AWS B5.1:2003
An American National Standard

Specification for the Qualification of Welding Inspectors

American Welding Society

Approved American National Standard
ANSI

Key Words—Qualification, inspection, Visual examination, inspector, Associate Welding Inspector, AWI, Welding Inspector, WI, Senior Welding Inspector, SWI

AWS B5.1:2003
An American National Standard

Approved by
American National Standards Institute
April 29, 2003

Specification for the Qualification of Welding Inspectors

Prepared by
AWS B5 Subcommittee on Welding Inspectors

Under the Direction of
AWS Personnel and Facility Qualification Committee

Approved by
AWS Board of Directors

Abstract

This standard defines the qualification requirements to qualify welding inspectors. The qualification requirements for visual welding inspectors include experience, satisfactory completion of an examination which includes demonstrated capabilities, and proof of visual acuity. The examination tests the inspector's knowledge of welding processes, welding procedures, nondestructive examinations, destructive tests, terms, definitions, symbols, reports, welding metallurgy, related mathematics, safety, quality assurance and responsibilities.

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

Statement on Use of AWS American National Standards

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

International Standard Book Number: 0-87171-588-0

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

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

AWS disclaims liability for any injury to persons or to property, or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this standard. AWS also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

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 any duty owed by any person or entity to someone else. Anyone using these documents should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

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. AWS disclaims liability for the infringement of any patent resulting from the use or reliance on this standard.

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

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

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

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

Photocopy Rights

Personnel

AWS Personnel and Facility Qualification Committee

J. F. Harris, Chair	Ashland Specialty Chemical Company
S. A. Tennant, 1st Vice Chair	Northeast Wisconsin Technical College
P. R. Evans, 2nd Vice Chair	PCI Energy Services
J. L. Gayler, Secretary	American Welding Society
W. F. Behnke	Visteon
K. W. Coryell	Consultant
J. A. Grantham	Welding & Joining Management Group
P. A. Grimm	Modern Welding Company
V. Kuruvilla	Havens Steel Company
R. D. Messer	Consultant
B. W. Phillips	Bureau Veritas North America
R. Poe	Thermal Arc Stoody
J. R. Reid	Sithe Boston
Y. Senechal	Canadian Welding Bureau
R. C. Stevens	Stevens Engineering, LLC
T. W. Wallace	Metro Water District of Southern California

AWS B5A Subcommittee for Welding Inspectors

P. R. Evans, Chair	PCI Energy Services
S. I. Buss	Welder Training & Testing Institute
F. J. Fascenda	Ventura Inspection
S. P. Fugate	Fought & Company, Incorporated
A. S. Gallant	Elite Inspection Services
J. E. Greer	Moraine Valley Community College
P. A. Grimm	Modern Welding Company
V. Kuruvilla	Havens Steel Company
P. A. Michalski	Dominion East Ohio
C. K. Nicholson	Law Engineering & Environmental Services
Dr. D. V. Rypien	Consultant
G. C. Shubert	Pratt & Whitney
P. Smith	FLUOR Corporation
**Z. Turner*	City & County of San Francisco

*Advisor

Foreword

(This Foreword is not a part of AWS B5.1:2003, *Specification for the Qualification of Welding Inspectors*, but is included for informational purposes only.)

The purpose of welding inspection is to determine if a weldment meets the acceptance criteria of a specific code, standard, or other document. The welding inspector must be thoroughly familiar with welding processes, welding procedures, welder qualifications, materials, the limitation of weld testing, be able to read drawings, prepare and keep records, prepare and make reports and make responsible judgments. For welding inspectors to be effective, the activities performed should be consistent with the requirements and technical and ethical principles.

The Qualification and Certification Committee of the American Welding Society was formed in 1973. AWS QC1, *Standard for Certification of AWS Welding Inspectors* was first published in 1975. The first examinations for the certification of AWS Certified Welding Inspector were conducted in the spring and fall of 1976. Over 30,000 individuals have met the requirements of AWS QC1, worldwide, since the start of the program. The last revision to AWS QC1 was published in 1996 and was approved by the American National Standards Institute. In 1996, the AWS Qualification and Certification Committee was divided into two freestanding committees. The Personnel and Facility Qualification Committee is now responsible for creating ANSI 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.

This standard supersedes the part of AWS QC1 that concerns qualification requirements to be met by a welding inspector. For the certification process, refer to AWS QC1 or equivalent. This document establishes the qualification requirements for welding inspectors of all levels. The intent of this subcommittee is to set qualification requirements for welding inspectors that will be equal to those that have been used for the past twenty years by AWS.

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

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

Table of Contents

List of Tables

Specification for the Qualification of Welding Inspectors

1. Scope

1.1 Requirements. This standard establishes the requirements for qualification and defines the body of knowledge for welding inspection personnel.

1.2 Levels. There are three levels of qualification: Associate Welding Inspector (AWI), Welding Inspector (WI), and Senior Welding Inspector (SWI).

1.3 Responsibility. It shall be the responsibility of the employer to determine that the AWI/WI/SWI is capable of performing the duties involved in his/her particular welding inspection assignment.

1.4 Employer. 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.

1.5 Terminology Guideline. As used in this standard, the word ***shall*** denotes a requirement, the word ***should*** denotes a guideline, and the word ***may*** denotes a choice. As used in this specification the word ***welders*** includes welding operators, brazers, and brazing operators.

1.6 Safety Precautions. Safety and health issues and concerns are beyond the scope of this standard, and therefore are not fully addressed herein. Safety and health information is available from other sources, including, but not limited to, ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes* and applicable federal and state regulations.

1.7 Referenced Documents

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

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

1. ANSI Z49.1 and AWS standards are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

2. Terms and Definitions

Terms used in this standard are defined below. All other terms, are defined by AWS A3.0, *Standard Welding Terms and Definitions*.

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

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

candidate. The person attempting to qualify to this standard.

certification. The act of determining, verifying and attesting in writing to the qualification of personnel in accordance with specified 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 in part by a governmental authority as a part of a law or regulation or as specified by other mandatory documents.

Committee. The Personnel and Facility Qualification Committee of the American Welding Society.

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.

qualification. Demonstrate training, skill, knowledge and experience required for personnel to perform the duties of a specific job or function typically demonstrated by passing a performance test.

qualified. In compliance with specific requirements.

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.

QA audit. Systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.

QA surveillance. Continued monitoring and verification of the status of an entity and analysis of records to ensure that specified requirements are being fulfilled.

quality control (QC). Operational techniques and activities that are used to fulfill requirements for quality.

specification. A specification describes the essential technical requirements for material, fabrication, product, system, or service. It indicates the means to determine that all requirements have been met. 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 committee, and approved and adopted in accordance with established procedures.

welder. One who performs manual or semi-automatic welding.

welding operator. One who operates adaptive control, automatic, mechanized, or robotic welding equipment.

3. Levels of Qualification

There are three levels of qualifications for welding inspection personnel. These levels are:

3.1 Associate Welding Inspector (AWI). A person meeting the qualification requirements of 5.1 and Section 6.

3.2 Welding Inspector (WI). A person meeting the qualification requirements of 5.2 and Section 6.

3.3 Senior Welding Inspector (SWI). A person meeting the qualification requirements of 5.3 and Section 6.

4. Functions

4.1 Duties. The employer shall define the welding inspector's specific duties.

4.1.1 AWI. The AWI shall be able to perform inspections, under the active supervision of a SWI or WI. Supervision should be within visible and audible range. The SWI or WI, shall maintain the responsibility for determining if welded assemblies conform to workmanship and acceptance criteria.

4.1.2 WI. The WI shall be able to supervise and train AWIs. The WI shall be able to perform inspections to applicable procedures and processes. The WI shall be able to conduct audits of suppliers and organizations providing materials or services to the project. The WI shall ensure the work performed and associated records, are maintained and conform to the requirements of the applicable standards or other contract documents.

4.1.3 SWI. The SWI shall be able to train, supervise, and evaluate WIs and AWIs. In addition to being able to perform the duties of the WI, the SWI shall be able to develop inspection requirements, safety procedures, quality assurance plans, project plans, and training programs.

4.2 Capabilities. As specified by qualification level, the welding inspector shall be able to perform the tasks listed in Table 1.

5. Education and Experience Requirements

5.1 Associate Welding Inspector. An Associate Welding Inspector (AWI):

5.1.1 Shall be a high school graduate, or hold a state or military approved high school equivalency diploma (e.g., GED).

5.1.2 Shall have a minimum of two years experience in an occupational function with a direct relationship to weldments fabricated to national or international standards and directly involved in one or more of the areas listed under 5.5.

5.1.3 Alternatives to 5.1.1 and 5.1.2, with supporting documentation (e.g., copies of transcripts or letters of reference specifying earned credit hours of training) may be substituted as follows:

5.1.3.1 Eighth grade level of schooling with a minimum of four years work experience in any of the welding functions as defined under 5.5.

5.1.3.2 Less than an eighth grade level of schooling with a minimum of six years experience in any of the welding functions, as defined under 5.5.

5.1.3.3 Eighth grade level of schooling with a minimum of one year of vocational education and training in a welding curriculum and a minimum of three years experience in any of the welding functions, as defined under 5.5.

5.1.3.4 Two years post-high school education in welding curriculum or engineering technology, engineering, or physical sciences, and a minimum of six months experience in any of the welding functions, as defined under 5.5.

Table 1
Welding Inspection Capabilities Based on Qualification Level

Knowledge and Skills	AWI	WI	SWI
(1) prepare reports	X	X	X
(2) communicate effectively orally and written	X	X	X
(3) understand the fundamentals of SMAW, SAW, OFW, RW, GTAW, FCAW, GMAW, PAW, SW, ESW and Thermal Spraying, Soldering, Mechanical Cutting, Thermal Cutting/Gouging, Brazing/ Braze Welding	X	X	X
(4) understand the fundamentals of VT, MT, AET, UT, PT, ET, RT, LT, quality procedures and quality audits/surveillance	X	X	X
(5) understand the fundamentals of welding metallurgy		X	X
(6) understand welding symbols and drawings	X	X	X
(7) interpret drawings		X	X
Standards	**AWI**	**WI**	**SWI**
(1) verify base material compliance	X	X	X
(2) verify filler metal compliance	X	X	X
(3) verify filler metal storage/handling compliance	X	X	X
(4) verify inspection records compliance	X	X	X
(5) verify proper documentation compliance	X	X	X
(6) verify base material and filler metal compatibility		X	X
(7) certify documented results compliance		X	X
(8) verify procedure qualification records compliance		X	X
(9) verify welding procedure compliance		X	X
(10) verify NDE procedures compliance		X	X
Procedure Qualification	**AWI**	**WI**	**SWI**
(1) verify welding equipment appropriateness	X	X	X
(2) verify edge preparation compliance	X	X	X
(3) verify joint geometry compliance	X	X	X
(4) witness procedure qualification		X	X
(5) witness procedure qualification		X	X
(5) verify welding procedure qualification compliance		X	X
(6) review and approve welding procedures		X	X
(7) develop welding procedures			X
Performance Qualification	**AWI**	**WI**	**SWI**
(1) witness welder performance qualification		X	X
(2) verify welder qualification compliance		X	X
(3) verify welder qualification records compliance		X	X
(4) request welder performance requalification		X	X
Production	**AWI**	**WI**	**SWI**
(1) verify welder qualification appropriateness		X	X
(2) verify production welding compliance		X	X
(3) verify personnel qualifications		X	X

(Continued)

Table 1 (Continued)

Inspection	**AWI**	**WI**	**SWI**
(1) perform visual examinations	X	X	X
(2) verify examination procedure compliance		X	X
(3) review examination results compliance		X	X
(4) develop visual inspection procedures (before, during, and after welding	X	X	
(5) provide NDE inspection planning and scheduling (before, during, and after a project)	X	X	
(6) review welding inspection reports		X	X
(7) verify implementation of nondestructive and destructive evaluation methods		X	X
(8) prepare visual inspection requirements			X
(9) prepare NDE requirements			X
(10) report investigation results of quality inspection disputes			X
(11) prepare destructive testing requirements			X
Safety	**AWI**	**WI**	**SWI**
(1) verify safety requirements compliance	X	X	X
(2) develop safety procedures and policies			X
Quality Assurance	**AWI**	**WI**	**SWI**
(1) perform audits and surveillance		X	X
(2) develop quality assurance plans			X
(3) prepare base material control requirements			X
(4) prepare weld consumable control requirements			X
(5) prepare audit and surveillance plans			X
(6) prepare documentation control requirements			X
Project Management	**AWI**	**WI**	**SWI**
(1) review contract requirements		X	X
(2) review vendor proposal compliance		X	X
(3) prepare weld inspection bid specifications			X
(4) prepare purchase specifications			X
(5) determine vendor capacity and capability			X
(6) select vendor			X
Training	**AWI**	**WI**	**SWI**
(1) develop and provide a training program for the AWI		X	X
(2) develop visual inspection training		X	X
(3) verify implementation of visual inspection training		X	X
(4) develop and provide a training program for the WI			X
(5) provide technical leadership for welding inspectors			X
(6) develop quality assurance training program			X
(7) verify implementation of quality assurance training			X
(8) provide guidance and direction to inspectors for maintaining and upgrading their individual qualifications			X
Evaluation	**AWI**	**WI**	**SWI**
(1) evaluate AWIs performance		X	X
(2) evaluate WIs performance			X
(3) perform inspection results trend analysis			X

5.2 Welding Inspector. A Welding Inspector (WI):

5.2.1 Shall be a high school graduate, or hold a state or military approved high school equivalency diploma (e.g., GED).

5.2.2 Shall have a minimum of five (5) years experience in an occupational function that has a direct relationship to welded assemblies fabricated to national or international standards and be directly involved in one or more of the areas listed under 5.5.

5.2.3 Alternatives to 5.2.1 and 5.2.2, with supporting documentation (e.g., copies of transcripts or letters of reference specifying earned credit hours of training) may be substituted as follows:

5.2.3.1 Eighth grade level schooling with a minimum of 9 years work experience in any of the welding functions as defined under 5.5.

5.2.3.2 Less than an eighth grade level schooling with a minimum of 12 years work experience in any of the welding functions as defined under 5.5.

5.2.3.3 A maximum of two (2) years of post-high school education may be substituted for an equal number of years of the required five years experience, provided studies are relevant to any of the functions as defined under 5.5. Credit is given as follows:

(1) **Associate or higher degree.** Two years maximum if the degree is in engineering technology, engineering, or physical sciences.

(2) **Engineering/Technical School Courses.** Two years maximum, and only for successfully completed courses* in a curriculum that can be (or could be) applied to (1) above.

(3) **Trade/Vocational Courses.** One year maximum, and only for successfully completed courses* in a curriculum related to welding that can be (or could be) applied to (1) above.

**Note: "Courses in a curriculum" means courses within a program toward a degree, diploma, or certificate, to be applied to item (1) above. "Successfully completed courses" means a completed quarter or semester with credit in that course. Documentation of the number of actual hours completed is necessary prior to notification of actual credit allowed.*

5.3 Senior Welding Inspector. A Senior Welding Inspector (SWI):

5.3.1 Shall be a high school graduate, or hold a state or military approved high school equivalency diploma (e.g., GED).

5.3.2 Shall have a minimum of fifteen years experience in an occupational function that has a direct relationship to welded assemblies fabricated to national or international standards and shall be directly involved in *two* or more of the areas listed in 5.5.

5.3.3 Shall have been qualified as a WI.

5.3.4 Alternatives to 5.3.1 and 5.3.2 with supporting documentation (e.g., copies of transcripts or letters of reference specifying earned credited hours of training) may be substituted as follows:

5.3.4.1 A maximum of two (2) years of post-high school education may be substituted for an equal number of years of the required fifteen years experience, provided studies are relevant to any of the functions described under 5.5. Credit is given as follows:

(1) **Associate or higher degree.** Two (2) years maximum if the degree is in engineering technology, engineering, or a physical science.

(2) **Engineering/Technical School Courses.** Two (2) years maximum, and only for successfully completed courses* in a curriculum that can be (or could be) applied to (1) above.

(3) **Trade/Vocational Courses.** One (1) year maximum, and only for successfully completed courses* in a curriculum related to welding that can be (or could be) applied to (1) above.

**Note: "Courses in a curriculum" means courses within a program toward a degree, diploma, or certificate, to be applied to item (1) above. "Successfully completed courses" means a completed quarter or semester with credit in that course. Documentation of the number of actual hours completed is necessary prior to notification of actual credit allowed.*

5.4 Documentation. Candidates shall submit verifiable documentation of education and employment.

5.5 Qualifying Experience. Candidates shall submit verifiable documentation of experience in an occupational function with a direct relationship to weldments fabricated to national or international standards and directly involved in:

5.5.1 Experience in the development of plans, drawings, procedures, inspection requirements, acceptance criteria, and specifications for weldments.

5.5.2 Experience in planning, control, supervision, and application of base metals and filler metals in the preparation and completion of production weldments.

5.5.3 Experience in fabrication, construction, and supervision of personnel in erection of welded assemblies or subassemblies.

5.5.4 Experience in the detection and measurement of weld discontinuities by application of visual or other nondestructive evaluation processes to a written procedure.

5.5.5 Experience in supervision of personnel engaged in material and weld examination.

5.5.6 Experience in repair welding, or supervision of personnel performing weld repairs.

5.5.7 Experience in the preparation of written procedures for welding, nondestructive evaluation, or destructive tests.

5.5.8 Experience in the qualification of welders or welding procedures to various codes, standards and specifications.

5.5.9 Experience in welding design functions, as specified in the applicable code, standard or specification.

5.5.10 Experience in operational techniques and activities used to fulfill quality control requirements for weldments.

5.5.11 Experience using a quality system.

5.5.12 Experience in teaching the occupational skill of welding or subjects related to welding; its application, control, materials, and processes.

6. Examination Requirements

The AWI, WI, or SWI shall meet the following examination requirements:

6.1 Visual Requirements. Shall pass an eye examination, with or without corrective lenses, to prove near vision acuity on Jaeger J2 at not less than 12 inches. Shall take a color perception test.

Note: Near vision acuity is considered essential to the proper performance of welding examination. Failure to meet the above level of acuity shall be a failure to meet this standard. Color perception is desirable in some specific applications, but is not considered essential for all examinations. It shall be the employer's responsibility to establish and enforce visual requirements for those AWIs, WIs, and SWIs in his/her employ.

6.2 Written Test Requirements. Shall pass each Part of the applicable AWI, WI, or SWI examination. Individuals failing one Part of the examination shall retest on all Parts.

The examination includes the following Parts:

6.2.1 A test on the requirements of a code, standard or specification.

6.2.2 A test on fundamental principles including, but not limited to: welding processes, nondestructive examination, safety, quality assurance, inspector's duties, weld discontinuities, welding symbols, joint design, mechanical properties of metals, and basic on-the-job mathematics.

6.2.3 A test on practical application of welding inspection knowledge including, but not limited to, welding procedure qualification, welder qualification, mechanical testing, drawing and specification compliance, welding examination, and nondestructive testing processes.

7. Examination Structure

7.1 WI/AWI Examination

Code Applications	Percent of Total Questions[2]
Material and Design	10
Fabrication	30
Inspection	25
Qualification	30

Fundamentals	Percent of Total Questions[2]
Welding Processes	10
Heat Control & Metallurgy (carbon and low-alloy steel)	6
Weld Examination	9
Welding Performance	9
Definitions and Terminology	12
Symbols—Welding and NDE	10
Test Methods—NDE	8
Reports and Records	6
Duties and Responsibilities	4
Safety	5
Destructive Tests	4
Cutting	3
Brazing	2
Soldering	1

Practical Applications	Percent of Total Questions[2]
Procedure and Welder Qualifications	30
Mechanical Test and Properties	10
Welding Inspection and Flaws	36
NDE	10
Utilization of Specification and Drawings	10

2. Percentages indicate the *minimum* required for each category in an examination.

7.2 SWI Examination

Technical Fundamentals	Percent of Total Questions[2]
Welding and Allied Processes	5
Heat Control & Metallurgy (High Alloy Steel and Nonferrous Materials)	10
NDE fundamentals, techniques, and applicability (VT, PT, MT, RT, UT)	10
NDE applicability (ET, AET, LT)	1
Destructive Testing fundamentals, techniques, and applicability Including groove welds, fillet welds, stud welds, and weldability testing	5
Administrative Fundamentals	
Welding Procedure Qualification and Approval	10
Welding Personnel Qualification and Certification	10
Welding Inspection and NDE Personnel Qualification and Certification	10
Quality Assurance/Quality Management, including: Quality Programs Document Control Procurement and Supplier Control Calibration Quality Control Process Control Statistical Quality Control Trend Analysis Nonconformance Control Auditing and Surveillance Corrective Action Records	10
Safety Programs and Procedures	5
Project Management	5
Personnel Management and Training Programs	5
Performance Evaluation	

2. Percentages indicate the *minimum* required for each category in an examination.

8. Maintenance of Qualification

The WI/SWI shall demonstrate his/her continuing ability to perform the functions in Section 4. Maintenance of qualification shall be no more than three years.

Nonmandatory Annexes

Annex A
Reference Documents

(This Annex is not a part of AWS B5.1:2003, *Specification for the Qualification of Welding Inspectors,* but is included for informational purposes only.)

The examination questions may be taken from the following reference information. The reference documents are not limited to the following.

Number	Title	Applicability
ANSI Z49.1	*Safety in Welding, Cutting, and Allied Products*	AWI, WI, SWI
AWS A1.1	*Metric Practice Guide for the Welding Industry*	AWI, WI, SWI
AWS A2.4	*Standard Symbols for Welding, Brazing, and Nondestructive Examination*	AWI, WI, SWI
AWS A3.0	*Standard Welding Terms and Definitions*	AWI, WI, SWI
AWS B1.10	*Guide for the Nondestructive Examination of Welds*	AWI, WI, SWI
AWS B1.11	*Guide for the Visual Inspection of Welds*	AWI, WI, SWI
AWS B2.1	*Specification for Welding Procedure and Performance Qualification*	AWI, WI, SWI
AWS B4.0	*Standard Methods for Mechanical Testing of Welds*	AWI, WI, SWI
AWS B5.1	*Specification for the Qualification of Welding Inspectors*	AWI, WI, SWI
AWS QC1	*Standard for AWS Certification of Welding Inspectors*	AWI, WI, SWI
AWS	*Certification Manual for Welding Inspection*	AWI, WI, SWI
AWS	*Welding Inspection Handbook*	AWI, WI, SWI
AWS	*Welding Handbook, Vol. 1: Welding Science & Technology*	AWI, WI, SWI
AWS	*Welding Handbook, Vol. 2: Welding Processes*	AWI, WI, SWI
AWS	*Welding Handbook, Vol. 3: Materials and Applications Part I*	AWI, WI, SWI
AWS	*Welding Handbook, Vol. 4: Materials and Applications Part II*	AWI, WI, SWI
ISO 9001	*Quality Management Systems—Requirements*	SWI
ASNT SNT-TC-1A	*Recommended Practice: Personnel Qualification and Certification in Nondestructive Testing*	WI, SWI

Annex B

Guidelines for Preparation of Technical Inquiries for AWS Technical Committees

(This Annex is not a part of AWS B5.1:2003, *Specification for the Qualification of Welding Inspectors,* but is included for informational purposes only.)

B1. 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 must be followed, some interpretations may require considerable time.

B2. Procedure

All inquiries must be directed to:

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

All inquiries must contain the name, address, and affiliation of the inquirer, and they must 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.

B2.1 Scope. Each inquiry must address one single provision of the standard, unless the point of the inquiry involves two or more interrelated provisions. That provision must 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.

B2.2 Purpose of the Inquiry. The purpose of the inquiry must 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.

B2.3 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 must be cited. If the point of the inquiry is to obtain a revision of the standard, the inquiry must provide technical justification for that revision.

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

B3. Interpretation of Provisions of the Standard

Interpretations of provisions of the standard are made by the relevant AWS Technical Committee. The secretary of the committee refers all inquiries to the 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.

B4. Publication of Interpretations

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

B5. Telephone Inquiries

Telephone inquiries to AWS Headquarters concerning AWS standards should be limited to questions of a general nature or to matters directly related to the use of the standard. The 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.

B6. 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.