

AWS B5.5:2011
An American National Standard



Specification for the Qualification of Welding Educators



American Welding Society®



**AWS B5.5:2011
An American National Standard**

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American National Standards Institute
September 13, 2011**

Specification for the Qualification of Welding Educators

2nd Edition

Supersedes AWS B5.5:2000

Prepared by the
American Welding Society (AWS) Personnel and Facilities Qualification Committee

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This specification defines the requirements and program to qualify Welding Educators. The qualification of a Welding Educator is determined by a combination of education and experience, satisfactory demonstration of welding performance qualification tests, and written and practical examinations. The written examination demonstrates the educators' knowledge of welding process, weld discontinuities, destructive and nondestructive test methods, safety, welding metallurgy, weld symbols, basic arithmetic, codes, and other standards.



American Welding Society®

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Foreword

This foreword is not part of AWS B5.5:2011, *Specification for the Qualification of Welding Educators*, but is included for informational purposes only.

This is the second edition of AWS B5.5; the first edition was published in 2000. This edition makes several wholesale changes to the previous edition's requirements. The changes are widespread enough that clear markup of the changes is difficult. One change, of note, is that the previous welding performance qualification requirements for educators have been reduced slightly.

The purpose of this standard is to set qualification requirements for welding educators. Individuals seeking qualification are required to demonstrate that they have adequate skills, knowledge, and experience in the field of welding education. The AWS certification process for welding educators is covered by AWS QC5.

The Qualification and Certification Committee of the American Welding Society was formed in 1973. AWS QC5, AWS Standard for Certification of Welding Educators, was published in 1991. In 1996, the Qualification and Certification Committees were separated into two separate entities; the B5 Committee on Qualification was formed as a Technical Committee and under the direction of the Technical Activities Committee (TAC), and the Certification Committee remained as a Standing Committee. In 2002, the B5 Committee became the Personnel and Facilities Qualification Committee (PFQC) reporting to the AWS Standards Council. The PFQC creates qualification standards from which a central certification agency or employer may base a certification program upon.

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.

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Specification for the Qualification of Welding Educators

1. Scope

1.1 This specification establishes the attributes required for determining the qualification of welding educators.

1.2 In the qualification process, a welding educator shall be capable of performing welding skills and demonstrate their knowledge of welding processes and fabrication principles. The welding educator shall furnish documentation showing that they meet the requirements of their training facility with regard to education and instructional methods. The documentation may be in the form of educational transcripts, certificates, or written recommendation from a senior educational institution administrator attesting that the welding educator meets the educational requirements of that facility.

1.3 It shall be the responsibility of the employer to determine that a person is capable of performing the duties involved in their welding educator assignment.

1.4 This specification is intended to supplement the requirements of an employer, or of local, state, or national regulations; it shall not be construed as a preemption of the employer's responsibility for the work or the performance of the work. Hence, it is the responsibility of the employer to determine the welding educator's qualifications, other than those stated in 1.2 above, and confirm the capability of the welding educator to perform the duties required by the organization for the job function assigned to the welding educator. Furthermore, this standard is not intended to supersede, replace, or contradict the local, state, or national regulations governing the licensing of teachers or instructors and the exemptions, if any, permitted by such regulations with regard to teaching or instructing welding without a license.

1.5 This specification does not require units of measure. Therefore, no equivalents or conversions are contained herein.

1.6 Safety and Health issues are beyond the scope of this specification 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 (also see note in 5.1).

1.7 Terminology. 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.

2. Normative References

The following standards contain provisions which, through reference in this text, constitute mandatory provisions of this AWS standard. For undated references, the latest edition of the reference shall apply. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply.

AWS Documents:¹

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

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

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

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

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

AWS B1.11, *Guide for Visual Examination of Welds*

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

AWS B4.0, *Standard Methods for Mechanical Testing of Welds*

AWS B5.1, *Specification for the Qualification of Welding Inspectors*

AWS CM, *Certification Manual for Welding Inspectors*

AWS D1.1, *Structural Welding Code—Steel*

AWS EG2.0, *Guide for the Training and Qualification of Welding Personnel: Entry Level Welders*

AWS EG3.0, *Guide for the Training and Qualification of Welding Personnel: Level II—Advanced Welders*

AWS EG4.0, *Guide for the Training and Qualification of Welding Personnel: Level III—Expert Welders*

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

AWS QC7, *Standard for AWS Certified Welders*

AWS QC10, *Specification for Qualification and Registration of Level I—Entry Welders*

AWS QC11, *Specification for Qualification and Registration of Level II—Advanced Welders*

AWS QC12, *Specification for Qualification and Registration of Level III—Expert Welders*

AWS WHB-1.9, *Welding Handbook, Volume 1, Welding Science and Technology*

AWS WHB-2.9, *Welding Handbook, Volume 2, Welding Processes, Part 1*

AWS WIT-T, *Welding Inspection Technology*

NFPA Documents:²

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*

3. Terms and Definitions

All terms used herein are defined by AWS A3.0, *Standard Welding Terms and Definitions*. Exceptions and additions, within the context of this standard, are listed below with their definitions.

acceptance criteria. The specified limits placed on characteristics of an item or process defined in codes or other standards.

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

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*.

fabrication. The act of constructing or manufacturing to a standard.

inspection. The act of examining or measuring to verify whether an item or activity conforms to a standard.

qualification. Process of demonstrating whether an entity is capable of fulfilling specified requirements.

qualified. Status given to an entity when the capability of fulfilling specified requirement has been demonstrated.

training facility. An organization that trains people for employment in the field of welding. This includes organizations open to the public or in-house training organizations who train their own employees.

² NFPA standards are published by the National Fire Protection Agency, 1 Batterymarch Park, Quincy, MA 02196.

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

welding. As used in this specification welding shall be construed to include brazing.

welding educator. An education specialist whose duties are to educate others in the theories and practical methods of welding. Note: Wherever the term “welding educator” is used throughout this document it includes those individuals whose title is “welder trainer,” “welding instructor,” and “welding teacher.”

4. Qualification Levels

There are three levels of welding educators. These levels are defined as follows:

4.1 Welding Educator (WE). A person meeting the qualification requirements of 6.1, Clause 7, and 8.1.

4.2 Senior Welding Educator (SWE). A person meeting the qualification requirements of 6.2, Clause 7, and 8.2.

4.3 Expert Welding Educator (EWE). A person meeting the qualification requirements of 6.3, Clause 7, and 8.3.

5. Duties and Capabilities

5.1 Duties. The welding educator should have the ability to direct and perform operations associated with welder training and classroom instruction. Each employer is responsible for defining the specific duties of a welding educator in the respective place of employment. The welding educator shall be able to demonstrate the capability of performing the duties defined in this specification.

NOTE: It is strongly recommended that the welding educator teach and practice welding safety in accordance with ANSI Z49.1, Safety in Welding, Cutting, and Allied Processes, and Occupational Safety and Health Administrative Rules, as published in the Code of Federal Regulations (CFR), NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, and other approved safety practices.

5.2 Capabilities. The functions and required skills and knowledge of a welding educator include, but are not limited to the following:

(1) **Welding Codes, Drawings, and Specifications.** The welding educator shall be capable of reading and explaining typical welding codes, drawings, and specifications. This requires knowledge of welding symbols and of welding definitions and terminology.

(2) **Base Material and Welding Materials.** The welding educator shall be capable of instructing students on base materials and their weldability characteristics and on welding filler metal types and characteristics.

(3) **Welding and Metal Cutting, Grinding, and Beveling Equipment.** The welding educator shall be capable of conducting instruction on the characteristics and operation of typical welding power sources and related metal cutting, grinding or beveling equipment; providing basic safety instruction on the use of that equipment; teaching basic troubleshooting of that equipment, and demonstrating the proper use of that equipment.

(4) **Welding Skills.** The welding educator shall be capable of demonstrating competent welding skills per the AWS QC7 standard, or equivalent. The welding educator shall be able to demonstrate the welding processes defined in Clause 8, “Performance Requirements.”

(5) **Review of Welding Instructional Plan.** The welding educator shall be able to review written welding instructional materials to determine that they comply with a specified code or other standard. The welding educator shall be able to write welding instructional or lesson plans and shall be able to perform test methods required to evaluate welding students.

(6) **Evaluation of Welder Training.** The welding educator shall be able to evaluate the educational experience of his or her welding students and verify that their educational experience meets desired outcomes.

(7) **Inspection.** The welding educator shall be capable of performing appropriate destructive and nondestructive examinations of in-process and completed weldments to confirm that they comply with specified acceptance criteria.

(8) **Reports.** The welding educator shall be capable of preparing written reports of weld inspections and welding performance evaluations.

(9) **Safe Practices.** The welding educator shall be familiar with the content of AWS Z49.1, including but not limited to welding safety issues related to eyes and face, noise, respiratory protective equipment, ventilation, fire protection, confined spaces, and pressurized gasses. The welding educator shall be familiar with the content of the AWS Safety and Health Fact Sheets.

6. Education and Experience Requirements

6.1 Welding Educator (WE). In order to qualify as a Welding Educator, each of the following requirements shall be met. A Welding Educator:

6.1.1 Shall be a high school graduate, or hold a state or military approved high school equivalency diploma.

6.1.2 Shall have no less than 3 years work experience in an environment where welding is performed in accordance with written welding procedures or a welding code or other standard;

OR

No less than 2 years work experience in an environment where welding is performed in accordance with written welding procedures or a welding code or other standard AND a post-secondary Certificate (or higher) in welding, welding technology, or a related area (any Technology, Engineering Technology or Engineering discipline, Metallurgy, or Material Science);

OR

No less than 1 year work experience in an environment where welding is performed in accordance with written welding procedures or a welding code or other standard AND an Associate's degree (or higher) in Welding Technology, Welding Engineering, Metallurgy, or other closely related area (any Technology, Engineering Technology, Material Science, or any Engineering discipline) or completion of a formal welder apprentice program.

6.1.3 Shall have work experience in an occupational function directly involved with one or more of the following:

(1) **Design.** Preparation of plans and drawings for weldments.

(2) **Production.** Planning and control of welding materials, welding procedures, or welding operations for weldments.

(3) **Construction.** Fabrication, construction, or erection of weldments.

(4) **Examination.** Detection and measurement of weld discontinuities or verification of quality of fabricated weldments.

(5) **Training or Education.** Classroom or laboratory instruction in welding.

6.2 Senior Welding Educator (SWE). In order to qualify as a Senior Welding Educator, each of the following requirements shall be met. A Senior Welding Educator:

6.2.1 Shall have an Associate's degree (or higher) in Welding Technology, Welding Engineering, Metallurgy, or other closely related area (any Technology, Engineering Technology, Material Science, or any Engineering discipline);

OR

Shall have no less than 10 years experience as a welding educator or trainer who has conducted both welding theory classes and hands-on welding instruction or training.

6.2.2 Shall have no less than 5 years experience as a welding educator or trainer who has conducted both welding theory classes and hands-on welding instruction, AND shall have no less than 3 years work experience in an environment where welding is performed in accordance with written welding procedures and a welding code or other standard.

Verification of teaching employment shall be written documentation from the employer and shall demonstrate compliance with state or employer requirements.

6.2.3 Shall have work experience in an occupational function directly involved with one or more of the following:

- (1) **Design.** Preparation of plans and drawings for weldments.
- (2) **Production.** Planning and control of welding materials, welding procedures, or welding operations for weldments.
- (3) **Construction.** Fabrication, construction, or erection of weldments.
- (4) **Examination.** Detection and measurement of weld discontinuities or verification of the quality of fabricated weldments.
- (5) **Training or Education.** Classroom or laboratory instruction in welding.

6.2.4 Shall provide written verification of teaching employment from his or her employer and shall demonstrate compliance with state or employer requirements.

6.3 Expert Welding Educator (EWE). In order to qualify as an Expert Level Welding Educator, each of the following requirements shall be met. An Expert Welding Educator:

6.3.1 Shall have an Associate's degree (or higher) in Welding Technology, Welding Engineering, Metallurgy, or other closely related area (any Technology, Engineering Technology, Material Science, or any Engineering discipline);

OR

Shall have no less than 15 years experience as a welding educator or trainer who has conducted both welding theory classes and hands-on welding instruction or training.

6.3.2 Shall have no less than 10 years experience as a welding educator or trainer who has conducted both welding theory classes and hands-on welding instruction AND shall have no less than 3 years work experience in an environment where welding is performed in accordance with written welding procedures or a welding code or other standard.

6.3.3 Shall have work experience in an occupational function directly involved with one or more of the following:

- (1) **Design.** Preparation of plans and drawings for weldments.
- (2) **Production.** Planning and control of welding materials, welding procedures, or welding operations for weldments.
- (3) **Construction.** Fabrication, construction, or erection of weldments.
- (4) **Examination.** Detection and measurement of weld discontinuities or verification of the quality of fabricated weldments.
- (5) **Training or Education.** Classroom or laboratory instruction in welding.

6.3.4 Shall provide written verification of employment as a welding educator or trainer from his or her employer and shall demonstrate compliance with state or employer requirements.

7. Examination Requirements

7.1 Welding Fundamentals Written Examination. The WE, SWE, and EWE shall demonstrate knowledge of the fundamental welding principles including, but not limited to: welding processes, weld discontinuities and defects, destructive and nondestructive test methods, safety, basic welding metallurgy, welding symbols, weld fit-up, welding and cutting equipment, welding consumables, and basic arithmetic. The WE, SWE, and EWE shall demonstrate knowledge by passing a written examination with a score of no less than 72 percent on the fundamental welding principles listed above or by holding current status as an AWS CWI or SCWI.

7.2 Welding Inspection Practical Examination. The WE, SWE, and EWE shall demonstrate practical welding inspection skills by passing an inspection skills test with a score of no less than 72 percent or by holding current status as an AWS CWI or SCWI.

7.3 Welding Code Practical Examination. The WE, SWE, and EWE shall demonstrate knowledge of a code or other standard by passing a practical examination with a score of no less than 72 percent or by holding current status as an AWS CWI or SCWI.

8. Performance Requirements

8.1 Welding Educator. The WE shall have documented welding proficiency, no more than five (5) years prior to the initial qualification as a WE, in two (2) of the processes being taught.

8.2 Senior Welding Educator. The SWE shall have documented welding proficiency, no more than five (5) years prior to the initial qualification as a WE or SWE, in:

8.2.1 Two (2) of the processes being taught

AND

8.2.2 Two (2) of the four (4) following or more difficult performance tests:

- (1) **SMAW All-Position Plate:** AWS or equivalent welding procedure
- (2) **GMAW All-Position Plate:** AWS or equivalent welding procedure
- (3) **FCAW All-Position Plate:** AWS or equivalent welding procedure
- (4) **GTAW All-Position Plate:** AWS or equivalent welding procedure

8.3 Expert Welding Educator. The EWE shall demonstrate proficiency in the following welding processes by passing all of the following (or more difficult) welding performance tests, all of which must have been passed no more than ten (10) years prior to initial qualification as a EWE:

(1) **SMAW All-Position Pipe:** AWS or equivalent open root welding procedure (8 in or smaller pipe, no backing or back welding).

(2) **GMAW All-Position Pipe:** AWS or equivalent open root welding procedure (8 in or smaller pipe, no backing or back welding).

(3) **FCAW All-Position Pipe:** AWS or equivalent open root welding procedure (8 in or smaller pipe, no backing or back welding, root deposited by the EWE using SMAW or GTAW or GMAW).

(4) **GTAW All-Position Pipe:** AWS or equivalent open root welding procedure (6 in or smaller pipe, no backing or back welding).

8.4 Testing. The WE, SWE, and EWE applicants shall perform the required welder performance qualification tests at an AWS Accredited Test Facility (ATF), OR an organization that tests people for employment in the field of welding including organizations open to the public and organizations who train and test their own employees. The required welding performance test shall be welded in accordance with a written welding procedure specification (WPS) and shall be evaluated by a current Certified Welding Inspector (CWI or SCWI). Performance qualification tests (for WE, SWE, and EWE purposes only) shall be tested and evaluated in accordance with AWS B2.1, *Specification for Welding Procedure and Performance Qualification*, or any equivalent national standard, military specification, or company specification.

8.5 Supervision of Testing. All WE, SWE, and EWE welding performance tests shall be witnessed, inspected, and signed by a current CWI or SCWI.

9. Body of Knowledge

9.1 Examination Basis Documents. The examination questions shall be taken from and shall be answerable from the body of knowledge in Table 1.

9.2 Performance Basis Documents. In performance of the welding educators' duties the welding educator shall have knowledge of the documents in Table 2.

10. Maintenance of Qualification

The qualification of a WE, SWE, or EWE shall remain valid unless there is reason to question the ability of the welding educator to competently teach or demonstrate the processes he or she teaches.

Table 1
Examination Basis Documents

Number	Title	Applicability
ANSI Z49.1	Safety in Welding, Cutting, and Allied Processes	WE, SWE, EWE
AWS A2.4	Standard Symbols for Welding, Brazing, and Nondestructive Examination	WE, SWE, EWE
AWS A3.0	Standard Welding Terms and Definitions	WE, SWE, EWE
AWS B1.10	Guide for Nondestructive Inspection of Welds	WE, SWE, EWE
AWS B1.11	Guide for the Visual Inspection of Welds	WE, SWE, EWE
AWS B2.1	Specification for Welding Procedure and Performance Qualification	WE, SWE, EWE
AWS B4.0	Standard Methods for Mechanical Testing of Welds	WE, SWE, EWE
AWS B5.1	Specification for the Qualification of Welding Inspectors	WE, SWE, EWE
AWS CM-94	Certification Manual for Welding Inspectors	WE, SWE, EWE
AWS EG2.0	Guide for the Training and Qualification of Welding Personnel—Entry Level Welders	WE, SWE, EWE
AWS EG3.0	Guide for the Training and Qualification of Welding Personnel—Advanced Level Welders	WE, SWE, EWE
AWS EG4.0	Guide for the Training and Qualification of Welding Personnel—Expert Level Welders	WE, SWE, EWE
AWS QC1	Standard for AWS Certification of Welding Inspectors	WE, SWE, EWE
AWS QC10	Specification for Qualification and Certification of Entry Level Welders	WE, SWE, EWE
AWS QC11	Specification for Qualification and Certification of Level II Advanced Welders	WE, SWE, EWE
AWS QC12	Specification for Qualification and Certification of Level III Expert Welder	WE, SWE, EWE
AWS WHB-1.9	Welding Handbook, Volume 1 Welding Science and Technology	WE, SWE, EWE
AWS WHB-2.9	Welding Handbook, Volume 2 Welding Processes, Part 1	WE, SWE, EWE
AWS WIT-T	Welding Inspection Technology	WE, SWE, EWE
NFPA 51B	Standard for Fire Prevention During Welding, Cutting, and Other Hot Work	WE, SWE, EWE

Table 2
Performance Basis Documents

Number	Title	Applicability
AWS B5.5	Specification for the Qualification of Welding Educators	WE, SWE, EWE
AWS D1.1	Structural Welding Code Steel	WE, SWE, EWE
AWS EG2.0	Guide for the Training and Qualification of Welding Personnel—Entry Level Welders	WE, SWE, EWE
AWS EG3.0	Guide for the Training and Qualification of Welding Personnel—Advanced Level Welders	WE, SWE, EWE
AWS EG4.0	Guide for the Training and Qualification of Welding Personnel—Expert Level Welders	WE, SWE, EWE

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Annex A (Informative)

Guidelines for the Preparation of Technical Inquiries

This annex is not part of AWS B5.5:2011, *Specification for the Qualification of Welding Educators*, but is included for information purposes only.

A1. Introduction

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

A2. Procedure

All inquiries shall be directed to:

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

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

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. The provision(s) shall be identified in the scope of the inquiry along with the edition of the standard that contains the provision(s) the inquirer is addressing.

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

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

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 provide the wording for a proposed revision, if this is what the 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 chair of the particular subcommittee that has jurisdiction over the portion of the standard addressed by the inquiry. The subcommittee reviews the inquiry and the proposed reply to determine what the response to the inquiry should be. Following the subcommittee's development of the response, the inquiry and the response are presented to the entire committee for review and approval. Upon approval by the committee, the interpretation is an official interpretation of the Society, and the secretary transmits the response to the inquirer and to the *Welding Journal* for publication.

A4. Publication of Interpretations

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

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 *AWS Board Policy Manual* requires that all AWS staff members respond to a telephone request for an official interpretation of any AWS standard with the information that such an interpretation can be obtained only through a written request. Headquarters staff cannot provide consulting services. However, the staff can refer a caller to any of those consultants whose names are on file at AWS Headquarters.

A6. AWS Technical Committees

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

