

AWS B5.17:2004
An American National Standard



Specification for the Qualification of Welding Fabricators



American Welding Society



Key Words—Fabricator, qualification, quality control manual, Welding Fabricator

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Specification for the Qualification of Welding Fabricators

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Prepared by
AWS B5G Subcommittee on Fabricators

Under the Direction of
AWS Personnel and Facilities Qualification Committee

Approved by
AWS Board of Directors

Abstract

This specification establishes the minimum requirements necessary to qualify as a Welding Fabricator. The qualification is determined based on an examination of the implementation of the fabricator's quality control manual to verify compliance to the requirements defined in this specification. This document also defines the Welding Fabricator's functions and lists the minimum reference materials that the Welding Fabricator should possess.



American Welding Society

550 N.W. LeJeune Road, Miami, Florida 33126

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Foreword

(This Foreword is not a part of AWS B5.17:2004, *Specification for the Qualification of Welding Fabricators*, but is included for informational purposes only.)

This specification was developed by the AWS Personnel and Facilities Qualification Committee in response to an industry demand for a qualification document for welding fabricators. This specification establishes the qualification requirements from which a central certification agency or an employer may develop a certification program for welding fabricators.

This is the second edition of this specification. Editorial changes were made throughout the document. Significant changes were made to the Quality Document and Procedure Control section (see 6.5). The requirements for the qualification and certification of individuals designated by the Welding Fabricator for welding inspection and nondestructive examination were expanded. The first edition followed the work done by the AWS Task Group on Fabricators that created the document *Welding Quality Assurance Guideline for Fabricators*.

The Qualification and Certification Committee of the American Welding Society was formed in 1973. In 1996, it was divided into two committees. The Personnel and Facilities Qualification Committee 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.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS Personnel and Facilities 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 only be obtained by sending a request, in writing, to the Managing Director, Technical Services Division, American Welding Society (see Annex A). 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 Fabricators

1. Scope

1.1 General. This specification establishes the minimum requirements for the Welding Quality Program for Welding Fabricators (WF). This specification is intended to be used by companies regardless of the welding processes or materials used. This specification does not cover weldment design or non-welding related fabrication processes, such as bolting and coatings.

1.2 Safety Precautions. 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 (MSDS) 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 Terminology Guideline. 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.

2. Referenced Documents

(1) AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination*¹

1. AWS standards are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

(2) AWS A3.0, *Standard Welding Terms and Definitions*¹

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

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

(5) AWS QC1, *Standard for AWS Certification of Welding Inspectors*

(6) *AWS Safety and Health Fact Sheets*

(7) ASNT SNT-TC-1A, *Recommended Practice: Personnel Qualification and Certification in Nondestructive Testing*²

(8) ASNT CP-189, *ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel*

3. Qualification

A facility meeting the requirements of Sections 6 and 7 shall be considered qualified as a Welding Fabricator (WF).

4. Definitions

For more detailed definitions of terms, refer to AWS A3.0, *Standard Welding Terms and Definitions*. Terms used in this specification are defined as follows:

Certified Welding Inspector (CWI). A welding inspector certified by the AWS as meeting the requirements of AWS QC1, *Standard for AWS Certification of Welding Inspectors*.

contract documents. Plans, specifications, and other documents necessary for the design of a product, assembly, or structure.

2. ASNT documents are published by the American Society for Nondestructive Testing, Inc., 1711 Arlingate Lane, Columbus, OH 43228-0518.

nondestructive examination (NDE). The act of determining the suitability of some material or component for its intended purpose using techniques that do not affect its serviceability.

procedure qualification record (PQR). A record of welding variables used to produce an acceptable test weldment and the results of tests conducted on the weldment to qualify a welding procedure specification.

quality assurance (QA). All the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfill requirements for quality.

quality control (QC). Operational techniques and activities that are used to fulfill requirements for quality (e.g., detection and measurement of weld discontinuities or the supervision of individuals so involved; specification of quality control methods, procedures, and acceptance criteria; review of quality control programs of vendors, subcontractors, or other organizations.)

quality control personnel. Individuals responsible for verifying compliance with the fabricator's quality control program.

quality control manual (QCM). Document stating the quality policy and describing the quality system of an organization.

quality record. A report, list or other documentation showing the results of the welding quality control process. It attests to either the achievement or failure to achieve the required quality.

supplier. Organization that provides a product or service to the customer (e.g., vendor, material supplier, NDE test facility).

welding procedure specification (WPS). A document providing the required welding variables for a specific application to assure repeatability by qualified welders and welding operators.

5. Function

The Welding Fabricator shall be responsible for control of contract documents and procedures, material control, welding, inspection, and shipment. The Welding Fabricator shall operate an internal quality control program, in accordance with a quality control manual meeting the requirements of Section 6 of this specification. Although this specification does not require a Welding

Fabricator to control weldment design or final coating, it does not preclude those activities.

6. Quality Control System Requirements

The Welding Fabricator is required to prepare and maintain a quality control manual. This quality control manual is intended to be a comprehensive description of the Fabricator's production and quality control operations, procedures, and documentation methods.

The quality control manual shall be suitable for use as an everyday working document. The quality control manual and any subsequent revision shall be approved by management. The ultimate responsibility for maintaining the quality control manual's accuracy is usually assigned to the QA or QC department.

Copies of the quality control manual shall be formally assigned to each department or work area or both which affects quality to assure a copy is readily available for reference by all personnel. A system shall be used to maintain traceability of these quality control manuals. Since compliance with the quality control manual is essential to the qualification process, the Welding Fabricator shall verify that all personnel are familiar with its contents. To ensure the quality control manual's accuracy, employees should be urged to report possible errors, report production changes as they occur, and make suggestions for improving the quality control manual's readability.

A typical quality control manual will include all of the following sections:

6.1 Cover Page. The cover page of the quality control manual shall contain the company name, physical address(es), publication status, and revision status.

6.2 Quality Personnel Requirements

6.2.1 Personnel directly responsible for quality control inspection of weldments should have defined roles separate from the responsibility for fabrication and delivery.

6.2.2 Personnel responsible for quality control shall have the authority and responsibility to identify problems, recommend and provide solutions, and stop production.

6.2.3 The quality control manual shall include a written policy describing the fabricator's commitment to quality. This program shall also address the following:

(1) Who is directly responsible for the management and implementation of the quality control program.

(2) Who is responsible for the preparation and revision of the quality control manual.

(3) Who is responsible for the inspection of weldments.

(4) How appropriate welding procedures are selected for the specific fabrication work.

(5) To whom the delegation of authority is assigned when persons listed in the quality control program are unavailable.

6.3 Management Support. There shall be a statement included in the quality control manual assuring that responsible quality control personnel have the full support of management. This statement shall designate who is responsible to resolve disputes between quality control personnel and other department heads. This statement shall include language stating the quality assurance and quality control personnel have the authority to identify quality problems, initiate, recommend, or provide solutions, verify implementation of solutions, and limit or control further processing and delivery of nonconforming items until proper disposition has occurred.

6.4 Organization. The quality control manual shall include an organization chart showing the relationship among management functions (e.g., purchasing, quality control, receiving, production, welding, and shipping). If field work is also being performed by a Welding Fabricator, the quality control manual shall describe how quality control functions will be handled in the field.

6.5 Quality Document and Procedure Control

6.5.1 The quality control manual shall describe how documents controlling quality in the fabricating process shall be approved, maintained, and made available for work activities.

6.5.2 The quality control manual shall indicate how the fabrication system assures that applicable drawings, specifications, and instructions are utilized for welding, inspection, and testing and how these documents are controlled by revision. The quality control manual shall state the most current revision of the documents shall be utilized and shall be available to personnel performing the work.

6.6 Quality Records

6.6.1 The quality control manual shall detail the Welding Fabricator's role in maintaining a file of all quality related documents and revisions that they issue. The Welding Fabricator shall be able to retrieve quality related documents. The Welding Fabricator shall specify in the QC manual the record retention duration.

6.6.2 Quality records shall include, but are not limited to:

(1) Welder Performance Qualification Records (WPQRs)

(2) Welding Procedure Specifications (WPSs)

(3) Procedure Qualification Records (PQRs)

(4) Material Test Reports (MTRs) when required

(5) Nondestructive Examination Reports (NDE)

(6) Nondestructive Examination Procedures

(7) Nondestructive Examination Personnel Qualification Records

(8) Weld identification reports (weld mapping) when required

(9) Inspection check off list (Traveler, Inspection Record)

(10) Heat treatment records

(11) Material inspection reports

(12) Nonconformance Reports (NCRs)

6.7 Material Control

6.7.1 The quality control manual shall detail the Welding Fabricator's system of material control and receiving inspection. This system shall ensure that the correct material is ordered and that upon receipt it is properly identified per purchasing documents. When material certifications or material test reports are required, they shall be reviewed to verify that the material meets the requirements established by the order. The material control system shall also ensure that only the correct material is used in the intended application.

6.7.2 The quality control manual shall detail procedures that indicate how materials or parts are identified, and how identity and traceability are maintained by the quality program.

6.8 Welding Procedure Specifications (WPSs). The quality control manual shall define how the Welding Fabricator will control the Weld Procedure documentation and the implementation of, but not limited to the following:

6.8.1 The Welding Fabricator shall have written welding procedure specifications (WPSs). All welding procedure specifications and procedure qualifications shall be reviewed and approved for use by a Certified Welding Inspector (CWI) or fabricator's designee before being used in production welding operations. Welding procedures shall be qualified, approved, and certified in accordance with the applicable governing AWS specification or AWS B2.1, *Specification for Welding Procedure and Performance Qualification*, if there is no governing AWS specification. An alternate specification may be used upon verification that it is technically consistent with AWS B2.1.

6.8.2 The applicable welding procedure specification shall be available to welders or welding operators during testing and production welding.

6.8.3 When the governing specification(s) mandates that welding procedures be qualified by test, the Welding Fabricator shall have procedure qualification records (PQRs) that support the applicable welding procedure specifications (WPSs) except that PQRs are not required for prequalified welding procedure specifications or Standard Welding Procedure Specifications (SWPSs) published by the AWS.

6.9 Filler Materials. The quality control manual shall direct the control of filler materials using the following criteria:

6.9.1 The Welding Fabricator shall purchase and use the filler materials to appropriate AWS filler metal specifications. Other specifications may be used if there are no equivalent AWS specifications. Proprietary filler materials may be used in the absence of any applicable AWS specification.

6.9.2 The applicable filler material shall appear on the WPS. Controls shall be in place to assure that the filler material required by the WPS is used. The quality control manual shall specify how welders obtain filler material and who is responsible to assure that the proper filler material is used.

6.9.3 Storage of all filler materials shall meet the requirements of the manufacturer and applicable code. The quality control manual shall specify how this requirement is met.

6.10 Welder Performance Qualification

6.10.1 The quality control manual shall identify to what specification welders will be qualified and who is responsible for approving the welder performance qualification records.

6.10.2 The quality control manual shall contain requirements that all welder performance qualification records shall be reviewed and approved by the Welding Fabricator's designee.

6.10.3 The quality control manual shall contain provisions requiring all welders and welding operators shall be qualified and certified to the governing specification or AWS B2.1, *Specification for Welding Procedure and Performance Qualification*, if there is no governing specification.

6.10.4 The Welding Fabricator's quality control manual shall detail how welder's and welding operator's process operations are evaluated and documented.

6.10.5 The Welding Fabricator's quality control manual shall specify how welders and welding operators are assigned to specific jobs and assure that qualified welders with current qualifications are used.

6.11 Inspection

6.11.1 The Welding Fabricator's quality control manual shall have a system for welding inspection that includes the following items:

- (1) Frequency of inspections necessary to assure required quality of welds.
- (2) Manner of documenting inspection results.

6.11.2 Welding Inspector (WI). The Welding Fabricator shall designate those who are qualified to inspect weldments to the requirements of the applicable specifications. Inspectors shall be knowledgeable with the specification(s) which applies to the fabrication work performed. It is recommended, but not mandatory, that this individual be an AWS Certified Welding Inspector. If an AWS Certified Welding Inspector is not used, then the weld inspector shall be certified to a company written practice based on ASNT SNT-TC-1A.

6.11.3 NDE Inspectors. Radiographic Interpreters should be certified in accordance with AWS B5.15, Specification for the Qualification of Radiographic Interpreters. The employer may elect to qualify and certify personnel performing radiographic interpretation in accordance with the employer's written practice meeting ASNT SNT-TC-1A. Personnel performing other NDE methods shall be qualified and certified in accordance with the employee's company's written practice based on ASNT SNT-TC-1A.

6.12 Nonconformance

6.12.1 The Welding Fabricator shall have a system in place to identify, control, dispose of, and perform corrective action on materials, items, and processes that do not conform to the requirements of approved procedures, codes, specifications, or contract requirements.

6.12.2 The quality control manual's nonconformance system shall provide a means to identify nonconformities and detail the procedures necessary to bring the item into conformance.

6.13 Measuring and Testing Equipment

6.13.1 The quality control manual shall state what measuring and testing equipment will be used to control fabrication quality and who is responsible for equipment calibration.

6.13.2 Calibration. The overall program of calibration of equipment shall be specified in the quality control manual and designed so as to ensure that measurement made by or for the Welding Fabricator are traceable (where the concept is applicable) to national standards of measurement. Where the concept of traceability to national standards of measurement is not applicable, the Welding Fabricator shall provide satisfactory evidence

of calibration or accuracy of test results. Calibration intervals shall be specified within the quality control manual.

6.13.3 Calibration Tag. A log, label or tag indicating the date of last calibration and due date of next calibration shall be maintained for each piece of equipment. The serial number (identification system) of the equipment shall be included in the log, label or tag. The label or tag should be attached to the equipment.

6.13.4 Records. Records shall be maintained on each item of equipment. The record shall include:

- (1) Type of equipment
- (2) Serial number
- (3) Calibration frequency
- (4) Calibration tolerance
- (5) Date calibrated
- (6) Next calibration due date
- (7) Standard used

6.14 Quality Audits

6.14.1 As a minimum, the Welding Fabricator shall audit the implementation of the quality control program on an annual basis. The quality control manual shall specify:

- (1) who is to perform the audit (the person must have the freedom and authority to identify quality audit problems)

- (2) the qualification requirements of auditors (the auditor must have knowledge in the quality system being audited)

- (3) how the audit is to be documented

- (4) company management shall review the audit results and implement corrective actions.

6.15 Sample Forms

6.15.1 Documents described within the quality control manual shall be displayed as samples (typical forms) within the quality control manual.

7. Library

As a minimum, the following listed publications shall be readily available at the fabricator's facility:

- (1) AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination*
- (2) AWS A3.0, *Standard Welding Terms and Definitions*
- (3) ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*
- (4) The standard governing the qualification of welding procedures and welders
- (5) The standard governing the fabrication of the weldment(s)
- (6) The standard governing the qualification and certification of NDE inspectors.

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Nonmandatory Annex

Annex A

Guidelines for Preparation of Technical Inquiries for AWS Technical Committees

(This Annex is not a part of AWS B5.17:2004, *Specification for the Qualification of Welding Fabricators*, 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 will be handled in a formal manner. Under that policy, all interpretations are made by the committee that is responsible for the standard. Official communication concerning an interpretation is 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 shall be followed, some interpretations may require considerable time.

A2. Procedure

All inquiries shall be directed to:

Managing Director, Technical Services
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 fully understand the point of concern in the inquiry. Where that point is not clearly defined, the inquiry will be returned for clarification. For efficient handling, all inquiries should be typewritten and should also be in the format used here.

A2.1 Scope. Each inquiry shall address one single provision of the standard, unless the point of the inquiry involves two or more interrelated provisions. That provision shall be identified in the scope of the inquiry,

along with the edition of the standard that contains the provisions or that 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 standard requirement, or to request the revision of a particular provision in the standard.

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 standard, the inquiry shall 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 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 chairman 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 will be an official interpretation of the Society, and the secretary will transmit the response to the inquirer and to the *Welding Journal* for publication.

A4. Publication of Interpretations

All official interpretations will appear in the *Welding Journal*.

A5. 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 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. The Headquarters staff cannot provide consulting services. The staff can, however, refer a caller to any of those consultants whose names are on file at AWS Headquarters.

A6. The AWS Technical Committee

The activities of AWS Technical Committees in regard to interpretations, are limited strictly to the Interpretation of provisions of standards prepared by the committee or to consideration of revisions to existing provisions on the basis of new data or technology. Neither the committee nor the staff is in a position to offer interpretive or consulting services on: (1) specific engineering problems, or (2) requirements of standards applied to fabrications outside the scope of the document or 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.

