

Engineering Procedure

SAEP-1111

29 October, 2003

Welding Test Supplement S11 for SAW,
Overlay, Carbon and Low Alloy Steel Pipe

Document Responsibility: Inspection Department

Saudi Aramco DeskTop Standards

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

Revised paragraphs are indicated in the right margin

Primary contact: Supervisor, ID/OID/IEU on 874-6604

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1 Scope

This welder performance qualification Test Supplement shall govern the testing of welders with the Submerged Arc Welding (SAW) process for welding corrosion-resistant weld metal overlay on carbon and low alloy steel pipe.

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 Procedure

[SAEP-321](#)

*Performance Qualification Testing and
Certification of Saudi Aramco Welders*

2.2 Industry Codes and Standards

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 No

Structural Yes *

* Restricted to shop fabrication only

3.7 Testing and Inspection Requirements

Time Limit of Test Two (2) hours maximum

	Liquid Penetrant Examination	100% (ASME QW-195)
	Guided-Bend Test	4S (ASME QW-163)
	Visual Inspection	See paragraph 6.5.2.3 of SAEP-321
3.8	Qualification Limits	
	Material Form	Plate or pipe
	Joint Type	Corrosion-resistant weld overlay
	Base Material	Carbon steel (P1) and low alloy steels (P3, P4, P5, P9, P11).
	Process	SAW
	Filler Wire	A5.9, A5.14
	Flux	Manufacturers recommended type
	Base Metal Thickness	Unlimited
	WM Overlay Thickness	Per the job approved WPS
	Position	1G (down flat or rolling)
3.9	Restrictions	
	None.	

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".
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WELDING PROCEDURE SPECIFICATION (WPS)

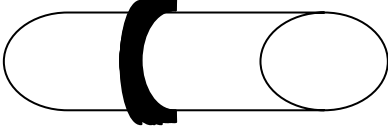
WPS S11

Rev. 0

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Procedure Qualification Record (PQR): <u>None</u>	Welding Process: <u>SAW</u>
Scope: <u>For welder qualification only</u>	Prior Qualification Requirements: <u>None</u>

BASE MATERIAL (QW-403)	POST WELD HEAT TREATMENT (QW-407)																
Test coupon type: <u>Pipe</u> Material Spec, type or Grade: <u>Carbon Steel</u> Diameter of test coupon <u>8" NPS</u> Thickness of test coupon: <u>0.812"</u> To Material spec. type or grade: <u>Carbon Steel</u> Joint Design: <u>Type - Weld overlay (bead on pipe)</u> <u>Number of Layers: 2</u> <u>Width of Overlay Area - 6"</u> <u>Thickness of Overlay - 1/4" (overall)</u>	Temperature: <u>None</u> Time: _____ Other: _____																
FILLER METALS (QW-404)	GAS (QW-408)																
Weld Metal Analysis Number: <u>NA</u> Filler Metal F No.: <u>43</u> AWS specification: <u>A 5.14</u> AWS Classification: <u>ERNiCu-7</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th><th style="width: 25%;">Gas</th><th style="width: 25%;">Composite</th><th style="width: 25%;">Flow (CFH)</th></tr> </thead> <tbody> <tr> <td>Shielding</td><td><u>None</u></td><td></td><td></td></tr> <tr> <td>Backing</td><td><u>None</u></td><td></td><td></td></tr> <tr> <td>Trailing</td><td></td><td></td><td></td></tr> </tbody> </table>		Gas	Composite	Flow (CFH)	Shielding	<u>None</u>			Backing	<u>None</u>			Trailing			
	Gas	Composite	Flow (CFH)														
Shielding	<u>None</u>																
Backing	<u>None</u>																
Trailing																	
POSITION (QW-405)	TECHNIQUE																
Position of Groove: <u>1G (rolling)</u> Weld Progression: _____	String or weave: <u>Stringer or Weave</u> Oscillation: _____ Multiple or Single pass per side: <u>Multiple</u> Single or multiple electrode: <u>Single</u> Other: _____																
PREHEAT (QW 406)																	
Preheat Temperature: <u>10°C</u> Interpass temperature: <u>177°C</u> Other: _____																	

	WELDING PROCEDURE SPECIFICATION (WPS)	WPS S11 Rev. 0 Page 2 of 2
		Joint Design: Weld overlay (bead on pipe)

WELD LAYER	PROCESS	FILLER METAL		CURRENT		VOLTAGE	TRAVEL SPEED (cm/min)
		Class	Dia. (mm)	Polarity	Amps.		
Bare Wire	SAW	ERNiCu-7					
Flux	SAW	INCO-5/SANDVIK NiCu-7SF	3.2	DCEP	150-250	28-32	25-50