

**QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)**  
 (See QW-201.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name \_\_\_\_\_ ① By: \_\_\_\_\_ ②  
 Welding Procedure Specification No. \_\_\_\_\_ ③ Date \_\_\_\_\_ ④ Supporting PQR No.(s) \_\_\_\_\_ ⑤  
 Revision No. \_\_\_\_\_ ⑥ Date \_\_\_\_\_ ⑦  
 Welding Process(es) \_\_\_\_\_ ⑧ Type(s) \_\_\_\_\_ ⑨  
 (Automatic, Manual, Machine, or Semi-Auto.)

**JOINTS (QW-402)** Details ⑬

Joint Design \_\_\_\_\_ ⑩  
 Backing (Yes) \_\_\_\_\_ ⑪ (No) \_\_\_\_\_  
 Backing Material (Type) \_\_\_\_\_ ⑫  
 (Refer to both backing and retainers.)

Metal     Nonfusing Metal  
 Nonmetallic     Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

**\*BASE METALS (QW-403)**

P-No. \_\_\_\_\_ ⑭ Group No. \_\_\_\_\_ ⑮ to P-No. \_\_\_\_\_ ⑯ Group No. \_\_\_\_\_ ⑰

OR

Specification type and grade \_\_\_\_\_ ⑱  
 to Specification type and grade \_\_\_\_\_ ⑲

OR

Chem. Analysis and Mech. Prop. \_\_\_\_\_ ⑳  
 to Chem. Analysis and Mech. Prop. \_\_\_\_\_ ㉑

Thickness Range:

Base Metal:	Groove _____ ㉒	Fillet _____ ㉓
Pipe Dia. Range:	Groove _____ ㉔	Fillet _____ ㉕
Other _____ ㉖		

*FILLER METALS (QW-404)		
Spec. No. (SFA) _____ ㉗		
AWS No. (Class) _____ ㉘		
F-No. _____ ㉙		
A-No. _____ ㉚		
Size of Filler Metals _____ ㉛		
Deposited Weld Metal _____ ㉜		
Thickness Range:		
Groove _____ ㉝		
Fillet _____ ㉞		
Electrode-Flux (Class) _____ ㉟		
Flux Trade Name _____ ㊱		
Consumable Insert _____ ㊲		
Other _____		

\*Each base metal-filler metal combination should be recorded individually.

<p><b>POSITIONS (QW-405)</b></p> <p>Position(s) of Groove _____ (59)</p> <p>Welding Progression: Up _____ (46) Down _____</p> <p>Position(s) of Fillet _____ (41)</p>	<p><b>POSTWELD HEAT TREATMENT (QW-407)</b></p> <p>Temperature Range _____ (45)</p> <p>Time Range _____ (46)</p>																			
<p><b>PREHEAT (QW-406)</b></p> <p>Preheat Temp. Min. _____ (42)</p> <p>Interpass Temp. Max. _____ (43)</p> <p>Preheat Maintenance _____ (44)</p> <p>(Continuous or special heating where applicable should be recorded)</p>	<p><b>GAS (QW-408)</b></p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th colspan="3">Percent Composition</th> </tr> <tr> <th>Gas(es)</th> <th>(Mixture)</th> <th>Flow Rate</th> </tr> </thead> <tbody> <tr> <td>Shielding</td> <td>(47)</td> <td>(48)</td> <td>(49)</td> </tr> <tr> <td>Trailing</td> <td>(50)</td> <td></td> <td></td> </tr> <tr> <td>Backing</td> <td>(51)</td> <td></td> <td></td> </tr> </tbody> </table>		Percent Composition			Gas(es)	(Mixture)	Flow Rate	Shielding	(47)	(48)	(49)	Trailing	(50)			Backing	(51)		
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Trailing	(50)																			
Backing	(51)																			

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current AC or DC \_\_\_\_\_ (52) Polarity \_\_\_\_\_ (53)

Amps (Range) \_\_\_\_\_ (54) Volts (Range) \_\_\_\_\_ (55)

(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type \_\_\_\_\_ (56)  
(Pure Tungsten, 2% Thoriated, etc.)

Mode of Metal Transfer for GMAW \_\_\_\_\_ (57)  
(Spray arc, short circuiting arc, etc.)

Electrode Wire feed speed range \_\_\_\_\_ (58)

**TECHNIQUE (QW-410)**

String or Weave Bead \_\_\_\_\_ (59)

Orifice or Gas Cup Size \_\_\_\_\_ (60)

Initial and Interpass Cleaning (Brushing, Grinding, etc.) \_\_\_\_\_ (61)

Method of Back Gouging \_\_\_\_\_ (62)

Oscillation \_\_\_\_\_ (63)

Contact Tube to Work Distance \_\_\_\_\_ (64)

Multiple or Single Pass (per side) \_\_\_\_\_ (65)

Multiple or Single Electrodes \_\_\_\_\_ (66)

Travel Speed (Range) \_\_\_\_\_ (67)

Peening \_\_\_\_\_ (68)

Other \_\_\_\_\_ (69)

Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
		Class	Dia.	Type Polar.	Amp. Range			
(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)

Form QW482  
Welding Procedure Specifications (WPS)

WPS is intended to provide direction for the welder listing acceptable ranges for all parameters, listing a detailed description of all variables, essential, supplementary, and non-essential to weld in accordance with the Code and shall be available for reference by the welders and the Authorized Inspector.

- (1) Company Name (Manufacturer, contractor, or installer with an ASME Certificate of Authorization or National Board Authorization to repair or alter ASME stamped Boilers and Pressure Vessels)
  - (2) The WPS shall show name of the company representative responsible for approving the WPS, and shall sign for all revisions of the WPS
  - (3) Unique number or letters assigned for each WPS
  - (4) Date WPS was prepared or approved
  - (5) Supporting PQR or PQR's (unique PQR number(s) or letter(s))
  - (6) WPS revision number should indicate where all revisions were made with a symbol or sign [1] (2)
  - (7) Date WPS was revised
  - (8) Type of Process (i.e.,) Shielded metal-arc welding, (SMAW) Submerged-arc welding, (SAW) Gas metal-arc welding, (GMAW) Gas tungsten-arc welding, (GTAW) Plasma arc-welding, (PAW) etc.
  - (9) Type of process (i.e) Automatic, Spray Transfer, Machine, etc.
  - (10) Types of groove that "may be used" with this WPS (i.e.) Square Butt Joint, "V" Grooves, etc.
  - (11) List if WPS is to be used with or without backing.
  - (12) List type of backing material the WPS was qualified for use with (i.e) Steel, Copper, Nitrogen, Flux, or etc.
  - (13) The WPS shall show a sketch or sketches of the general joint configuration acceptable for use with this WPS. The WPS may reference production drawings, charts or weld symbols. Joint prep should also be considered such as Gas Cut, Machining, Plasma Cut, and etc.
  - (14) & (15) The WPS shall list the combination of P No(s) and
  - (16) & (17) Group No(s) covered by this WPS (i.e, P 1 Gr 1 & Gr 2 to P1 Gr 1 & Gr 2 or P 4 Gr 1 to P5 Gr2 and etc)
  - (18) & (19) In lieu of (14 thru 17) the WPS may list the combination of specification(s) type and grade covered by this WPS (i.e., SA 285 Gr B to SA 515 Gr 70 or SA 182 Gr. T304 to SA 312 Gr. TP 316 or etc.)
  - (20) & (21) In lieu of (14 thru 19) the WPS may list the combination of chemical analysis and mechanical properties covered by this WPS
  - (22) & (23) Range of thickness covered by this WPS (i.e., base metal groove: 1/16"-3/4" fillet) all deposited weld metal groove 1/16" - 1/2" fillet).
- Note: Combination process show range for each process and F numbers
- (24) & (25) Range of pipe diameter covered by this WPS (i.e, 2-7/8" O.D. and over)
  - (26) Other (i.e, fillet pipe diameter range) indicate maximum thickness of weld pass.  
Note: If exceeds 1/2" only qualifies to 1.1 times thickness
  - (27) ASME Specification No.(i.e. SFA 5.1, 5.4, 5.9)

- (28) AWS Classification No (i.e. E- 7018, E-308L, ER316L)
- (29) "F" No. or Manufacturer trade name if no number (QW-432)
- (30) "A" No. or Manufacturer trade name if no number (QW-442)
- (31) Range of sizes of electrode that may be used with this WPS (i.e., 1/16", 3/32", and 1/8")
- (32) Range of sizes of additional filler that may be used when applicable (i.e., cold wire, hot wire, etc)
- (33)(34)(35) Thickness range, size of groove and fillet such as maximum size or all etc.)
- (36) This may be the Electrode-Flux AWS Classification (i.e, F-71-EL12)
- (37) Flux tradename (i.e., Weldeasy 300 or Slickweld Co #69)
- (38) List if WPS was qualified for use with a consumable insert and if so shall list the composition of the consumable insert
- (39) Position of groove covered by this WPS (i.e., 2G, 6G, or etc.)
- (40) Welding progression (i.e, vertical up or vertical down)
- (41) Position of fillet covered by this WPS (i.e, 2F,3F, or etc.)
- (42) Range of preheat covered by this WPS  
Note: If no preheat minimum temperature shall be shown
- (43) Range of interpass temperature covered by this WPS
- (44) Range of preheat maintenance covered by this WPS
- (45) Range of postweld heat treat temperature covered by this WPS
- (46) Range of postweld heat treat time covered by this WPS
- (47) Shielding gas type (i.e., CO<sub>2</sub> Argon-CO<sub>2</sub> or etc.)
- (48) Shielding gas percent composition (i.e, 75%A-25% CO<sub>2</sub>)
- (49) Shielding gas flow rate range.
- (50) List trailing shielding gas is used and if so list type and etc.
- (51) List if gas backing is used and if so list the type and etc.
- (52) Type of current (i.e., A.C. or D.C.)
- (53) Polarity (i.e., straight or reversed)
- (54) Amperage range
- (55) Voltage range. See note on form  
\*(Amps and volts should be recorded for each electrode size, position, thickness and processes etc. This information maybe listed on the bottom of QW-482 (back) as shown below.
- (56) Tungsten electrode size range and type (i.e., 3/16" and 1/16" dia, 2% thoriated, etc.)
- (57) Mode of transfer for GMAW (i.e, Spray arc, short circuiting arc, Pulsed, etc.)
- (58) Electrode wire feed speed range for each size
- (59) List type of technique(s) for each process by this WPS
- (60) Orifice or gas cup size (i.e, #5 to #10 etc.)
- (61) List type of cleaning required and or allowed (i.e., wire brushing or grinding on each side of weld joint 1/2" for ferrous metals 2" for non ferrous, carbon steel brush not permitted for stainless steel etc.)
- (62) List methods of Back Gouging required and or allowed (i.e, air arc, chipping and grinding or etc.)
- (63) List oscillation parameter ranges covered by this WPS (i.e, width, frequency, etc.)
- (64) Contact tube to work distance range.
- (65) List multipass or single pass (per side) when applicable.
- (66) List single or multiple electrode when applicable
- (67) Travel Speed range
- (68) List method(s) of peening required and/or allowed

- (69) List other techniques, essential or non-essential variables applicable to this WPS.
- (70) List each layer with specific changes in this WPS (i.e., root pass, fill passes, cover pass)
- (71) List process(es) for use with this WPS
- (72) AWS classification(s) (i.e., E6010, E7018)
- (73) List all diameter(s) for use with this WPS
- (74) & (75) List amp range and polarity for each specific change (size & process)
- (76) List voltage range when applicable
- (77) List travel speed range for each specific change
- (78) Additional changes, Techniques, or comments

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