

Where a WPS Comes From & Reading A WPS

Fact Sheet

WHERE A WPS COMES FROM

- Welding Procedure Specifications are typically used by certified welders and derived from welding code standards
- A company can select an existing welding code to use or create own standards.
- If a welding code is selected by the company performing the welding, that company will use welding procedures based on the welding code
- A WPS can be prequalified by a welding code
- If a welding procedure does not exist for a design, the procedure must be qualified

Welding Code

- There are several types of welding codes and procedures for all metals and uses
- Welding codes come from organizations such as:
 - American Welding Society (AWS)
 - American Society of Mechanical Engineers (ASME)
 - American Petroleum Institute (API)
 - International Organization for Standardization (ISO)
 - Canadian Standards Association (CSA)
 - European Committee for Standardization (CEN)

Steps to Qualify a WPS & Welder

Steps to Qualifying a Welding Procedure and Certifying a Welder

1. Analyze joint design
2. Write a WPS
3. Qualify WPS
4. Qualify welder
5. Certify welder

STEP 1:

Analyze Design

- Joint design
- Weld type
- Size of weld
- Location of weld

STEP 2:

Write a WPS

- A Certified Welding Inspector or a Welding Engineer will write a WPS for the design
- In this step, the WPS is based on information in the welding code used by the company; it is essentially an educated guess on what would work
- This WPS will need to be tested by a skilled certified welder in the next step

STEP 3:

Qualify WPS

- A certified welder performs welds in accordance to the WPS
- Several specimens are welded
- Welded specimens are tested using destructive and/or nondestructive testing methods
- Once all tests are passed, the procedure has been proven to work

STEP 4:

Qualify Welder

- Welders will take a welding qualification test in accordance to the qualified WPS
- The welder qualification test is typically similar to the one used to qualify the WPS
- A Certified Welding Inspector will test the weld specimens using destructive and/or nondestructive testing methods and determine whether the test passed or failed

STEP 5:

Certify Welder

- Written verification that welder met the standards of the test
- A Certified Welding Inspector needs to be present while welder is testing to ensure that the test was completed in accordance to the WPS
- The welder is certified ONLY to the specified positions, electrodes, filler metals, metal thicknesses, etc. that is specified in the welding code or company standards that the welder took the test for
- Certifications do not transfer between companies and welding codes.
- There is no such thing as a universal welder certification

READING A WPS

Welding Procedure Specification Definition

According to American Welding Society standard AWS A3.0M/A3.0:2010 Standard Welding Terms and Definitions:

“A document providing the required welding variables for a specific application to assure repeatability by properly trained welders and welding operators.”

Parts of a WPS

Although all WPS are a little different, these are some of the main parts that most have in common

- General Information
 - Tells the welder about where the procedure comes from and who it's for
 - Company information
 - Welding process
 - Identification number
 - How the weld is performed (manual, automatic, semiautomatic, mechanized)
 - Joint Design
 - Tells the welder about preparation of the welding joint
 - Type of joint design
 - Backing required
 - Specifics about the joint regarding root opening, root face, groove angle, radius of groove, whether back gouging is required
 - Position
 - Tells the welder what position the joint is to be welded in
 - Position to be welded: this is expressed with a number and a letter
 - The number indicates the position
 - 1 is flat
 - 2 is horizontal
 - 3 is vertical (progression up or down is also indicated)
 - 4 is overhead
 - The letter indicates whether it is a fillet or groove joint
 - G is a groove weld
 - F is a fillet weld
- Example: 1F indicates flat fillet, 3G indicates vertical groove
- Electrical Characteristics
 - Tells the welder about the electrical setup of the welder
 - Transfer Mode for GMAW (short circuit, pulse, spray, globular)
 - Current, or polarity being used (DCEP, DCEN, or AC)
 - Power source (constant current or constant voltage)
 - Base Metals & Filler Metals
 - Tells the welder what type of metal can be welded on and the matching filler to use
 - Thickness range of the base metal
 - Material specification: all base and filler metals have specification numbers that identify the type of metal
 - Filler metal classification: a number that tells the welder about the filler metal
 - Specifications and classifications for base and filler metals are defined by standardizing organizations. These numbers tell the welder what the metal is and what alloys are present in the metal
 - Shielding
 - Tells the welder what type of shielding gas or flux is used
 - Type of shielding gas and the composition of a shielding gas mixture

- Flow rate
 - Where to set the flow meter
- Gas cup size
 - Even the size of the nozzle is specified!!
- Technique
 - Tells the welder how to make the weld
 - Stringer or weave bead
 - Number of passes required
 - Contact tube to work distance
 - Interpass cleaning
- Preheat & Postheat
 - Tells the welder how to heat the base metal
 - Preheat and interpass temperatures
 - Postweld heat temperature
 - Length of time a postweld heat treatment is held
- Welding Procedure
 - All parts of a WPS must be carried out for the weld to be considered sound
 - Quality control in a welding shop will make sure welders are carrying out the WPS
 - Check volts and amps with multi-meter
 - Check to see that proper electrodes, filler metal and shielding is being used
 - Check the travel speed, temperature of metal and other variables in WPS
 - Welds made by a WPS are often tested using destructive or nondestructive examination