

**Standard Welding Procedure  
Specification (SWPS) for**

**Argon Plus 25% Carbon  
Dioxide Shielded Gas Metal  
Arc Welding (Short Circuiting  
Transfer Mode) followed by  
Argon Plus 25% Carbon  
Dioxide Shielded Flux Cored  
Arc Welding of Carbon Steel  
(M-1/P-1/S-1, Groups 1 and 2),  
1/8 through 1-1/2 inch Thick,  
ER70S-3 and E7XT-X,  
As-Welded or PWHT  
Condition, Primarily Pipe  
Applications**

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**AWS B2.1-1-232:2006**  
**An American National Standard**

**Approved by the**  
**American National Standards Institute**  
**May 3, 2006**

**Standard Welding Procedure Specification (SWPS) for  
Argon Plus 25% Carbon Dioxide Shielded Gas Metal  
Arc Welding (Short Circuiting Transfer Mode) followed  
by Argon Plus 25% Carbon Dioxide Shielded Flux  
Cored Arc Welding of Carbon Steel (M-1/P-1/S-1,  
Groups 1 and 2), 1/8 through 1-1/2 inch Thick,  
ER70S-3 and E7XT-X, As-Welded or PWHT  
Condition, Primarily Pipe Applications**

Prepared by the  
American Welding Society (AWS) B2 Committee on Welding Procedure and Performance Qualification

Under the Direction of the  
AWS Technical Activities Committee

Approved by the  
AWS Board of Directors

## **Abstract**

This standard contains the essential welding variables for carbon steel in the thickness range of 1/8 through 1-1/2 inch, using gas metal arc welding (short circuiting transfer mode) with Argon plus 25% Carbon Dioxide shielding for the root followed by flux cored arc welding (globular transfer mode) with Argon plus 25% Carbon Dioxide shielding for the balance. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This WPS was developed primarily for pipe application.



**American Welding Society**

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# Standard Welding Procedure Specification (SWPS)

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**Argon Plus 25% Carbon Dioxide Shielded Gas Metal Arc Welding (Short Circuiting Transfer Mode) followed by Argon Plus 25% Carbon Dioxide Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 and 2), 1/8 through 1-1/2 inch Thick, ER70S-3 and E7XT-X, As-Welded or PWHT Condition, Primarily Pipe Applications**

**Welding Research Council<sup>1</sup>—Supporting PQR Numbers:  
005032, 005041, 007007, 007009, 200547, 200548,  
200772, 200786, 200788, 200789, 200707, 200853,  
200854, 200855, 200856, 200858, 200861**

## Requirements for Application of Standard SWPSs

**Scope.** The data to support this Standard Welding Procedure Specification (SWPS) have been derived from the above listed Procedure Qualification Records (PQRs) which were reviewed and validated under the auspices of the Welding Research Council. This SWPS is not valid using conditions and variables outside the ranges listed. The American Welding Society considers that this SWPS presents information for producing an acceptable weld using the conditions and variables listed. The user needs a significant knowledge of welding and accepts full responsibility for the performance of the weld and for providing the engineering capability, qualified personnel, and proper equipment to implement this SWPS.

**Application.** This SWPS is to be used only as permitted by AWS B2.1, *Specification for Procedure and Performance Qualification*, and the applicable fabrication document(s) [such as code, specification, or contract document(s)]. The fabrication document(s) should specify the engineering requirements such as design, need for heat treatment, fabricating tolerances, quality control, and examination and tests applicable to the end product.

**User's Responsibility.** An SWPS does not replace or substitute fabrication codes, specifications, con-

tract requirements, or capability and judgment on the part of the user. An SWPS is to be used only as permitted by the applicable fabrication code, specification, or contract document.

The ability to produce production welds having properties suitable for the application depends upon supplementing the SWPS with appropriate performance qualification tests and sound engineering judgment. The user is responsible for the quality and performance of the final product in accordance with the provisions of the fabrication document(s).

**Supplementary Instructions.** To adapt this SWPS to a specific application, a user may issue supplementary instructions. Such instructions may consist of tighter fit-up tolerances, higher minimum preheat temperature, or any other instructions necessary to produce a weldment that meets the requirements of the fabrication document(s). These instructions shall not be less restrictive than provided in the SWPS.

**Safety.** Safety precautions shall conform to the latest edition of ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*, published by the American Welding Society.

This specification may involve hazardous materials, operations, and equipment. The specification does not purport to address all of the safety problems associated with its use. It is the responsibility of the user to establish appropriate safety and health practices. The user should determine the applicability of any regulatory limitations prior to use.

<sup>1</sup>Welding Research Council, P.O. Box 201547, Shaker Heights, OH 44120.