AWS B5.5:2000
An American National Standard

Specification for the Qualification of Welding Educators

American Welding Society

ANSI

Key Words—Qualification, Welding Educator, educator, requirements SWE, WE, AWE

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Approved by
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Specification for the Qualification of Welding Educators

Prepared by
AWS B5 Committee on Qualification

Under the Direction of
AWS Technical Activities Committee

Approved by
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 educator's knowledge of welding processes, weld discontinuities, destructive and nondestructive test methods, safety, welding metallurgy, weld symbols, basic arithmetic, codes, and other standards.

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

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Dedication

This standard is respectfully dedicated to the memory of Wally Urbick who served on the Qualification and Certification Committee from 1976 to 1995 and on the B5 Committee on Qualification from 1995 to 1998 as well as many other AWS committees covering the certification, qualification, and education of welding personnel.

Foreword

(This Foreword is not a part of AWS B5.5:2000, *Specification for the Qualification of Welding Educators*, but is included for information purposes only).

The Qualification and Certification Committee of the American Welding Society was formed in 1973. AWS QC5, AWS *Standard for Certification of Welding Educators*, was first 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. The B5 Committee on Qualification creates qualification standards from which a central certification agency or employer may base a certification program upon. This standard supersedes that part of AWS QC5 that concerns qualification requirements to be met by a welding educator. The AWS certification process is covered in AWS QC5.

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.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS B5 Committee on Qualification, 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 (see Annex B). 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 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 demonstrating skills and knowledge of welding processes and fabrication principles. The welding educator must provide evidence of their teaching skills.

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 for 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 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.

2. Normative References

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

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

AWS QC1, *Standard for AWS Certification of Welding Inspectors*[1]

AWS QC7, *Standard for AWS Certified Welders*[1]

AWS B2.1, *Standard for Welding Procedure and Performance Qualification (including B2.1 Welding Procedure Specifications, as applicable)*[1]

3. Qualification Levels

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

3.1 Senior Welding Educator (SWE). A person meeting the qualification requirements of 6.1 and Section7.

3.2 Welding Educator (WE). A person meeting the qualification requirements of 6.2 and Section 7.

3.3 Associate Welding Educator (AWE) A person meeting the qualification requirements of 6.3 and Section 7.

4. Definitions

All terms used herein are defined by AWS A3.0, *Standard Welding Terms and Definitions.* Exceptions, 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.

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

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

1. Available from American Welding Society, Inc., 550 N.W. LeJeune Road, Miami, FL 33126

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

Certification Committee. Certification Committee of the American Welding Society.

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.

professionalism. The practice of conducting oneself in an appropriate manner.

Qualification Committee. The Committee on Qualification of the American Welding Society.

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 institution. 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 only their own employees.

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."*

weldment. An assembly whose component parts are joined by welding.

5. Function, Skills, and Knowledge

The welding educator has the responsibility 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 tasks defined in this specification.

Note: It is strongly recommended that the welding educator instruct 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), and other approved safety practices.*

The functions and required skills and knowledge of a welding educator include, but are not limited to:

5.1 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.

5.2 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.

5.3 Welding Equipment. The welding educator shall be capable of conducting instruction on the characteristics and operation of various power sources and related equipment, provides basic safety instruction on the use of the equipment, troubleshoots, and demonstrates the proper use of equipment.

5.4 Welding Skills. The welding educator shall be capable of demonstrating competency of welding skills per the AWS QC7 standard, or equivalent. The welding educator shall demonstrate the welding processes defined in Section 7, "Knowledge and Performance Requirements."

5.5 Review of Welding Instructional Plan. The welding educator shall demonstrate competence in the review of written welding instructional materials to determine that they comply with the appropriate code or other standard. The welding educator shall be capable of writing new welding instructional or lesson plans and shall be able to perform test methods required to evaluate welding students.

5.6 Evaluation of Welder Training. The welding educator shall be capable of evaluating the educational experience of the welding students to verify that it meets the desired outcomes.

5.7 Inspection. The welding educator shall be capable of performing visual inspections of the in-process and completed weldments to confirm that they comply with the specified acceptance criteria.

5.8 Reports. The welding educator shall be capable of preparing written reports of the reviews, inspection results, and performance evaluations.

6. Education and Experience Requirements

6.1 Senior Welding Educator (SWE). In order to qualify as a Senior Welding Educator, the following requirements shall be met. A Senior 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 10 (ten) years experience as a welding educator who has conducted both welding theory classes and practical weld shop training (see 6.1.7).

6.1.3 Shall have no less than 5 (five) years experience in an occupational function in the welding of assemblies fabricated to a code or specification.

6.1.4 Shall be familiar with, understand, and be capable of explaining and/or performing the following joining and cutting processes and any other processes required by local industry. Refer to AWS A3.0, *Standard Welding Terms and Definitions*.

SMAW	GMAW	TB	PAC
GTAW	SAW	Soldering	CAC-A
FCAW	OFW	OFC	Mechanical Cutting

6.1.5 Shall be able to interpret and develop welding instructional plans as required by industry.

6.1.6 Shall be thoroughly familiar with and capable of performing the duties described in Section 5, "Function, Skills, and Knowledge."

6.1.7 Alternatives to 6.1.2 with supporting documentation (e.g., copies of transcripts which specify credited hours of training, quarter hours, or semester hours) may be substituted as follows:

6.1.7.1 A maximum of 2 (two) years of post-high school education may be substituted for an equal number of years of the required 10 (ten) years teaching experience provided studies are relevant to the skill and technology of welding. There shall be no substitution for occupational experience. Credit is given as follows:

(1) Associate or higher degree. Two years maximum if the degree is in welding technology or welding engineering.

(2) Technical School/Trade/Vocational Courses. Two years maximum exclusively for successfully completed courses in a curriculum that can be (or could be) applied to (1) above.

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

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

6.2.2 Shall have no less than 5 (five) years experience as a welding educator who has conducted both welding theory classes and practical weld shop training (see 6.2.6).

6.2.3 Shall have no less than 3 (three) years experience in an occupational function in the welding of assemblies fabricated to a code or specification.

6.2.4 Shall be able to explain and demonstrate the welding and cutting processes to be taught.

6.2.5 Shall be thoroughly familiar with and capable of performing the duties described in Section 5, "Function, Skills, and Knowledge."

6.2.6 Alternatives to 6.2.2 with supporting documentation (e.g., copies of transcripts which specify credited hours of training, quarter hours, or semester hours) may be substituted as follows:

6.2.6.1 A maximum of 2 (two) years of post-high school education may be substituted for an equal number of years of the required 5 (five) years teaching experience provided studies are relevant to the skill and technology of welding. There shall be no substitution for occupational experience. Credit is given as follows:

(1) Associate or higher degree. Two years maximum if the degree is in welding technology or welding engineering.

(2) Technical School/Trade/Vocational Courses. Two years maximum exclusively for successfully completed courses in a curriculum that can be (or could be) applied to (1) above.

6.3 Associate Welding Educator (AWE). In order to qualify as an Associate Welding Educator, the following requirements shall be met. An Associate Welding Educator:

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

6.3.2 Shall have no less than 2 (two) years experience as a welding educator who has conducted both welding theory classes and practical weld shop training (see 6.3.6).

6.3.3 Shall have no less than 1 (one) year experience in an occupational function in the welding of assemblies fabricated to a code or specification.

6.3.4 Shall be able to explain and demonstrate welding and cutting processes to be taught.

6.3.5 Shall be thoroughly familiar with and capable of performing the duties described in Section 5, "Function, Skills, and Knowledge."

6.3.6 Alternatives to 6.3.2 supporting documentation (e.g., copies of transcripts which specify credited hours of training, quarter hours, or semester hours) may be substituted as follows:

6.3.6.1 A maximum of one year of post-high school education may be substituted for an equal number of years of the required 2 (two) years teaching experience provided studies are relevant to the skill and technology of welding. There shall be no substitution for occupational experience. Credit is given as follows:

(1) Associate or higher degree. One year maximum if the degree is in welding technology or welding engineering.

(2) Technical School/Trade/Vocational Courses. One year maximum exclusively for successfully completed courses in a curriculum that can be (or could be) applied to (1) above.

7. Knowledge and Performance Requirements

7.1 The SWE, WE, and AWE shall demonstrate knowledge of fundamental welding principles including, but not limited to, welding processes, weld discontinuities, destructive and nondestructive test methods, safety, basic welding metallurgy, welding symbols, and basic arithmetic. The demonstration of knowledge shall be by written examination. A minimum score of 72 percent on the *CWI Closed Book Examination* or equivalent shall be considered adequate demonstration of knowledge for these requirements.

7.2 The SWE, WE, and AWE shall demonstrate practical welding inspection skills and knowledge including determining qualification standards from a code or specification. An SWE, WE, or AWE shall demonstrate these skills and knowledge by passing the *CWI Practical Examination* or equivalent with a minimum score of 72 percent.

7.3 The SWE shall demonstrate proficiency in the following welding processes by performance qualification:

7.3.1 SWE-1 SMAW 6G Pipe: AWS B2.1-1-201 Joint 1 or equivalent as determined by employer

7.3.2 SWE-2 GMAW 6G Pipe: Annex A (SWE-2) or equivalent as determined by employer

7.3.3 SWE-3 GMAW/FCAW 6G Pipe: Annex A (SWE-3) or equivalent as determined by employer

7.3.4 SWE-4 GTAW 6G Pipe: AWS B2.1-1-207 Joint 1 or equivalent as determined by employer

7.4 The WE shall demonstrate proficiency in the following welding processes by performance qualification:

7.4.1 WE-1 SMAW 3G and 4G plate: AWS B2.1.001 Joint 1 or equivalent as determined by employer

7.4.2 WE-2 GMAW 3G and 4G plate: Annex A (WE-2) or equivalent as determined by employer

7.4.3 WE-3 FCAW 3G and 4G plate: AWS B2.1-1-020 Joints 1 or 3 or equivalent as determined by employer

7.4.4 WE-4 GTAW 3G and 4G plate: AWS B2.1.008 Joints 1 or 2 or equivalent as determined by employer

7.5 The AWE shall demonstrate proficiency in the following welding processes by performance qualification:

7.5.1 AWE-1 SMAW 1G plate: AWS B2.1.001 Joint 1 or equivalent as determined by employer

7.5.2 AWE-2 GMAW 1G plate: Annex A (AWE-2) or equivalent as determined by employer

7.5.3 AWE-3 FCAW 1G plate: AWS B2.1-1-020 Joints 1 or 3 or equivalent as determined by employer

7.5.4 AWE-4 GTAW 1G plate: AWS B2.1.008 Joints 1 or 2 or equivalent as determined by employer

7.6 The SWE, WE, or AWE applicants shall perform the required welder performance qualification tests at an accredited test facility or any other test facility provided the required qualification test is conducted and evaluated by a current Certified Welding Inspector. Performance qualification tests (for SWE, WE, AWE purposes only) shall be tested and evaluated in accordance to the latest edition of AWS B2.1, *Specification for Welding Procedure and Performance Qualification*, and shall be valid for a 4 (four) year period. After this period, a retest of all performance qualification tests shall be required as per applicable documents.

8. Period of Effectiveness and Continued Competence

The SWE, WE, AWE qualification shall be valid for a 4 (four) year period unless there is reason to question the ability of the educator to competently instruct or demonstrate the processes they instruct. In these instances, the SWE, WE, AWE shall demonstrate their continued competence by examination and/or performance qualification.

9. Examination Structure and 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 the following reference information.

Number	Title	Applicability
AWS A2.4	*Standard Symbols for Welding, Brazing, and Nondestructive Examination*	SWE, WE, AWE
AWS A3.0	*Standard Welding Terms and Definitions*	SWE, WE, AWE
AWS B4.0	*Standard Methods for Mechanical Testing of Welds*	SWE, WE, AWE
AWS B1.10	*Guide for Nondestructive Inspection of Welds*	SWE, WE, AWE
AWS B1.11	*Guide for Visual Inspection of Welds*	SWE, WE, AWE
ANSI Z49.1	*Safety in Welding, Cutting, and Allied Processes*	SWE, WE, AWE
AWS B5.1	*Specification for the Qualification of Welding Inspectors*	SWE, WE, AWE
AWS QC1	*Standard for AWS Certification of Welding Inspectors*	SWE, WE, AWE
AWS WIT-T	*Welding Inspection Technology*	SWE, WE, AWE
AWS WHB-1.8	*Welding Technology, Welding Handbook, Volume 1*	SWE, WE, AWE
AWS WHB-2.8	*Welding Processes, Welding Handbook, Volume 2*	SWE, WE, AWE
AWS CM-94	*Certification Manual for Welding Inspectors*	SWE, WE, AWE

9.2 Performance Basis Documents. In performance of the welding educators duties the welding educator shall have knowledge of the following documents.

Number	Title	Applicability
AWS D1.1	*Structural Welding Code—Steel*	SWE, WE, AWE
AWS B5.5	*Specification for the Qualification of Welding Educators*	SWE, WE, AWE
AWS EG2.0	*Guide for the Training and Qualification of Welding Personnel—Entry Level Welders*	SWE, WE, AWE
AWS EG3.0	*Guide for the Training and Qualification of Welding Personnel—Level II Advanced Welders*	SWE, WE, AWE
AWS EG4.0	*Guide for the Training and Qualification of Welding Personnel—Expert Level Welders*	SWE, WE, AWE
AWS QC10	*Specification for Qualification and Certification of Entry Level Welders*	SWE, WE, AWE
AWS QC11	*Specification for Qualification and Certification for Level II—Advanced Welders*	SWE, WE, AWE
AWS QC12	*Specification for Qualification and Certification for Level III—Expert Welder*	SWE, WE, AWE
AWS B2.1	*Standard for Welding Procedure and Performance Qualification*	SWE, WE, AWE

Annex A

Performance Qualification Welding Procedure Specifications

(This Annex is a part of AWS B5.5:2000, *Specification for the Qualification of Welding Educators*, and includes mandatory requirements for use in this standard.)

SWE-2 WELDING PROCEDURE SPECIFICATION (WPS)

Prequalified Yes ☐ No ☒

Identification # SWE-2 Revision _____ Date 1-5-99

By S. Tennant Authorized by _____ Date _____

Welding Process(es) GMAW-S Type: Manual ☐ Machine ☐ Semi-Automatic ☒ Automatic ☐

Supporting PQR No.(s) SWE-2A

JOINT DESIGN USED

Type Butt

Single ☒ Double Weld ☐

Backing: Yes ☐ No ☒

Backing Material n/a

Root Opening 3/32 in. ± 1/32 in.

Root Face Dimension 1/32 in. (+1/32 in.,-0 in.)

Groove Angle 60° to 70°

Radius (J–U) n/a

Backgouging: Yes ☐ No ☒

Method n/a

BASE METALS

Material Spec. AWS D1.1 Group I or II

Type or Grade _____

Thickness: Groove 0.280 in.

Fillet n/a

Diameter (Pipe) 6.000 in. Sch. 40

FILLER METALS

AWS Specification A5.18

AWS Classification ER70S-X

SHIELDING

Flux n/a

Electrode-Flux (Class) n/a

Gas Ar/CO_2

Composition 75% Ar/25% CO_2

Flow Rate 25 CFH to 35 CFH

Gas Cup Size 5/8 in. to 7/8 in.

PREHEAT

Preheat Temp., Min 50°F

Thickness		Temp.
	Up to 3/4 in.	50°F
	Over 3/4 in. to 1-1/2 in.	n/a
	Over 1-1/2 in. to 2-1/2 in.	n/a
	Over 2-1/2 in.	n/a

Interpass Temp., Min 50°F Max 500°F

Preheat Note _____

POSITION

Position of Groove 6G Fillet n/a

Vertical Progression Up ☒ Down ☒

Root pass down Fill Cap up

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW) Short-Circuiting ☒

Globular ☐ Spray ☐

Current AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐

Other n/a

Tungsten Electrode (GTAW)

Size n/a

Type n/a

TECHNIQUE

Stringer or Weave Bead Either

Multi-pass or Single Pass (per side) Multiple

Number of Electrodes One

Electrode Spacing Longitudinal n/a

Lateral n/a

Angle n/a

Contact Tube to Work Distance 1/4 in. to 1/2 in.

Peening Not required

Interpass Cleaning Brush and grind in position

POSTWELD HEAT TREATMENT

PWHT Required Yes ☐ No ☒

Temp. n/a

Time n/a

SWE-2 WELDING PROCEDURE SPECIFICATION (WPS)

WELDING PROCEDURE

Pass or Weld Layer(s)	Process	Filler Metals		Current		Volts	Travel Speed	Joint Details
		Class	Diam.	Type and Polarity	Amps or Wire Feed Speed			
One	GMAW-S	ER70S-X	0.035	DCEP	215-240 ipm	17-18	10-14	Root Pass Down
Two	GMAW-S	ER70S-X	0.035	DCEP	200-230 ipm	17-19	5-9	Fill/Cap Up

NOTES:

Base Metal: 6 inch schedule 40 AWS D1.1 Group I or II

Filler Metal: Use 0.035 in. diameter ER70S-X for root, fill, and cap passes

Position: Root pass down, fill/cap upward, 6G position

Preheat: Temperature listed is the minimum

PWHT: Post Weld Heat Treatment not required for this procedure

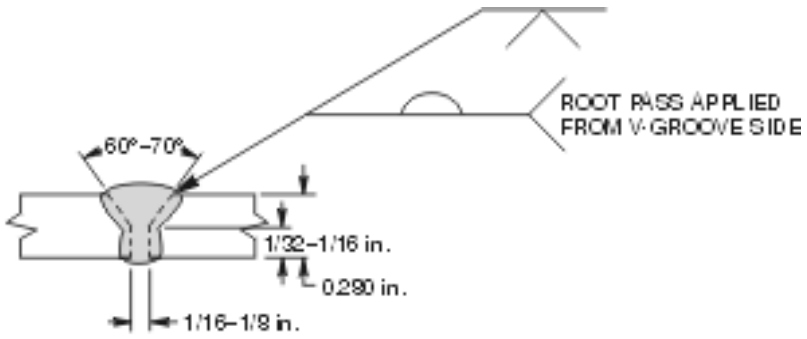
Shielding: Use 75% Ar-25% CO_2 shielding gas at 25–35 CFH flowrate

Electrical: Use DCEP for GMAW-S root pass and fill/cap pass

Technique: Use stringer or weave beads

General: The parameters for this GMAW short circuit welding procedure are based upon the use of two weld layers and a weave bead technique. The weld progression of the root pass (layer one) shall be downward and the final layer (layer two) upwards. For the final layer (layer two) a full weave or split weave technique may be used provided the range of essential variables are followed. The GMAW ESO is specified as 1/4 in. to 1/2 in. **WPS SWE-2 is to be used for the purpose of qualifying as a Senior Level Welding Educator only. It is not intended to be used for production welding.**

SINGLE-V-GROOVE WELD (2)
BUTT JOINT (B)



SWE-3 WELDING PROCEDURE SPECIFICATION (WPS)

Prequalified Yes ☐ No ☒

Identification # SWE-3 Revision _____ Date 9-1-99

By S. Tennant Authorized by _____ Date _____

Welding Process(es) GMAW-S & FCAW-G Type: Manual ☐ Machine ☐ Semi-Automatic ☒ Automatic ☐

Supporting PQR No.(s) SWE-3A

JOINT DESIGN USED

Type Butt

Single ☒ Double Weld ☐

Backing: Yes ☐ No ☒

Backing Material n/a

Root Opening 3/32 in. ± 1/32 in.

Root Face Dimension 1/16 in. ± 1/32 in.

Groove Angle 60° to 70°

Radius (J–U) n/a

Backgouging: Yes ☐ No ☒

Method n/a

BASE METALS

Material Spec. AWS D1.1 Group I or II

Type or Grade _____

Thickness: Groove 0.432 in.

Fillet n/a

Diameter (Pipe) 6.000 in. Sch. 80

FILLER METALS

AWS Specification A5.18, A5.20

AWS Classification ER70S-X, E71T1

SHIELDING

Flux n/a

Electrode-Flux (Class) n/a

Gas Ar/CO_2

Composition 75% Ar/25% CO_2

Flow Rate 30 CFH to 40 CFH

Gas Cup Size 5/8 in. to 7/8 in.

PREHEAT

Preheat Temp., Min 50°F

Thickness		Temp.
Up to 3/4 in.		50°F
Over 3/4 in. to 1-1/2 in.		n/a
Over 1-1/2 in. to 2-1/2 in.		n/a
Over 2-1/2 in.		n/a

Interpass Temp., Min 50°F Max 500°F

Preheat Note _____

POSITION

Position of Groove 6G Fillet n/a

Vertical Progression Up ☒ Down ☒

Root pass down Fill Cap up

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW) Short-Circuiting ☒

Globular ☐ Spray ☐

Current AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐

Other FCAW-G and GMAW-S use DCEP

Tungsten Electrode (GTAW)

Size n/a

Type n/a

TECHNIQUE

Stringer or Weave Bead Either

Multi-pass or Single Pass (per side) Multiple

Number of Electrodes One

Electrode Spacing Longitudinal n/a

Lateral n/a

Angle n/a

Contact Tube to Work Distance 1/4 in. to 1/2 in. (GMAW-S), 1/2 in. to 3/4 in. (FCAW-G)

Peening Not required

Interpass Cleaning Chip and grind in position

POSTWELD HEAT TREATMENT

PWHT Required Yes ☐ No ☒

Temp. n/a

Time n/a

SWE-3 WELDING PROCEDURE SPECIFICATION (WPS)

WELDING PROCEDURE

Pass or Weld Layer(s)	Process	Filler Metals		Current		Volts	Travel Speed	Joint Details
		Class	Diam.	Type and Polarity	Amps or Wire Feed Speed			
One	GMAW	ER70S-X	0.035	DCEP	220-240 ipm	17-19	6-9.5	Root Pass Down
Two	FCAW	E71T1	0.045	DCEP	160-190 A	23-27	7-10	Fill Pass Up
Three	FCAW	E71T1	0.045	DCEP	150-180 A	22-26	7-10	Split Cap Up

NOTES

Base Metal: 6 inch schedule 80 AWS D1.1 Group I or II

Filler Metal: Use 0.035 in. diameter for root pass and 0.045 in. E71T1 for fill/cap

Position: Root pass down, fill/cap upward 6G position

Preheat: Temperature listed is the minimum

PWHT: Post Weld Heat Treatment not required for this procedure

Shielding: Use 75%Ar-25%CO_2 shielding gas at 30–40 CFH flowrate

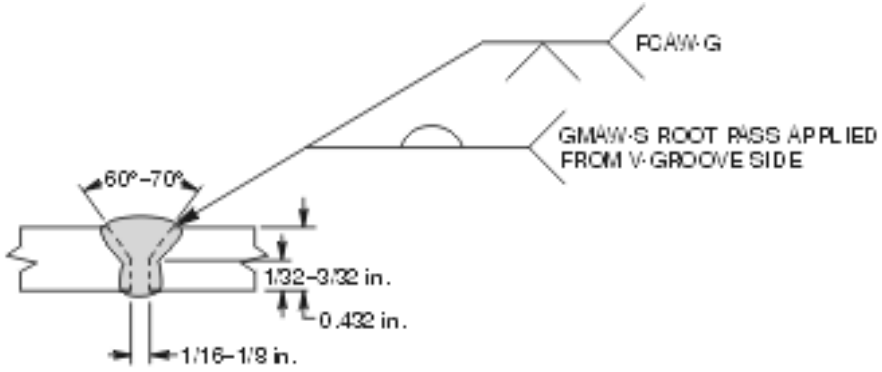
Electrical: Use DCEP for GMAW-S root pass and FCAW-G fill/cap pass

Technique: Use stringer or weave beads

General: FCAW-G parameters are based on the use of 0.045 diameter E71T1 FCAW-G electrode with 75%Ar-25%CO_2 shielding gas. GMAW ESO is specified as 3/8 in. to 1/2 in. and the FCAW-G ESO is 1/2 in. to 3/4 in. The weld progression of the GMAW root pass (layer one) shall be downward and the second and third FCAW-G layers shall be upward. Either stringer or weave beads may be used for this procedure.

WPS SWE-3 is to be used for the purpose of qualifying as a Senior Level Welding Educator only. It is not intended to be used for production welding.

SINGLE-V-GROOVE WELD (2)
BUTT JOINT (B)



WE-2 WELDING PROCEDURE SPECIFICATION (WPS)

Prequalified Yes ☐ No ☒

Identification # WE-2 Revision _____ Date 7-1-99

By S. Tennant Authorized by _____ Date _____

Welding Process(es) GMAW-S Type: Manual ☐ Machine ☐ Semi-Automatic ☒ Automatic ☐

Supporting PQR No.(s) WE-2A

JOINT DESIGN USED

Type Butt

Single ☒ Double Weld ☐

Backing: Yes ☐ No ☒

Backing Material n/a

Root Opening 3/32 in. ± 1/32 in.

Root Face Dimension 1/16 in. ± 1/32 in.

Groove Angle 60° to 70°

Radius (J–U) n/a

Backgouging: Yes ☐ No ☒

Method n/a

BASE METALS

Material Spec. AWS D1.1 Group I or II

Type or Grade _____

Thickness: Groove 0.375 in.

Fillet n/a

Diameter (Pipe) n/a

FILLER METALS

AWS Specification A5.18

AWS Classification ER70S-X

SHIELDING

Flux n/a

Electrode-Flux (Class) n/a

Gas Ar/CO_2

Composition 75% Ar/25% CO_2

Flow Rate 25 CFH to 35 CFH

Gas Cup Size 5/8 in. to 7/8 in.

PREHEAT

Preheat Temp., Min 50°F

Thickness Up to 3/4 in. Temp. 50°F

Over 3/4 in. to 1-1/2 in. n/a

Over 1-1/2 in. to 2-1/2 in. n/a

Over 2-1/2 in. n/a

Interpass Temp., Min 50°F Max 500°F

Preheat Note _____

POSITION

Position of Groove 3G & 4G Fillet n/a

Vertical Progression Up ☒ Down ☒

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW) Short-Circuiting ☒

Globular ☐ Spray ☐

Current AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐

Other n/a

Tungsten Electrode (GTAW)

Size n/a

Type n/a

TECHNIQUE

Stringer or Weave Bead Weave

Multi-pass or Single Pass (per side) Multiple

Number of Electrodes One

Electrode Spacing Longitudinal n/a

Lateral n/a

Angle n/a

Contact Tube to Work Distance 1/4 in. to 1/2 in.

Peening Not required

Interpass Cleaning Brush and grind in position

POSTWELD HEAT TREATMENT

PWHT Required Yes ☐ No ☒

Temp. n/a

Time n/a

WE-2 WELDING PROCEDURE SPECIFICATION (WPS)

WELDING PROCEDURE

Pass or Weld Layer(s)	Process	Filler Metals		Current		Volts	Travel Speed	Joint Details
		Class	Diam.	Type and Polarity	Amps or Wire Feed Speed			
One	GMAW-S	ER70S-X	0.035	DCEP	210-235 ipm	17-18	10-14	3G Root Down
Two	GMAW-S	ER70S-X	0.035	DCEP	200-240 ipm	18-19	5.5-9	3G Fill Up
Three	GMAW-S	ER70S-X	0.035	DCEP	200-240 ipm	18-19	3-6	3G Cap Up
One	GMAW-S	ER70S-X	0.035	DCEP	200-230 ipm	17-18	8-12	4G Root
Two	GMAW-S	ER70S-X	0.035	DCEP	205-245 ipm	17-18.5	6-10	4G Fill
Three	GMAW-S	ER70S-X	0.035	DCEP	205-245 ipm	17-18.5	5-8	4G Cap

NOTES

Base Metal: 0.375 in. AWS D1.1 Group I or II

Filler Metal: Use 0.035 in. diameter ER70S-X for root, fill, and cap passes

Position: 3G and 4G (see General Note for 3G weld progression)

Preheat: Temperature listed is the minimum

PWHT: Post Weld Heat Treatment not required for this procedure

Shielding: Use 75% Ar-25% CO_2 shielding gas at 25–35 CFH flowrate

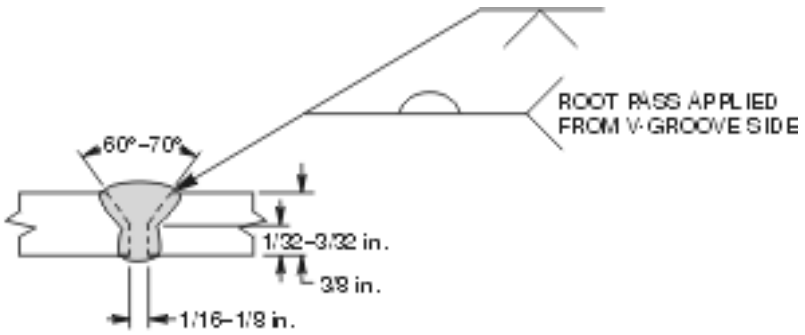
Electrical: Use DCEP for 3G and 4G root, fill, and cap passes

Technique: Use split or full weave beads

General: Parameters for the 3G and 4G GMAW weld procedures are based upon the use of three weld layers not exceeding 3/16 in. thick and the use of a full weave technique. For the final layer of the 3G and 4G procedures a full weave or split weave technique may be used, provided the range of essential variables are followed. The progression for the 3G root pass shall be downward and the fill and cap pass upward. The root opening and root face tolerance for the 3G and 4G procedures shall be ±1/32 in.

WPS WE-2 is to be used for the purpose of qualifying as a Welding Educator only. It is not intended to be used for production welding.

SINGLE-V-GROOVE WELD (2)
BUTT JOINT (B)



AWE-2 WELDING PROCEDURE SPECIFICATION (WPS)

Prequalified Yes [X] No [ ]

Identification # AWE-2 Revision _____ Date 8-20-99

By S. Tennant Authorized by _____ Date _____

Welding Process(es) GMAW Type: Manual [ ] Machine [ ] Semi-Automatic [X] Automatic [ ]

Supporting PQR No.(s) prequalified

JOINT DESIGN USED

Type Butt

Single [X] Double Weld [ ]

Backing: Yes [X] No [ ]

Backing Material ASTM A36

Root Opening 1/4 in. (+1/16 in., -0 in.)

Root Face Dimension zero

Groove Angle 45° (+10°, -0°)

Radius (J–U) n/a

Backgouging: Yes [ ] No [X]

Method n/a

BASE METALS

Material Spec. AWS D1.1 Group I or II

Type or Grade n/a

Thickness: Groove 0.375 in.

Fillet n/a

Diameter (Pipe) n/a

FILLER METALS

AWS Specification A5.18

AWS Classification ER70S-X

SHIELDING

Flux n/a

Electrode-Flux (Class) n/a

Gas Ar/CO_2

Composition 95% Ar/5% CO_2

Flow Rate 30 CFH to 40 CFH

Gas Cup Size 5/8 in. to 1.0 in.

PREHEAT

Preheat Temp., Min 50°F

Thickness Up to 3/4 in. Temp. 50°F

Over 3/4 in. to 1-1/2 in. n/a

Over 1-1/2 in. to 2-1/2 in. n/a

Over 2-1/2 in. n/a

Interpass Temp., Min 50°F Max 500°F

Preheat Note _____

POSITION

Position of Groove 1G Fillet n/a

Vertical Progression Up [ ] Down [ ]

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW) Short-Circuiting [ ]

Globular [ ] Spray [X]

Current AC [ ] DCEP [X] DCEN [ ] Pulsed [ ]

Other n/a

Tungsten Electrode (GTAW)

Size n/a

Type n/a

TECHNIQUE

Stringer or Weave Bead Either

Multi-pass or Single Pass (per side) Multiple

Number of Electrodes One

Electrode Spacing Longitudinal n/a

Lateral n/a

Angle n/a

Contact Tube to Work Distance 3/8 in. to 5/8 in.

Peening Not required

Interpass Cleaning Brush and grind

POSTWELD HEAT TREATMENT

PWHT Required Yes [ ] No [X]

Temp. n/a

Time n/a

WE-2 WELDING PROCEDURE SPECIFICATION (WPS)

WELDING PROCEDURE

Pass or Weld Layer(s)	Process	Filler Metals		Current		Volts	Travel Speed	Joint Details
		Class	Diam.	Type and Polarity	Amps or Wire Feed Speed			
One	GMAW	ER70S-X	0.045	DCEP	280-330 A	28-31	13-16	
Two	GMAW	ER70S-X	0.045	DCEP	275-325 A	28-30.5	15-20	
Three	GMAW	ER70S-X	0.045	DCEP	280-330 A	27-30	13-18	

NOTES

Base Metal: 0.375 in. AWS D1.1 Group I or II

Filler Metal: Use 0.045 in. diameter ER70S-X for all passes

Position: 1G

Preheat: Temperature listed is the minimum

PWHT: Post Weld Heat Treatment not required for this procedure

Shielding: Use 95% Ar-5% CO_2 shielding gas at 30–40 CFH flowrate

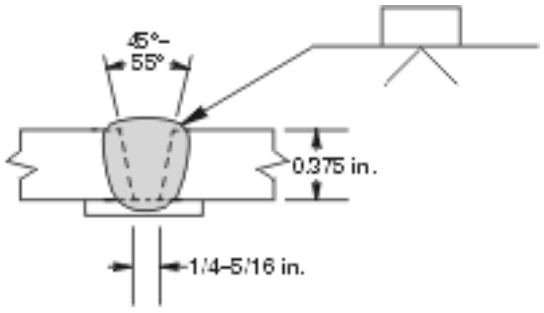
Electrical: Use DCEP

Technique: Use stringer or weave beads

General: Parameters for this GMAW SPRAY ARC procedure are based on the use of stringer beads and three weld layers not exceeding 3/16 in. thick. A push gun technique is recommended for layers one and two with a pull gun technique for layer three. The specified shielding gas for this procedure is 95% Ar-5% CO_2.

WPS AWS-2 is to be used for the purpose of qualifying as an Associate Level Welding Educator only. It is not intended to be used for production welding.

SINGLE-V-GROOVE WELD (2)
BUTT JOINT (B)



Annex B

Guidelines for Preparation of Technical Inquiries for AWS Technical Committees

(This Annex is not a part of AWS B5.5 *Specification for the Qualification of Welding Educators,* but is included for information 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 shall be followed, some interpretations may require considerable time.

B2. 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.

B2.1 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.

B2.2 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.

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 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.

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 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 can not 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.

AWS List of Documents on Specification for the Qualification of Welding Educators

AWS Designation	Title
B5.9	Specification for the Qualification of Welding Supervisors
B5.17	Specification for the Qualification of Welding Fabricators

For ordering information, contact the AWS Order Department, American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126. Telephones: (800) 334-9353, (305) 443-9353, ext. 280; FAX (305) 443-7559.