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AWS-NAVSEA B2.1-1-313:2020
An American National Standard

Standard Welding Procedure Specification for Naval Applications (SWPS-N) for Gas Tungsten Arc Welding Followed by Shielded Metal Arc Welding of Carbon Steel (S-1), 1/8 inch [3 mm] through 1-1/2 inch [38 mm] Thick, MIL-70S-2 and MIL-7018-M, in the As-Welded or PWHT Condition, Primarily Pipe for Naval Applications

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Approved by the
American National Standards Institute
March 16, 2020

Standard Welding Procedure Specification for Naval Applications (SWPS-N) for Gas Tungsten Arc Welding Followed by Shielded Metal Arc Welding of Carbon Steel (S-1), 1/8 inch [3 mm] through 1-1/2 inch [38 mm] Thick, MIL-70S-2 and MIL-7018-M, in the As-Welded or PWHT Condition, Primarily Pipe for Naval Applications

1st Edition

Prepared by the
American Welding Society (AWS) B2 Committee on 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 inch [3 mm] through 1-1/2 inch [38 mm], using manual gas tungsten arc welding followed by shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and joint designs for groove and fillet welds. This SWPS-N was developed primarily for naval applications that require performance to NAVSEA Technical Publication S9074-AQ-GIB-010/248*, Requirements for Welding and Brazing Procedure and Performance Qualification.*



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Foreword

This foreword is not part of this standard but is included for informational purposes only.

The American Welding Society generates Standard Welding Procedure Specifications (SWPSs) for industry through the cooperative efforts of the AWS B2 Committee on Procedure and Performance Qualification, the AWS B2D Subcommittee on Standard Welding Procedure Specifications, and the AWS B2G Subcommittee on Procedure Qualification Records. The Welding Procedures Committee (WPC) of the Welding Research Council (WRC) originally managed the procedure qualification records in support of AWS Standard Welding Procedure Specifications and was formally transitioned to the AWS B2G Subcommittee on Procedure Qualification Records in 2019.

The need for pretested welding procedures that are supported by adequate test data and that satisfy the technical requirements for the commonly used construction codes and specifications has been expressed by many individuals and organizations. The purpose of a welding procedure qualification is to provide test data for assessing the properties of a weld joint.

This Standard Welding Procedure Specification for Naval Applications is an outgrowth of the coordinated work of the AWS B2G Subcommittee on Procedure Qualification Records, the AWS B2 Committee on Procedure and Performance Qualification, and a Task Group of this committee that included the Naval Sea Systems Command (NAVSEA) and representatives of the shipbuilding industry. The AWS B2G Subcommittee on Procedure Qualification Records provided the test data documented by a Summary of Procedure Qualification Records. This SWPS-N was prepared by adapting AWS B2.1-1-209 to include requirements from NAVSEA Technical Publication S9074-AQ-GIB-010/248*, Requirements for Welding and Brazing Procedure and Performance Qualification*, and other relevant fabrication documents.

The welding terms used in this specification shall be interpreted in accordance with the definitions given in the latest edition of AWS A3.0M/A3.0, *Standard Welding Terms and Definitions Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*. Welding symbols shall be those shown in the latest edition of AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination*. The AWS designations for welding gases should be those shown in the latest edition of AWS A5.32M/A5.32 (ISO 14175 MOD), *Welding Consumables—Gases and Gas Mixtures for Fusion Welding and Allied Processes*.

The AWS B2 Committee on Procedure and Performance Qualification was formed in 1979 to provide welding standards concerning the subject of qualification. The primary document developed by this committee is AWS B2.1/B2.1M, *Specification for Welding Procedure and Performance Qualification*. This document established the foundation and framework for Standard Welding Procedure Specifications (SWPSs). The Task Group on Standard Welding Procedure Specifications for Naval Applications was formed in 2009 to address the need for SWPS-N documents that support the requirements of NAVSEA Technical Publication S9074-AQ-GIB-010/248 and fabrication requirements for naval applications.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary of the AWS B2 Committee on Welding Procedure and Performance Qualification, American Welding Society, 8669 NW 36 St., #130, Miami, Florida, 33166.

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Standard Welding Procedure Specification for Naval Applications (SWPS-N)

Gas Tungsten Arc Welding Followed by Shielded Metal Arc Welding of Carbon Steel (S-1), 1/8 inch [3 mm] through 1-1/2 inch [38 mm] Thick, MIL-70S-2 and MIL-7018-M, in the As-Welded or PWHT Condition, Primarily Pipe for Naval Applications

Supporting PQR Numbers: 001002, 001007, 001010, 001013, 001014, 001015, 001017, 001024, 001038, 005031, 200266, 200267 200268, 200269, 200270, 200272, 200273, 200274, 200275, 200530, 200531, 200532, 200534, 200535, 200625, 200626, 200627, 200628, 200629, 200630, 200631, 200632, 200633, 200634, 200635, 200636, 200637, 200638, 200639, 200708, 200709, 200710, 200711, 200712, 200713, 200728, 001A, 002A, 003B, 004A, 029A, 030A

Requirements for Application of SWPS-Ns

Scope. The data to support this Standard Welding Procedure Specification for Naval Applications (SWPS-N) have been derived from the above listed Procedure Qualification Records (PQRs), which were reviewed and validated under the auspices of the AWS B2G Subcommittee on Procedure Qualification Records. This SWPS-N is not valid using conditions and variables outside the ranges listed. The American Welding Society and Naval Sea Systems Command (NAVSEA) consider that this SWPS-N presents information for producing an acceptable weld using the conditions and variables listed. This procedure is intended to be used for groove and fillet welds. 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-N.

Application. This SWPS-N is to be used only as permitted by AWS B2.1/B2.1M, *Specification for Welding Procedure and Performance Qualification*, and either NAVSEA Technical Publication S9074-AQ-GIB-010/248*, Requirements for Welding and Brazing Procedure and Performance Qualification*, or *American Bureau of Shipping (ABS) Naval Vessel Rules (NVR)*, as applicable. Restrictions on the use of SWPS-Ns specified in the following documents, if any, shall also apply.

- NAVSEA Technical Publication S9074-AR-GIB-010/278*, Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping, and Pressure Vessels.*
- MIL-STD-1689*, Fabrication, Welding, and Inspection of Ships Structure.*
- NAVSEA Technical Publication T9074-AD-GIB-010/1688*, Requirements for Fabrication, Welding, and Inspection of Submarine Structure.*

The fabrication document(s) should specify the engineering requirements such as design, need for postweld heat treatment, fabricating tolerances, quality control, and examination and tests applicable to the end product.

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