



**CERTIFICATION TEST SPECIFICATION NO**  
**D9.1-F6-GMAW-2F\_TXST**

**AWS D9.1 – GMAW-S, 2F FILLET WELD**  
**3/16” PLATE**  
**ER70S-6 ELECTRODE**  
**WPS: D9.1-F6-GMAW-All**



## **SCOPE**

This test weld is a single pass 2F, horizontal fillet weld on a carbon steel plate “T” joint using GMAW-S (Gas Metal Arc Welding, Short-Circuiting mode of transfer).

## **MATERIALS AND PREPARATION**

Materials: 2 Carbon Steel Plates, 6” x 3” min. x 3/16” Thick

Joint Type: “T” Joint Fillet Weld, see Appendix 2

Tolerances: Root Opening: 0” [+1/16”, -0”]

Root Face: N/A, “T” Joint

Root Angle: N/A, “T” Joint

## **WELD REQUIREMENTS**

WPS: D9.1-F6-GMAW-All (see Appendix 1)

Filler Metal: ER70S-6 Electrode; 0.035” Diameter

Shielding Gas: 75%/25% Argon/CO<sub>2</sub>

Weld Type: Single Sided Fillet Weld

Passes: Single Pass

Position: 2F, Horizontal (see Appendix 3)

Weld Size: 1/4” [ $\pm 1/16$ ”] (see Appendix 4 for examples of acceptable & unacceptable weld profiles)

Test Welding: Plates must be completely welded in the specified horizontal position. A deviation of  $\pm 15^\circ$  from the horizontal plane is permitted.

Test coupons should not be moved or have the position adjusted until welding is complete.

Fillet weld shall be placed in a single weld pass<sup>1</sup>, starts and stops are permitted.

<sup>1</sup> **Note:** The AWS definition of a weld pass is a single progression of welding along a joint. The result of a weld pass is a weld bead or layer.



## **VISUAL INSPECTION REQUIREMENTS**

### **Welding Code:**

AWS, D9.1, Sheet Metal Welding Code (Sec. 6.4)

### **Acceptance Criteria:**

Inspection of all fillet test welds shall be visual, without aid of magnification. Except for the first and last 1/2 inch, welds shall exhibit the following:

- (1) Complete fusion;
- (2) Required minimum effective throat (weld size);
- (3) Convexity not to exceed 1/8";
- (4) No more than one visible pore or inclusion in any 1" of weld. The size of any pore or inclusion shall not exceed 0.25T (see Table 1 below for tabulated values);
- (5) No undercut exceeding 0.15T for base metal  $\leq 3/16"$  or 0.25T for base metal  $> 3/16"$  (see Table 1 below for tabulated values);
- (6) No cracks.

<b>Table 1 Max. Allowable Discontinuity Dimensions</b>		
<b>Base Metal Thickness (T)</b>	<b>Max. Allowable Pore Size</b>	<b>Max. Allowable Undercut</b>
0.1046 (12 ga.)	0.026"	0.016"
0.1345 (10 ga.)	0.034"	0.020"
3/16"	0.047"	0.028"
0.2391" (3 ga.)	0.060"	0.060"

## **NONDESTRUCTIVE EXAMINATION REQUIREMENTS**

### **Welding Code:**

N/A, NDE other than visual inspection is not required for this weld.

### **Acceptance Criteria:**

N/A

## **DESTRUCTIVE TESTING REQUIREMENTS**

### **Welding Code:**

N/A, destructive testing is not required for this weld.

### **Acceptance Criteria:**

N/A



# APPENDIX 1 – WPS

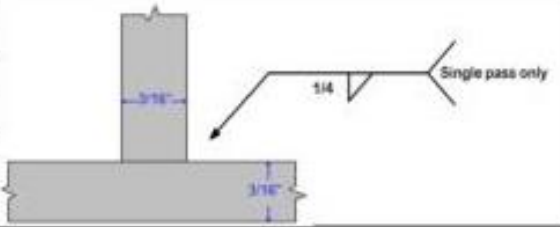


Welding Procedure Specification (WPS)  
 AWS D9.1/D9.1M:2018,  
 Sheet Metal Welding Code

WPS No.	D9.1-F6-GMAW-All	Revision	0	Date	31-08-21
Supporting PQR(s)	D9.1-F6-GMAW	Company	TXHSWS		

**Scope** GMAW fillet welds on mild carbon steel.

Joint Design	
Joint/Weld Type	Fillet Welds on T-Joints
Fit-up	90°, +/- 12°
Root Opening	0
Backing	N/A
Backgouging	None
Coating	None



Base Material			
P, M, or Group No.	Group I	Welded To	Group I
Thickness Range	3/16"	Diameter	All

Heat Treatment			
Preheat Min.	32°F (if < 32°F, preheat to 70°F min.)	PWHT Type	None
Interpass Max.	600°F	Procedure	-

Procedure		Procedure	
Weld Layer(s)	All	Weld Layer(s)	All
Process(es)	GMAW	Process(es)	GMAW
Type	Semi-Automatic	Shielding Gas	75%Ar/25%CO2
Transfer Mode	Short-Circuiting	Flow Rate	20 - 35 cfh
Position	All	Backing Gas	None
Progression	Uphill	Nozzle/Cup Size	1/4" - 1/2"
Filler Metal F-No	6	Tungsten Type	N/A
Classification	ER70S-X	Classification	-
Diameter	0.030" - 0.045"	Diameter	-
Deposit Thickness	N/A	Stringer/Weave	Stringer or Weave
A-No.	1	Mult or Single Pass	Single
Current/Polarity	DCEP	Tube-Work Distance	1/4" - 3/4"
Amps	100 - 180	Wire Feed Speed	150 - 280
Volts	17 - 22	Number of Electrodes	1
Travel Speed	5 - 10 ipm	Interpass Cleaning	Wire Brush
Heat Input Max.	47,520 J/in.	Peening	None

We, the undersigned, certify that this document was prepared in accordance with the requirements of AWS D9.1/D9.1M: 2018, *Sheet Metal Welding Code*.

This procedure has been authorized for use in the *Texas High School Welding Series (TXHSWS)* by Eric Pesak.

*Eric Pesak*

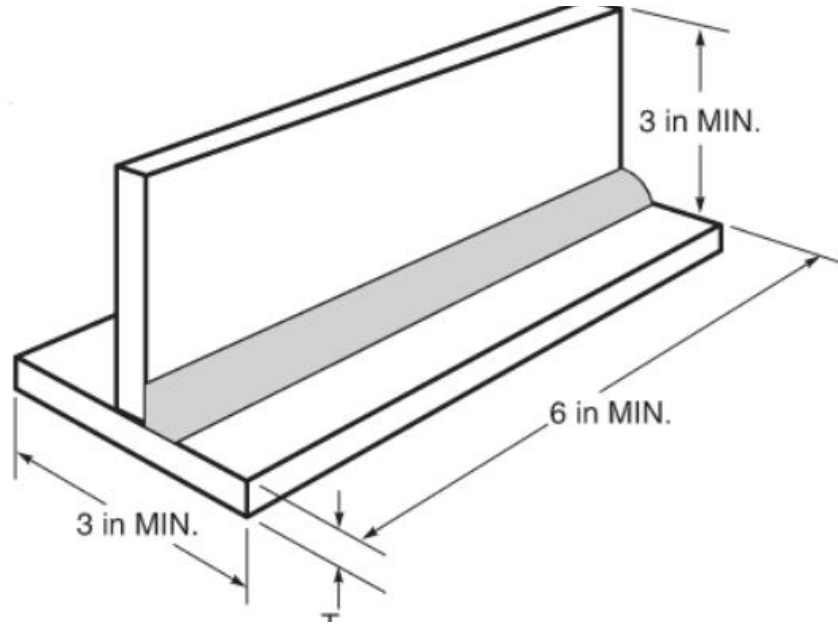


I have reviewed this procedure.

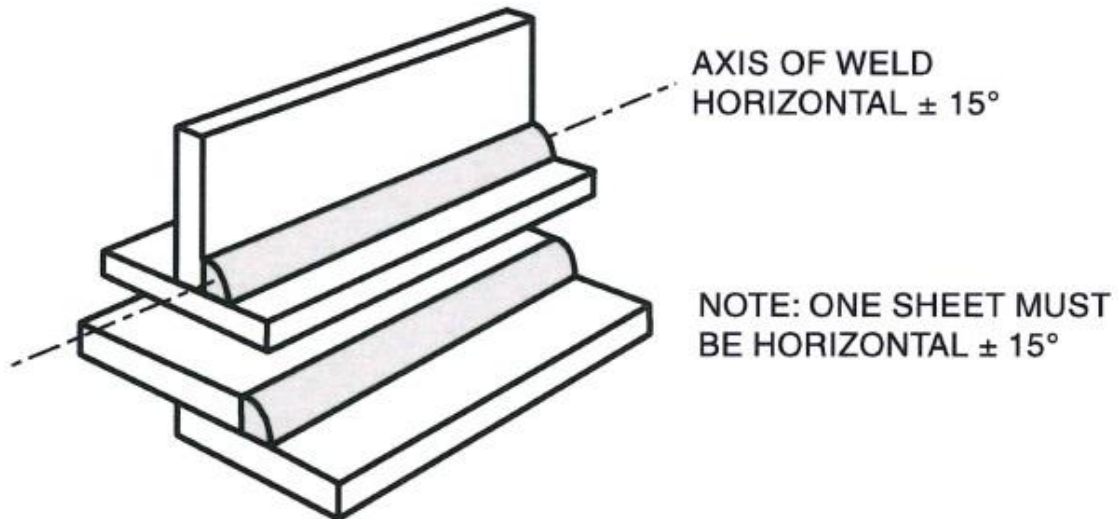
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2021-09-19

**APPENDIX 2 – WELD COUPON**

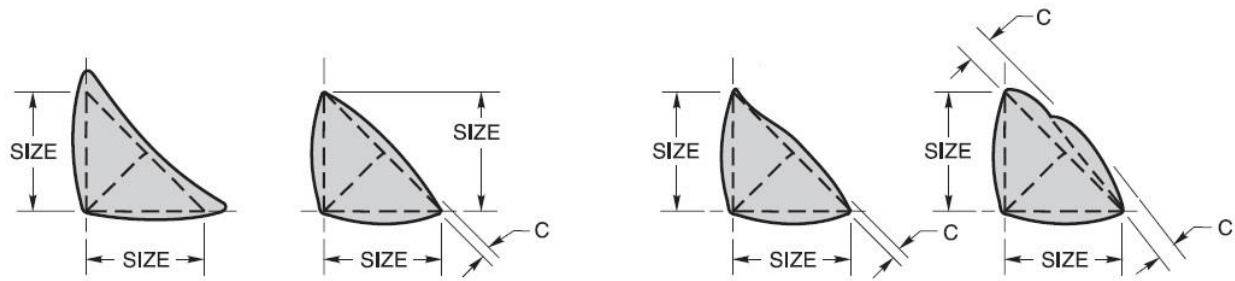


## APPENDIX 3 – WELD POSITION



**TEST POSITION 2F, HORIZONTAL**

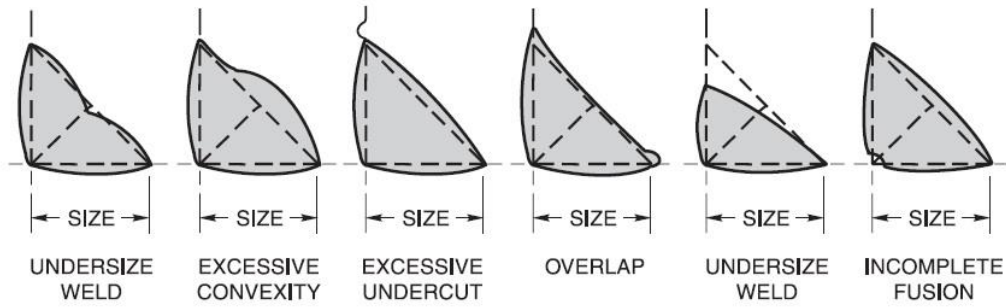
## APPENDIX 4 – WELD PROFILES



(A) DESIRABLE FILLET WELD PROFILES

(B) ACCEPTABLE FILLET WELD PROFILES

C = CONVEXITY



(C) UNACCEPTABLE FILLET WELD PROFILES