body, and approved and adopted in accordance with established procedures.

**verb usage.** As used in this standard, the word *shall* denotes a requirement, the word *should* denotes a guideline and the word *may* denotes a choice.

## **5. Functions**

The functions and duties of robotic arc welding personnel are defined in AWS D16.4. For purposes of this certification program, the CRAW Technician shall be considered as qualified to administer the performance test as defined in Section 7.2.2.

## **6. Education and Experience Requirements**

The education and experience requirements for certification as a CRAW Operator and Technician are defined in Tables 3 and 4, respectively, of AWS D16.4.

**6.1** Documentation of education to meet the requirements of AWS D16.4, shall include the following criteria:

**6.1.1** For documentation of partial completion or graduation from a state accredited high school, trade or technical school, college, or university; an official transcript shall be forwarded directly to the AWS Certification Department by the issuing school or agency. Photostat copies of diplomas and/or transcripts *shall not* be used to determine eligibility for certification. Official documentation supporting the highest level of education being claimed must be forwarded.

**6.1.2** For documentation of company, AWS Section, or other seminar or short-course submissions; in addition to a certificate of completion, the applicant shall be required to supply copies of course descriptions, outlines, and presenter's name(s) and qualifications.

**6.1.3** Continuing Educational Unit (CEU) certificates supporting educational claims shall be accompanied by course descriptions, outlines, and presenter's name(s) and qualifications. Certified copies of such certificates shall be forwarded directly to the AWS Certification Department by the issuing organization.

**6.2** Experience claims by applicants for all levels of certification and/or re-certification, shall be documented by one or more of the following:

**6.2.1** Completion of the employment verification section of the application for certification.

**6.2.2** Employment from present and former employers indicating applicant's name, social security number (optional), job title(s), length of employment, company name, company address and telephone number, immediate supervisor's name, and the name and title of the person completing the letter. If former employers are not available (such as out of business or none responsive) pay stubs along with a notarized sworn statement of employment and job description will be required.

**6.2.3** Employees of labor unions may provide a letter from their union representative containing the information in 6.2.2 relative to the union organization by which they were employed, accompanied by certified copies of work assignment sheets, books, or records.

6.2.4 Self-employed, or contract applicants shall document required experience by letter(s) from clients attesting to the nature of work assignments during the period of performance required for certification. If a particular client is not available (such as out of business or none responsive) for contact a notarized and sworn affidavit can be substituted.

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

## 7. Examination Requirements

7.1 Applicants for certification as CRAW Operator or Technician shall be required to meet the following written examination requirements:

7.1.1 Applicants for certification as CRAW Operator or Technician shall be required to achieve a pass mark of 75% correct on the written examination and on the performance test. The performance component of the exam involving a robotic system must be passed in a single session. A single session is considered a consecutive period of time such as starting at the end of one shift and completing at the beginning of that applicant's next regularly scheduled shift.

7.2 The certification tests shall consist of both a written and practical demonstration of knowledge and ability.

7.2.1 A closed-book, general knowledge test consisting of a minimum of one hundred and thirty six (136) multiple choice questions on fundamental principles.

The topics to be included and the weighting shall be as follows:

TOPIC	MINIMUM NUMBER	APPROXIMATE PERCENTAGE
Weld Equipment Setup	10	8
Welding Processes	20	15
Weld Examination	10	8
Definitions and Terminology	10	8
Symbols – Welding & Robotics	5	4
Safety	14	12
Destructive Testing	10	8
Conversion and Calculations	5	4
Robot Programming and Logic	25	20
Welding Procedures	10	8
Kinematic Concepts	5	4
Robot Arc Weld Cell Components-ID	5	4
<b>TOTAL</b>	<b>136 questions</b>	<b>100%</b>

7.2.1.1 The test questions shall be taken from, and answerable from, the references listed in Section 2.

7.2.2 A performance test on practical applications and knowledge is required. This test is to consist of a series of tasks, which will include a GMA welding test plate made to a Welding Procedure Specification (WPS). This performance test must be completed and passed three months prior to or after taking the written examination. The topics to be included and the weighting shall be as follows:

<b>TOPIC</b>	<b>APPROXIMATE PERCENTAGE</b>
<b>Identification of components &amp; demonstration of use</b>	
<b>Demonstration of safe use</b>	
Procedure & Welding Process Set-Up	
Cannot lose more than 10 points in above sections	
Robot Programming of Test Piece	20
Welding of test piece	40
Weld Quality Assessment	40
<b>TOTAL</b>	<b>100%</b>

7.2.3 The performance test will be conducted at an appropriate facility, such as a technical college, vocational school, junior college, university, robotic lab (private or public), robot supplier, robot integrator or at one's employer. The performance test must be administered by a CRAW Technician.

7.3 Examination scoring shall be as follows:

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

7.3.2 Applicants who fail to meet the minimum scores may apply for re-examination for the part failed not less than thirty (30) days following notification of test results by AWS.

7.3.3 Applicants may apply to be examined for certification as many times as they may choose; however, no applicant may be examined more than three (3) times per calendar year.

7.3.4 Applicants must complete and pass both written examinations and the performance test within a three (3) month period.

7.4 Applicants for certification as CRAW Technician must be currently certified, at the time of application, as an AWS Certified Welding Inspector (CWI) in accordance with AWS QC1, *Standard for Certification of Welding Inspectors*.

Note: Certification upgrade is not automatic. Applicants for upgrade must complete and submit all necessary documents for consideration. Also, refer to Section 11. Upgrading of Certification.

## 8. Certification

**8.1 Documentation.** The American Welding Society shall issue to each CRAW Operator or Technician applicant who complies with the requirements of Sections 6. and 7., as applicable, a serialized (unique number) certificate, and wallet card stating that the applicant has met the AWS QC19 certification requirements. Certification shall be valid for three years unless revoked for reasons defined in Section 9. Revocation. The certificate shall indicate the date of certification. The wallet card shall indicate the expiration date of certification.

**8.2 Verification.** The American Welding Society shall release certification test results only to the applicant, or to a person or agency designated by the applicant CRAW Operator or Technician upon written request, and with notarized and witnessed release. The exception to this requirement are members of American Welding Society staff and members and officers of the Certification 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. 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 certificate holder.

### 8.3 Use and Display of Documentation

**8.3.1** The certificate may be displayed in the work area or other suitable location at the discretion of the certificate holder and their employer. The certificate may be duplicated for the purpose of providing objective evidence of certification upon request. The certificate may not be altered in any way. Replacement certificates may be requested from AWS. The original, current certificate shall be surrendered upon request to the Certification Committee, or the Executive Director of AWS upon a finding carrying the penalty of revocation against the certificate holder.

**8.3.2** The wallet card shall be carried by the CRAW Operator or Technician when performing those tasks assigned, except when job safety considerations require special attire inappropriate for carrying items not essential for the job function. The CRAW Operator or Technician is required to present this credential upon demand of a judicial representative of the client or customer, or an assigned person charged with validating certification. The card shall not be altered. The original, current card shall be surrendered upon request to the Certification Committee, or the Executive Director of AWS upon a finding carrying the penalty of revocation against the certificate holder.

Note: Any attempt to modify the information contained on any of the documents issued to the CRAW Operator or Technician by AWS shall be considered an attempt to defraud, and punishable by probation, suspension, or revocation.

**8.4 Reciprocity.** The American Welding Society may issue a CRAW Operator or Technician certificate to applicants who have met requirements equivalent to those of Sections 6. and 7., the latter by successfully completing the examination of a reciprocal country, and holding a currently valid certificate. Reciprocity periods are for 3 year terms from the date of validation, or for the certification period remaining within his/her country's certificate, whichever is less. Re-certification for any remaining months or years (maximum of 3 years) of the CRAW Operator or Technician's home country's certification may be accomplished by submitting a "Renewal Application."

Notes:

(1) Except as noted in Section 12, recertification by application is limited to a total of nine years without examination.

(2) Reciprocity certifications shall remain in force until such time as the normal certification period has elapsed, or upon findings by the Committee, and confirmed by the Board of Directors, that the particular program upon which the original reciprocity was based is not being administered in conformance to the submitted specifications. Changes to programs subsequent to granting reciprocity shall be cause for re-evaluation by the AWS D16 or the AWS Certification Committee of issuance of certifications beyond the date of change.

Contact the AWS Certification Department for a listing of current reciprocal agreements.

## **9. Revocation**

**9.1 Committee.** The Committee shall have the power to suspend, refuse renewal, revoke the CRAW Operator or Technician certification for misrepresentation of facts regarding personal qualifications, status, assignments, etc., relating to CRAW Operator or Technician's certifications whether such misrepresentation was made at the time of application or on subsequent applications (renewal, etc.). The Committee may revoke, place on probation, or reprimand a CRAW Operator or Technician, if found guilty of any unauthorized practice. If a proceeding is required it will be conducted in conformance to 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 certificate 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. Upgrading of Certification

The CRAW Operator may remain at that level indefinitely subject only to the renewal/recertification requirements contained herein. Should certification upgrade be desired, certification to CRAW Technician shall comply with the requirements of Sections 6., and 7.4 at the time of upgrade, and the CRAW Operator shall request current upgrade directions from the AWS Certification Department.

## 12. Renewal and Recertification

12.1 The CRAW Operator or Technician shall be responsible for:

- Maintaining certification by submitting either:
  - A "Renewal Application" postmarked by the expiration date\* of the current certification, or
  - A written request for "Renewal Application" postmarked at least one calendar month prior to expiration of the current certification.
- Maintaining a current address with the AWS Certification Department\*\*.

\*Certification becomes effective on the first day of the month following the date of examination, and expires on the first day of that month, 3 years later. An expiration grace period exists until the last day of that month.

\*\*NOTIFICATION OF ADDRESS CHANGES(S) TO ONE DEPARTMENT, e.g., Welding Journal subscription or memberships, does not automatically notify other departments, such as the AWS Certification Department. Notify the Certification Department at AWS directly.

12.2 **Renewal.** The CRAW Operator or Technician shall renew his/her certification every three years by reexamination or, alternatively, meet certain requirements for renewal without examination. However, except as allowed in 12.2.1 and 12.3.1, renewal without examination is limited to two consecutive three-year periods, for a total of nine years. The CRAW Operator or Technician shall, upon expiration of his/her certification, cease to be certified and may not continue to advertise as such.



**12.2.1** The CRAW Operator or Technician requesting renewal of certification shall attest to two years activity, of their three-year certification period, in the practice of welding or related activities. The CRAW Operator or Technician shall complete a current "Renewal Application." One of the two years of activity may be fulfilled by satisfactory documentation of the completion or teaching of a minimum of forty (40) contact hours of training courses whose content must be in the occupational skill of welding, or subjects related to welding, its application, control, materials, and processes, as follows:

- Courses offered by accredited universities, colleges, or technical (including trade) schools.
- Courses offered by the AWS Education Department.
- AWS Education Department courses offered by AWS Sections.
- Home study courses as long as the candidate provides documentation that he or she successfully completed the course and passed an examination.
- Certificates of completion, diplomas, or transcripts must be sent to the AWS Certification Department directly from the issuing institution or organization.
- Trainers must submit documentation showing they performed forty (40) contact hours of training.

**12.3 Recertification.** After nine years from the date of initial certification, and each nine years thereafter, recertification shall be either: (a) by completing the current performance test of the CRAW Operator or Technician examination (current test at the time of application for recertification) or; (b) by documenting two (2) years of continued activity in inspection, welding, design, production, construction, or repair, during the last three years of certification, and by presenting evidence of participation in one or more of the activities listed below totaling 80 contact hours and documented as 8 CEUs, or 80 PDHs in combination:

**12.3.1** Teaching in training courses or programs offered by AWS Education Department, local AWS sections, or an accredited university, college or trade/vocational school meeting the following criteria:

- Minimum of eighty (80) contact hours earned during the nine-year certification period including forty (40) earned in the final three-year period.
- Course content must be one or more of the subject areas defined in Section 6. "Education and Experience Requirements" of this standard.
- Maximum of forty (40) contact hours are allowed for any one course, and no course may be repeated for credit within any three-year period.
- Certificates of completion, diplomas, CEUs, or transcripts must be sent to the AWS Certification Department directly from the issuing institution or organization.
- Trainers who want to substitute training hours for student hours shall submit documentation of the hours of training performed. Credit for a particular course may only be granted once in a three-year period.

### 12.3.2

- Participation in local or national AWS activities as PDHs earned by participating in correspondence or distance learning in one or more of the areas indicated in Section 5. “Education and Experience Requirements”. A minimum of 40 PDHs must be earned in the final three (3) years of certification. Course description and certificate of completion is required to obtain credit.
- PDHs earned by attending professional society (AWS or other) technical seminars and/or training courses in one or more of the areas indicated in Section 5. “Education and Experience Requirements”. A maximum of 10 PDHs may be accepted for re-certification and must be accompanied by a course description and certificate of attendance.
- PDHs earned for preparation and presentation of a technical session at AWS local or national technical seminar. A maximum of 10 PDHs may be accepted for re-certification upon presentation of copies of materials used to support the presentation, and certification of participation from the Society.
- PDHs earned for participation on a standing committee, sub-committee, or task group. A maximum of 20 PDHs may be accepted for re-certification upon presentation of a letter from the Committee Chairman indicating the documents/standards affected, and the number of PDHs requested. Note: Final PDH assignment for this category is at the discretion of the Certification Committee.
- PDHs earned for each published paper, article, or book in a nationally recognized publication. A maximum of 10 PDHs may be awarded for each publication, and 20 PDHs accepted for re-certification upon submission of the published document to the participant, officer, or representative meeting the AWS Certification Department criteria.
- PDHs earned for each patent issued that has an association with the field of welding, inspection, or testing. A maximum of 10 PDHs may be assigned for each patent issued within the last 9 years of certification, upon submission of a Photostat of the patent. A maximum of 20 PDHs may be accepted in this manner for re-certification.

Failure to meet the alternative requirements for experience and continuing education credits shall automatically require re-certification by examination using the current performance test in accordance with Section 7.2.2 of this standard.

**12.4** The CRAW Operator or Technician applying for renewal of certification that has expired or those choosing re-certification by examination will be considered as a new applicant, and should contact the AWS Certification Department for the correct procedure.

## **Annex A - Commentary**

(This annex is not a part of AWS QC19:2002, *Specification for AWS Certification of Robotic Arc Welding Personnel*, but is included to provide assistance to users of the Standard in understanding the intent of certain other sections, descriptions, and rules included herein)

Commentary is meant to elaborate, give historical perspective to, and generally assist in understanding intent. It is not the intention of this section to impose nor accept the requirements of relevant sections of the *Standard*.

Those wishing additional explanation or perspective on requirements contained herein, are encouraged to address their requests to the Chairman of the Certification Committee, American Welding Society, 550 N. W. LeJeune Road, Miami, FL 33126

### **A1.**

The practice of notification of current AWS Certification status has been in place from the earliest days of the Programs. The practice of revealing no more than certification number, date certified, and current status unless formally (in writing) requested by the correspondent (the CRAW Operator or Technician), is intended to protect both the correspondent and the American Welding Society. The certification is issued to the individual, not a company or institution, regardless of whether or not the company or institution paid for the certification. The correspondent may release any information deemed appropriate concerning pass mark, etc. to whom they choose.

### **A2.**

The actions of the AWS Certification Committee as it relates to certification program development and administration, including “alleged violations” of the standard and/or Code of Ethics, are subject to appeal to the AWS Board of Directors.

### **A3.**

The initial action of the Committee in processing alleged violation complaints is to ensure fairness to all parties concerned, protection of individual rights, and those of the Society, as well as protection of the public.

## **Annex B - Certification Questions and Answers**

(This annex is not a part of AWS QC19:2002, *Specification for AWS Certification of Robotic Arc Welding Personnel*, but is included to provide assistance to users of the Standard in understanding the intent of certain other sections, descriptions, and rules included herein)

### **B1. General**

*Why become certified?*

Many welding personnel employed in various welding sectors can measure themselves against standards for their occupation. Unfortunately, they cannot provide documentation. Certification provides this documentation for automatic process operators and technicians.

*Does A WS Certification signify anything else?*

Yes. It signifies that the CRAW Operator or Technician has demonstrated the capability of working with various codes, standards, and specifications. Since proof of active practice or reexamination is required every three years, certification also signifies that the CRAW Operator or Technician is current with the welding industry.

*Has a standard for qualification of the CRAW Operator or Technician been established?*

Yes, the qualification standard for CRAW Operator or Technician has been published by the AWS D16 Committee, the title of the qualification standard is AWS D16.4, *Specification for the Qualification of Robotic Arc Welding Personnel*.

*Who established the certification standards for CRAW Operators and Technicians?*

The AWS Certification Committee has established this certification standard. The AWS D16 Committee on Robotic and Automatic Welding has established the qualification standard. Both documents have been approved by the AWS Board of Directors. The Committees consist of volunteer members representing industry, consultants, education, testing laboratories, and representatives of other technical societies.

*Are the results of the certification examination made public by AWS?*

No. However, if you become certified, you will be registered by the AWS and maintained on the list of Certified CRAW Operators and Technicians. You alone will be notified of your test results. The only information that may be released to anyone, other than you, is your current status, date of certification, and level of certification.

*Does passing or failing the examination have any bearing on the candidate's status as an AWS member?*

No.

*Will I receive a refund if my application does not qualify me to take the examination?*

Yes. AWS will deduct the current processing fee and refund the balance. You will receive your returned application and a written explanation of your rejection. The refund will follow in approximately 30 days.

## **B2. Changes or Cancellations**

*If I am scheduled to take the exam in the city of my choice, can my selection be changed?*

Yes, but only if AWS cancels the exam site, or if you notify the Certification Department before the 4th Monday preceding the exam date. In the event of cancellation, if you have not indicated alternate sites on your application, AWS will deduct the current processing fee and refund the balance.

*If I am scheduled to take the exam and do not show up, will I receive a refund?*

No. You will forfeit all fees as a "no-show". You must contact the Certification Department before the 4th Monday preceding the exam date to cancel or change test sites with no penalty fee. If you change test sites after that date, you will be charged a penalty fee equal to 25% of the cost of certification. If you cancel test sites after that date, you will be charged a 50% penalty fee.

## **B3. Certification Requirements**

*What are the qualification requirements against which I will be certified?*

The principle requirements-experience and successful completion of a multi-part examination-are described with the prerequisite education and visual acuity requirements in Sections 5 and 6 of the standard.

*Can a person become certified under a "Grandfather" arrangement?*

No. Only those who meet the qualification requirements and successfully pass the examinations will be certified.

#### **B4. Common Questions about the Examination**

*When will I know how I did on the examination?*

Within two months of the examination date you will receive an official Exam Score Report. It will give the pass mark and your raw score on each sub-topic. This will permit remedial study in any weak areas. For your privacy, exam scores will not be discussed over the telephone. If you have met all other requirements, you will receive a wall certificate, and wallet card showing your certification level and number.

*Is it possible to take the examination at a time and place different than those of the nationwide examination?*

Yes. AWS maintains a test center in Miami at Society Headquarters for those wishing to take the written examination there. Unfortunately, AWS does not possess the robotic equipment necessary to hold the performance test at Society Headquarters.

*If I retest before my 9 years are up, do I have to take both the written and performance tests?*

No. You are only required to take the performance test and or document activities as described in 12.3.

*If I register to retest after my certification has expired, do I still take only the current practical examination?*

No. You must take the entire examination - all parts, in order to become current again.

*If I fail only one part of the examination do I have to retake the entire examination?*

No. You may take only that part of the testing in which you failed. Please read Section 7.3 for complete information.

*How often are the examinations given?*

The written examinations are given at locations and dates advertised for the AWS CWI program. The performance tests must be arranged separately.

## **Annex C - Notes on the Examination**

(This annex is not a part of AWS QC19:2002, *Specification for AWS Certification of Robotic Arc Welding Personnel*, but is included to provide assistance to users of the Standard in understanding the intent of certain other sections, descriptions, and rules included herein)

Although each test has different purposes, all are practical in that they cover basic knowledge or operating principles of methods, materials, processes, procedures, and equipment that apply to manufacturing of weldments using appropriate robotic arc welding equipment.

Typical questions and answers for each part are shown in the Annex on “sample questions”. The pass marks for the written examination is 75% correct.

## **Annex D - What to Bring to the Examination Site**

(This annex is not a part of AWS QC19:2002, *Specification for AWS Certification of Robotic Arc Welding Personnel*, but is included to provide assistance to users of the Standard in understanding the intent of certain other sections, descriptions, and rules included herein)

Written Examination Site:

- Photo identification, such as driving license.
- A self powered (battery or solar) four-function noiseless calculator.
- Several sharpened #2 pencils and erasers

Performance Examination Site:

- Photo identification, such as driving license.
- Personal tools as maybe required after reviewing the requirements of the performance examination.
- Note pad and writing instrument.

## **Annex E - What Not to Bring to the Examination Site**

(This annex is not a part of AWS QC19:2002, *Specification for AWS Certification of Robotic Arc Welding Personnel*, but is included to provide assistance to users of the Standard in understanding the intent of certain other sections, descriptions, and rules included herein)

- Visitors
- A calculator designed for metric to US standard conversions, or one that makes noise.
- Additional tools or equipment.

