

Welding Manual

9040

Prequalified Joint Welding Procedure

Procedure Specification

Procedure Specification for semiautomatic gas metal arc (MIG) welding of mild carbon steel per AWS structural welding code D1.1 1999 using 75-25 (75% Argon 25% CO²) gas - spray arc transfer - solid wire.

Base Metal: A-36 plate

Base Metal Thickness: 3/16" - 1 "

Filler Metal: .035" diameter solid wire AWS E-70S-3 Typical chemical composition - Carbon .10 Manganese 1.14 Phosphorus .015 Sulfur .020 Silicon .55

Gas for shielding arc welding 75% argon 25% Carbon Dioxide

Position: Groove Welding shall be done in flat positions. Fillet Welding shall be done in the flat and horizontal positions.

Preparations of Base Metal: The edges on surfaces of the parts to be joined by welding may be

prepared by flame cutting or machining and shall be cleaned of excessive amounts of oil, grease, moisture, scale, rust or other foreign material.

Nature of the Electric Current: Direct current reverse polarity.

Welding Technique: E-70S-3 AWS welding wire 0.035 diameter. Welding current approximately 200 Amps 21-21 volts.

Appearance of Welding: The welding current and manner of depositing the weld metal shall be such that there shall be practically no undercutting cold lap on the base metal.

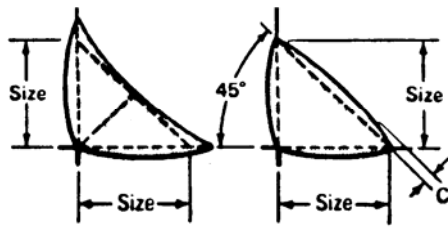
Defects: Any cracks or holes that appear on the surface of the weld beads shall be removed by grinding, chipping or gouging. All sharp edges etc., will be removed.

This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in 4B, C, or D AWS D1.1, Structural Welding Code.

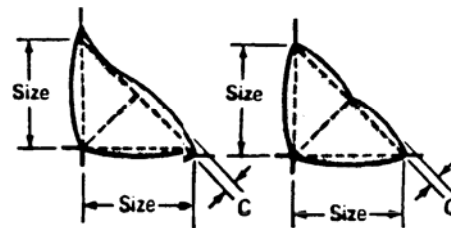


Acceptable And Unacceptable Weld Profiles

(A) Desirable fillet weld profiles

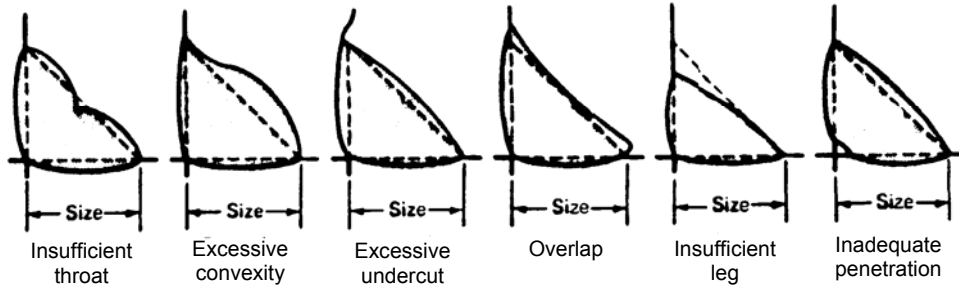


(B) Acceptable fillet weld profiles

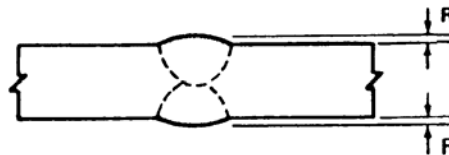


Note: Convexity, C, of a weld or individual surface bead shall not exceed 0.07 times the actual face width of the weld or individual bead, respectively, plus 0.06 in. (1.5 mm).

(C) Unacceptable fillet weld profiles

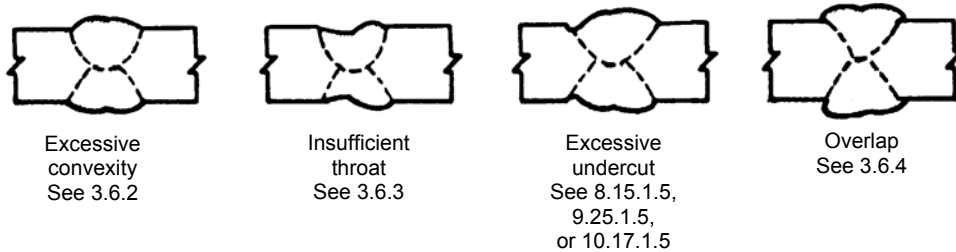


(D) Acceptable butt weld profile



Note: Reinforcement R shall not exceed 1/8" (3.2 mm). See 3.6.2

(E) Unacceptable butt weld profiles

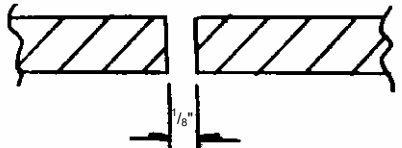


Prequalified Joint Welding Procedure Procedure Specification

Material specification	Mild carbon steel - per AWS D1.1 - (1999)
Welding process	Semi-Automatic gas metal arc (MIG)
Manual or machine	Semi-Automatic MIG equipment - consumable electrode
Position of welding	Groove weld - flat
Filler metal specification	
Filler metal classification	0.035 Ø - soudwire AWS E - 705-3
Flux	
Weld metal grade*	A - 36 maximum thickness 3/8"
Shielding gas	75% Argon - 25% Carbon Dioxide
Single or multiple pass	As required (string bead)
Single or multiple arc	
Welding current	Direct current - Reverse polarity
Polarity	Current approximately 200 Amps - 21-21 Volts
Welding progression	
Root treatment	Back gouge - carbon arc or grind
Preheat & interpass temp	N/A
Postheat treatment	N/A

* Applicable only when filler metal has no AWS classification

Welding Procedure

Pass No.	Electrode Size	Welding Current		Travel Speed	Joint Detail
		Amperes	Volts		
All	E705-5 0.052	200-350	25-34	Manual	 <p style="text-align: center;">(3/8" max. material thickness)</p>
All	E705-5 0.045	165-225	18-24	Manual	

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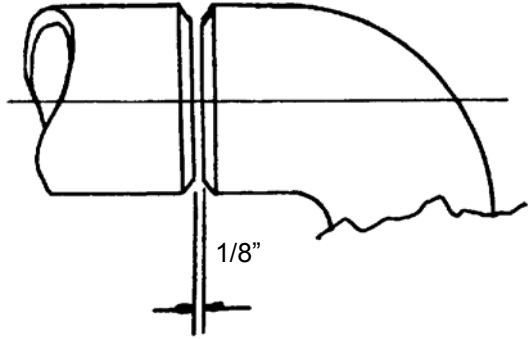
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Prequalified Joint Welding Procedure Procedure Specification

Material specification	Carbon steel pipe - ASTM - A53 - Grade B
Welding process	Semi-Automatic - gas metal arc (MIG)
Manual or machine	Manual
Position of welding	Flat - rotate member for position
Filler metal specification	
Filler metal classification	
Flux	
Weld metal grade*	
Shielding gas	CO ₂ Flow rate 24 ft ³ /hr
Single or multiple pass	Multiple
Single or multiple arc	Single
Welding current	DC+
Polarity	Positive
Welding progression	
Root treatment	Natural corner placement - commercial fittings
Preheat & interpass temp	
Postheat treatment	

* Applicable only when filler metal has no AWS classification

Welding Procedure

Pass No.	Electrode Size	Welding Current		Travel Speed	Joint Detail
		Amperes	Volts		
All	0.045	165-225	18-25	Manual	 <p style="text-align: center;">Natural Bevel Provided With Std Pipe Fittings</p>

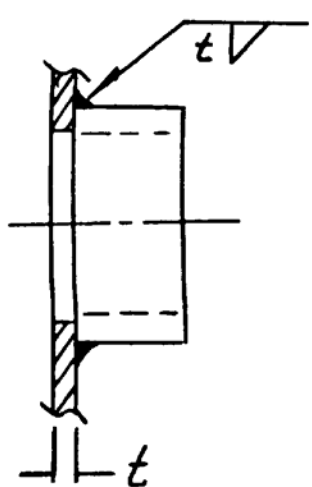
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Prequalified Joint Welding Procedure Procedure Specification

Material specification	A-36 Mild carbon steel	
Welding process	Semi-Automatic - flux core - AWS D1.1 -1999	
Manual or machine	Machine	
Position of welding	3G	
Filler metal specification	Wire - AWS - 52D	
Filler metal classification	E-70T-1	
Flux	Within wire	
Weld metal grade*		
Shielding gas	75-25	Flow rate 30 ft ³ /hr
Single or multiple pass	As required	
Single or multiple arc		
Welding current	Wire - 220-280V	
Polarity	Reverse	
Welding progression	Travel as required	
Root treatment	N/A	
Preheat & interpass temp		
Postheat treatment		

* Applicable only when filler metal has no AWS classification

Welding Procedure

Pass No.	Electrode Size	Welding Current		Travel Speed	Joint Detail
		Amperes	Volts		
All	Wire 0.062	DC+ 220-280	25-35 Constant	Manual	

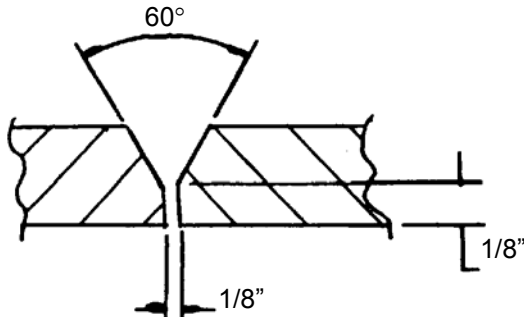
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Prequalified Joint Welding Procedure Procedure Specification

Material specification	A-36 Mild carbon steel	
Welding process	Semi-Automatic - flux core - AWS D1.1 - 1999	
Manual or machine	Machine	
Position of welding	3G	
Filler metal specification	Wire - AWS - 52D	
Filler metal classification	E-70T-1	
Flux	Contained within wire	
Weld metal grade*		
Shielding gas	75-25	Flow rate 30 ft ³ /hr
Single or multiple pass	As required	
Single or multiple arc		
Welding current	Wire - 220-280V	
Polarity		
Welding progression	Travel as required - flat	
Root treatment	Bevel prep	
Preheat & interpass temp	50° min	
Postheat treatment	N/A	

* Applicable only when filler metal has no AWS classification

Welding Procedure

Pass No.	Electrode Size	Welding Current		Travel Speed	Joint Detail
		Amperes	Volts		
All	Wire 0.062	DC+ 220-280	25-35 Constant	Manual	 <p style="text-align: center;">3/16" through 3/4" material thickness</p>

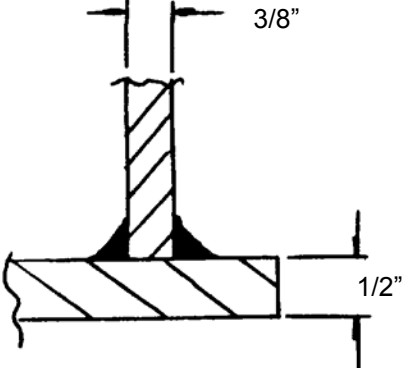
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Welding process	Semi-Automatic - flux core - AWS D1.1 - 1999		
Manual or machine	Machine		
Position of welding	3G		
Filler metal specification	Wire - AWS - 52D		
Filler metal classification	E-70T-1		
Flux	Within wire		
Weld metal grade*			
Shielding gas	75-25	Flow rate	30 ft ³ /hr
Single or multiple pass			
Single or multiple arc			
Welding current	Wire - 220-280V		
Polarity	Reverse		
Welding progression	Travel as required		
Root treatment	N/A		
Preheat & interpass temp	50° min		
Postheat treatment	N/A		

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Welding Procedure

Pass No.	Electrode Size	Welding Current		Travel Speed	Joint Detail
		Amperes	Volts		
All	Wire 0.062	DC+ 220-280	25-35	Manual	 <p style="text-align: center;">"Tee" joint - multiple material thickness</p>

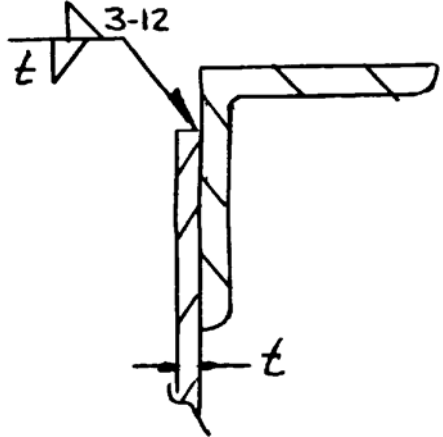
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Prequalified Joint Welding Procedure Procedure Specification

Material specification	A-36 Mild steel - plate and structurals	
Welding process	Semi-Automatic - flux core - AWS D1.1 - 1999	
Manual or machine	Machine	
Position of welding	3G	
Filler metal specification	E-70T-1 - wire - AWS 52D	
Filler metal classification		
Flux	Within wire	
Weld metal grade*		
Shielding gas	75-25	Flow rate 30 ft ³ /hr
Single or multiple pass	As required	
Single or multiple arc		
Welding current	Wire - 220-280V	
Polarity	Reverse	
Welding progression	Travel as required	
Root treatment		
Preheat & interpass temp	50° min	
Postheat treatment		

* Applicable only when filler metal has no AWS classification

Welding Procedure

Pass No.	Electrode Size	Welding Current		Travel Speed	Joint Detail
		Amperes	Volts		
All	Wire 0.062	DC+ 220-280	25-35 Constant	Manual	

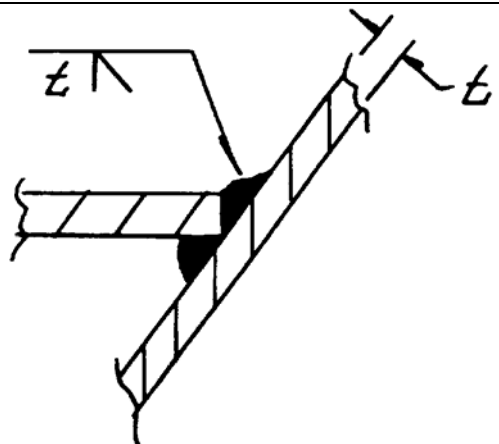
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Welding process	Semi-Automatic - flux core - AWS D1.1 - 1999		
Manual or machine	Machine		
Position of welding	3G		
Filler metal specification	Wire AWS 52D		
Filler metal classification	E-70T-1		
Flux	Contained with wire		
Weld metal grade*			
Shielding gas	75-25	Flow rate	30 ft ³ /hr
Single or multiple pass	As required		
Single or multiple arc			
Welding current	Wire - 220-280V		
Polarity	Reverse		
Welding progression	Travel as required		
Root treatment	Natural bevel by position		
Preheat & interpass temp	50° min		
Postheat treatment	N/A		

* Applicable only when filler metal has no AWS classification

Welding Procedure

Pass No.	Electrode Size	Welding Current		Travel Speed	Joint Detail
		Amperes	Volts		
All	Wire 0.062	DC+ 220-280	25-35 Constant	Manual	 <p style="text-align: center;">"Natural Bevel"</p>

This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in 4B, C, or D of AWS D1.1, (1999) Structural Welding Code.
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