

ANSI/AWS B2.1-1-202-96 (R2007)  
An American National Standard

Standard Welding Procedure  
Specification (SWPS) for

**Shielded Metal Arc  
Welding of Carbon  
Steel (M-1/P-1/S-1,  
Group 1 or 2),  
1/8 through 3/4 inch  
Thick, E6010 (Vertical  
Downhill) Followed by  
E7018 (Vertical Uphill),  
As-Welded Condition,  
Primarily Pipe  
Applications**

Site License



**American Welding Society**

## **Site License to Make Copies for Intra-Company Use**

This License is issued by the American Welding Society (hereinafter referred to as “AWS”) to you (hereinafter referred to as “Licensee”) based upon your application and conditions:

1. By becoming a Licensee, Licensee agrees to all the terms contained in this License.
2. Licensee is authorized to reproduce this AWS B2 Standard Welding Procedure for intra-company use only. Copies may not be made available to any individual not employed by Licensee or for any purpose unrelated to the business being conducted by Licensee.
3. Any reproduction must include the following copyright notice: “Copyright by the American Welding Society. Reproduced with the express written permission of the American Welding Society.”
4. Licensee may not enter into any sublicense agreement.
5. Reproduction of this Standard Welding Procedure signifies that you agree with the terms of the License. If you do not agree with the terms of this License please return this document, and a new document without the copyright notice will be issued.
6. The AWS B2 Standard Welding Procedures are not the subject of any warranty. AWS disclaims any liability arising from the use of any Standard Welding Procedure. AWS is not liable for any actual or consequential damages that may arise from the use of any Standard Welding Procedure.
7. Licensee will notify AWS in writing if it becomes aware that any employee or other party has made copies or otherwise made use of any Standard Welding Procedure contrary to the terms of the License.
8. This License contains the entire understanding as between Licensee and AWS, and any changes must be contained in a writing signed by both parties.
9. The terms of this License are governed under the laws of the State of Florida, and both parties agree to submit to the jurisdiction of the cognizant court of law within Dade County, Florida to resolve any disputes.

**Key Words**—Welding Procedure Specification,  
base metal, allowable joint designs,  
filler metal, carbon steel, manual  
welding, shielded metal arc welding

**ANSI/AWS B2.1-1-202-96 (R2007)**  
**An American National Standard**

**Approved by the**  
**American National Standards Institute**  
**May 28, 1996**

**Standard Welding Procedure  
Specification (SWPS) for  
Shielded Metal Arc Welding of Carbon Steel  
(M-1/P-1/S-1, Group 1 or 2), 1/8 through  
3/4 inch Thick, E6010 (Vertical Downhill) Followed by  
E7018 (Vertical Uphill), As-Welded 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 3/4 inch, using manual shielded metal arc welding with E6010 (vertical downhill) followed by E7018 (vertical uphill). It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.



**American Welding Society**

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

# Standard Welding Procedure Specification (SWPS)

---

## Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 through 3/4 inch Thick, E6010 (Vertical Downhill) Followed by E7018 (Vertical Uphill), As-Welded Condition, Primarily Pipe Applications

**Welding Research Council—Supporting PQR Numbers:**  
001009, 001021, 003016, 003017, 103004, 106004, 106006, 107020, 200018,  
200112, 200113, 200114, 200115, 200116, 200126, 200142, 200143, 200514,  
200516, 200518, 200519, 200614, 200615, 200617, 200618, 200619, 200620,  
200702, 200703, 500007, 500008, 500021, 500028, 500119,  
001A, 002A, 191C, 192A, 193B, 197A, 198A, 199A

### Requirements for Application of Standard WPSs

**Scope.** The data to support this Standard Welding Procedure Specification (WPS) 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 Standard WPS is not valid using conditions and variables outside the ranges listed. The American Welding Society considers that this Standard WPS 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 Standard WPS.

**Application.** This Standard WPS is to be used only as permitted by 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.** A Standard WPS does not replace or substitute for fabrication codes, specifications, contract requirements, or capability and judgment

on the part of the user. A Standard WPS 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 Standard WPS 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 Standard WPS 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 Standard WPS.

**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.