

Engineering Procedure

SAEP-1103

29 October, 2003

Welding Test Supplement S03 for
SMAW, Stainless Steel, Single Sided

Document Responsibility: Inspection Department

Saudi Aramco DeskTop Standards

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Previous Issue: 30 April, 2000 Next Planned Update: 1 November, 2008

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1 Scope

This welder performance qualification Test Supplement shall govern the testing of welders with the Shielded Metal Arc Welding (SMAW) process, welding progression vertical up, for welding stainless steel pipe (limited application - refer to the restrictions in paragraph 3.9).

2 Applicable Documents

The requirements contained in the following documents apply to the extent specified in this procedure.

2.1 Saudi Aramco References

Saudi Aramco Engineering Procedures

[SAEP-321](#)

*Performance Qualification Testing and
Certification of Saudi Aramco Welders*

[SAEP-1101](#)

*Welding Test Supplement S01 for SMAW, Carbon
and Low Alloy Steel Pipe, Uphill*

2.2 Industry Code(s) and Standard(s)

American Society of Mechanical Engineers

ASME SEC IX

*Qualification Standard for Welding and Brazing
Procedures, Welders, Brazers, and Welding
and Brazing Operators*

3 Instructions

Conduct the Performance qualification testing of welders following the requirements of [SAEP-321](#) as supplemented by the subsequent instructions.

3.1 Applications

Piping	Yes *
Pipelines	No
Pressure Vessels	Yes *
Tanks	Yes *
Structural	Yes *
Dissimilar Metals	Yes *

CRWMO	Yes *
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* See restrictions in paragraph 3.9

3.7 Testing and Inspection Requirements

Time Limit of Test	Four (4) hours maximum
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Radiography	100% (ASME QW-191)
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Visual Inspection	See paragraph 6.1.3 of SAEP-321
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3.8 Qualification Limits

Material Form	Plate or pipe
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Joint Type	Groove welds with backing and fillet welds
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Base Material	Stainless steels (P8)
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Process	SMAW
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Filler Metal:

Root/Fill/Cap	EXXX-15/16 (A5.4 austenitic)
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Base Metal Thickness	Unlimited
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Diameter Range	2.5" NPS and greater
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Positions	All
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Vertical Progression	Uphill
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3.9 Restrictions

(A) Piping - root pass welding is only permitted:

- (1) when the backside of the root is accessible for back grinding and back welding, or
- (2) when the piping to be welded is a gravity drain, or a vent operating at atmospheric pressure.

(B) Pressure Vessels and Tanks - limited to single sided full penetration welds with backing, double sided full penetration welds (second side back gouged or back ground to sound metal prior to welding), fillet welds and CRWMO welding [see (D) below].

- (C) Dissimilar Metal Welds (Pressure Vessels, Tanks and Structural) - permitted between austenitic stainless and ferritic steels using E309 welding electrodes for:
 - (1) structural welding applications where welds are not in contact with service fluid and the design temperature is less than 300°C, and
 - (2) welding stainless steel nameplates to vessel shells.
- (D) Corrosion-Resistant Weld Metal Overlay - welders with valid certifications are permitted to perform corrosion-resistant overlay welding provided a CRWMO Ability Performance Test per [SAEP-321](#) (paragraph 6.5.1) is performed.

Revision Summary

29 October, 2003

Minor revision to convert the text statements into a form layout (ASME SEC IX format).
Revised the "Next Planned Update".



WELDING PROCEDURE SPECIFICATION (WPS)

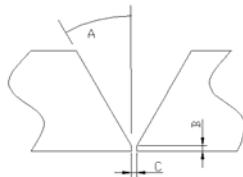
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Procedure Qualification Record (PQR): <u>None</u>	Welding Process: <u>SMAW, manual</u>
Scope: <u>For welder qualification only</u>	Prior Qualification Requirement: <u>S01</u>

BASE MATERIAL (QW-403)		POST WELD HEAT TREATMENT (QW-407)	
Test coupon type: <u>Pipe</u>		Temperature: <u>None</u>	
Material Spec, type or Grade: <u>Carbon Steel</u>		Time: _____	
Diameter of test coupon: <u>8" NPS</u>		Other: _____	
Thickness of test coupon: <u>0.812"</u>			
To Material spec. type or grade: <u>Carbon Steel</u>			
Tack Welds: <u>Four (4) made by the welder and incorporated into the root pass</u>			
FILLER METALS (QW-404)		GAS (QW-408)	
Weld Metal Analysis Number: <u>8</u>			
Filler Metal F No.: <u>5</u>		Gas	Composite
AWS specification: <u>A 5.4</u>		Shielding	Flow (CFH)
AWS Classification: <u>See Below</u>		Backing	
		Trailing	
POSITION (QW-405)		TECHNIQUE	
Position of Groove: <u>6G</u>		String or weave: <u>Stringer or Weave</u>	
Weld Progression: <u>Uphill</u>		Oscillation: _____	
PREHEAT (QW 406)		Multiple or Single pass per side: <u>Multiple</u>	
Preheat Temperature: <u>10°C</u>		Single or multiple electrode: <u>Single</u>	
Interpass temperature: <u>177°C</u>		Other: _____	
Other: _____			



Joint Design: Single Vee

A = 30° +/- 2.5°
B = 1.6 +/- 0.8mm
C = 3.2 +/- 0.8mm



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WELD LAYER	PROCESS	FILLER METAL		CURRENT		VOLTAGE	TRAVEL SPEED (cm/min)
		Class	Dia. (mm)	Polarity	Amps.		
All	SMAW	E308/308L/309/ 310/316/316L	2.4	DCEP	50-80	19-25	3.8-8.9
All	SMAW	E308/308L/309/ 310/316/316L	3.2	DCEP	75-110	19-25	3.8-10.2