



Engineering Procedure

SAEP-324

27 September 2009

Certification Review and Registration of Project Welders

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1 Scope

- 1.1 This Engineering Procedure specifies the minimum requirements for certification review and registration of contractor welders working on In-Kingdom construction and fabrication projects.
- 1.2 Unless specifically noted otherwise the term welder shall also mean welding operator.
- 1.3 Welders Performance and Guidelines Criteria are provided in Appendix I of this procedure.
- 1.4 Sample of Welder Job Clearance Card SA 4758 is provided in Appendix II of this procedure to provide uniformity in usage.
- 1.5 This procedure does not apply to permanent Manufacturers Fabrication Facilities.
- 1.6 This procedure does not apply to Maintenance Projects as defined in Section 4.

2 Conflicts and Deviations

Conflicts between this Engineering Procedure and any other Saudi Aramco Standard shall be resolved by the Chairman of the Inspection Engineering Standards Committee of the Inspection Department in writing.

3 Applicable Documents

Unless stated otherwise, all codes and standards referenced shall be the latest issue (including Revisions and Addenda). When industry codes and standards, or Saudi Aramco standards are required for use by project specification they shall become a part of this Engineering Procedure.

3.1 Saudi Aramco References

Saudi Aramco Engineering Procedures

<u>SAEP-321</u>	<i>Performance Qualification Testing and Certification of Saudi Aramco Welders</i>
<u>SAEP-1141</u>	<i>Radiation Protection for Industrial Radiography</i>
<u>SAEP-1160</u>	<i>Tracking and Reporting of Welding, NDT and Pressure Testing for Capital Projects</i>

Saudi Aramco Engineering Standards

<u>SAES-W-011</u>	<i>Welding Requirements for On-Plot Piping</i>
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SAES-W-012

Welding Requirements for Pipelines

SAES-W-013

Welding Requirements for Offshore Structures

Saudi Aramco Forms

SA 4758-ENG

Job Clearance Card

3.2 Industry Codes and Standards

American Petroleum Institute

API STD 1104

Welding of Pipelines & Related Facilities

American Society of Mechanical Engineers/Boiler & Pressure Vessels Code

ASME B31.1

Power Piping

ASME B31.3

Process Piping

ASME B31.4

*Pipeline Transportation Systems for Liquid
Hydrocarbons and Other Liquids*

ASME SEC IIC

Welding Rods, Electrodes and Filler Metals

ASME SEC V

Nondestructive Examination

ASME SEC IX

Welding and Brazing Qualifications

American Welding Society

AWS D1.1

Structural Welding Code - Steel

4 Definitions and Acronyms

Certified Welder: A welder that has a valid welder certification. A certified welder is only qualified to weld with those welding processes, and within the essential variables, of the valid certification according to the qualification governing code.

Contractor Welder: A welder working directly for, and under the supervision of, a contractor.

Fabrication Shop: A building used for the fabrication and/or assembly of equipment and structures such as pipe spools, pressure vessels, etc.

Fabrication Yard: A large open outdoor area used for the fabrication and/or assembly of very large structures such as offshore platforms, large pressure vessels, etc.

Field Fabrication Shop: A temporary fabrication shop set up in the field near a construction project by a contractor to fabricate piping, fittings and/or structural components.

JCC: Job Clearance Card (Form SA 4758-ENG)

Job Clearance Card (JCC): An identification card issued by Saudi Aramco Inspection to contractor welders registered on field fabrication projects. The JCC lists the welder's name, symbol, photograph, certifications held, description of the job, and the Name of Contractor Company.

Maintenance Project: A project to perform maintenance work under a short form contract with the Maintenance Department as the proponent.

Manufacturer's Fabrication Facility: in this procedure refers to In-Kingdom manufacturers fabrication facilities.

OIU: Operations Inspection Unit.

PWTC: Project Welder Tracking Coordinator

Qualification: See preferred term Welder Performance Qualification.

Qualification Card: A photo identity card issued by a welder testing agency or contractor to a welder passing a certification test that lists all the certifications held by the welder. Qualification Cards must be carried at all times by the welder, and must be presented for review upon request.

Qualified Welder: See preferred term Certified Welder.

Registered Welder: A welder whose certification has been reviewed, found to be acceptable, and is on file with the project inspector. Meets the requirements of this SAEP, [SAEP-321](#) and [SAEP-1160](#).

Registration: The act of registering a welder certification, or a photostatic copy thereof. Registration is performed after certification review and approval. Current lists of approved welders and/or Job Clearance Cards are examples of registration.

Retraining: as used in this procedure shall require a minimum of 40 hours of practice and instruction on the applicable welding process. Training should also include awareness of applicable sections of the Saudi Aramco Construction Safety Manual and [SAEP-1141](#), *Radiation Protection for Industrial Radiography*.

Saudi Aramco Approved Welder Testing Agencies: list available from ID website or as recommended by ID representative on site.

Saudi Aramco Construction Safety Manual: as available from Saudi Aramco Loss Prevention Department

Uncertified Welder: A welder that does not have a valid welder certification.

Unqualified Welder: See preferred term Uncertified Welder.

Welder Certification: Certification in writing that a welder has produced a test weld meeting a defined standard.

Welder Performance Qualification: The demonstration of a welders ability to produce a test weld meeting a defined standard.

WPS: Welding Procedure Specification

WTS: Welder Tracking System

WRR: Weld Rejection Rate

5 Responsibilities

5.1 The Project Inspector is responsible for:

- a) Reviewing contractor welder certifications prior to the start of welding;
- b) Registering contractor welders with valid welder certifications;
- c) Monitoring the initial production work of contract welders to determine their ability to make sound welds in accordance with the approved welder performance guidelines criteria for IK Projects per Appendix I.
- d) Monitoring the contractors quality control program to ensure contractor welder certifications and performance are being maintained in accordance with the governing codes and standards of the job or project including but not limited to ASME B31.1, ASME B31.3, ASME B31.4, ASME SEC IIC and ASME SEC V.
- e) Issuing and controlling Job Clearance Cards on the job.
- f) Monitoring Welder Qualification activities to ensure compliance with approved procedures and applicable codes/standards.
- g) Monitoring Welder Qualification activities of 3rd Party Testing Agencies to ensure compliance with Industry Codes and Saudi Aramco requirements.

Commentary Note:

If inspection of other non BI/JO work is handled by OIU, OIU Inspector is responsible for the above.

5.2. The Project Welder Tracking Coordinator is responsible for tracking all issued JCC's, welder performance and revoking of JCC's either at section level for small to medium size projects or on a single Mega Project.

6 Instructions

6.1 General Requirements

- 6.1.1 Contractors, fabricators and vendors are responsible for the testing and certification of welders working under their supervision in accordance with the governing Codes, standards, and or specifications of each project.
- 6.1.2 The project inspector shall have the right to require the removal or retest of any welder at any time due to unsatisfactory work or poor performance as indentified in Appendix I Welder Performance Guidelines.
- 6.1.3 Performance qualification testing of welders strictly for tack welding is prohibited.
- 6.1.4 For SMAW performance qualification testing welders shall be qualified for all passes and the full thickness of the test coupon.
- 6.1.5 The first three (3) production groove welds by each new contract welder shall be radiographed 100%. Radiograph acceptance shall be as specified by the applicable Code.
- 6.1.6 The first three production groove welds will not be included in the project welding statistics or weld repair rates for daily welding production percentage. The percentage radiography requirement is as listed in the applicable SAES-W-011 Section 17 and SAES-W-012 Section 16. Each welders and Welder operators work shall be represented in the percentage required.
- 6.1.7 For decision path on the first three (3) production welds see Appendix III.
- 6.1.8 Contractor to implement a tracking system that will track welder performance, Welder repair rates, identify short comings and actions required consistent with this SAEP and SAEP-1160.
- 6.1.9 Contract Welders and Welder Operators performance criteria to meet 0.2% Linear and 5% joint basis, with linear being the over-riding factor. From the performance data the welders shall be categorized from the linear WRR criteria as follows:
 - A. 0 - 0.2% Level A
 - B. >0.2% - 0.4% Level B
 - C. >0.4% - 0.5% Level C

D. > 0.5% Level D, Revoke

6.2 Field Fabrication Work

- 6.2.1 Contractor welders shall be tested in accordance with either **ASME SEC IX, AWS D1.1, or API STD 1104** as required, for all types of welding (includes tack, repair and temporary).
- 6.2.2 Contractor welders working on In Kingdom field construction projects (includes field fabrication shops also) shall be tested and certified by an independent 3rd Party Welder testing agency approved by the Saudi Aramco Inspection Department, Operations Inspection Division, providing written approval prior to the start of work.
- 6.2.3 Certifications of contractor welders and previous performance history shall be made available for review by the project inspector prior to the start of work. Continuity records shall be supported by a permanent NDT report – RT or UT.
- 6.2.4 Contractor welders that have not been properly certified shall not be permitted to weld.
- 6.2.5 All properly certified contractor welders shall be registered by the project inspector and issued a Job Clearance Card (JCC) prior to the start of work.
- 6.2.6 The initial production work of contractor welders shall be monitored by the project inspector to determine their ability to make sound welds. Contractor shall establish a hold point after new welders first three (3) production butt welds to verify the welding meets code requirements. The welder shall not proceed to production welding until after confirmation by NDT verification that the minimum acceptable NDT requirement as specified in Appendices I and III has been met.
- 6.2.7 The project inspector shall monitor the contractors quality control program to determine whether contractor welder certifications are being maintained in accordance with the governing Codes and standards of the job or project. Contractor welders that do not maintain valid certifications shall have their JCC withdrawn. Once withdrawn, JCC's will only be reinstated upon receipt of written proof of training, and the successful completion of a recertification test. All withdrawn JCC's shall be sent to the Project Welder Tracking Coordinator, where they will be kept on file for a period of at least three years.

6.2.8 For offshore pipelines and structures all welders welding primary joints (refer to SAES-W-013, Table 4, Note 7) shall be requalified if the original performance qualification test was not witnessed by a third party inspection agency. Requalification testing shall be witnessed by a third party inspection agency or the project inspector.

6.2.9 For offshore pipelines and structures all welders welding joints other than primary joints shall be retested on a 10% random basis, as selected by the project inspector unless the original performance qualification test was witnessed by a third party welder testing agency. Requalification testing shall be witnessed by a third party inspection agency or project inspector. If the requalification failure rate exceeds 20%, all welders shall be retested.

6.3 Fabrication Yard Work

6.3.1 For a land based Permanent fabrication yard or Project temporary field fabrication yard, the fabricator shall maintain a welder identification system acceptable to the project inspector. Welders shall carry an identification card that includes a photo, welders name, company identification number, and welders symbol.

6.3.2 A list of all welders shall be submitted to the project inspector prior to the start of work. This list shall be maintained up to date by the fabricator. The list shall include the welders name, symbol, processes qualified and all other important essential variables as well as certification issue dates.

6.3.3 The project inspector shall regularly audit welder certifications to ensure fabricator compliance with the Codes, standards and approved Quality Plan.

6.4 Job Clearance Cards (JCC)

6.4.1 Contractor welders working on field fabrication projects such as BI and JO work, and who are properly certified, shall be registered and issued a **Job Clearance Card (Form SA 4758-ENG)** by the project inspector prior to the start of work.

6.4.2 Job Clearance Cards are only valid for the job or project for which they are issued.

6.4.3 Job Clearance Cards can be withdrawn by the project inspector at any time for cause if the contractor welder is not producing work of acceptable quality. Once withdrawn, JCC's will only be reinstated upon

receipt of written proof of training, and the successful completion of a recertification test.

- 6.4.4 Job Clearance Cards shall be returned to the Project Welder Tracking Coordinator when the contractor welder goes on home leave or is terminated from the project. Contractor welders that return to work within three months from home leave (to the same project) may be reinstated without retesting.

Revision Summary

27 September 2009 Major revision.

Appendix I – Table for Welder Criteria

Welder Performance¹ Guideline (Contractor Welders) (On-Plot & Pipeline Manual / Semi-automatic Processes⁶)				
Welder Classification	JCC Status	Linear² Repair Rate (Weekly / Overall)	Joint² Repair Rate (Weekly / Overall)	Qualification & Performance^{3, 4, 5, 6} (Weekly & overall) - Weld Rejection Rate, WRR
A	Acceptable	Maximum 0.2%	5%	Level A Welder⁷, achieves both maximum 0.2% Linear and 5% Joint Repair Rates
B	Acceptable	Maximum 0.4%	7.5%	Level B Welder⁷, achieves up to maximum 0.4% Linear and up to 7.5% Joint Repair Rate,
C	See Note 7	Maximum 0.5%	See Notes	Level C Welder⁷, borderline, always meets maximum 0.5% Linear and regularly meets 7.5% maximum allowed Joint Repair Rate
D	Not Acceptable	Above 0.5%	Above 7.5%	Level D Welder⁸, consistently (weekly) exceeds above 0.5% linear and 7.5% joint rate. Pipe welding qualification to be Revoked. Note 8

Notes:

- Contractor's Welding Process Control Procedure (Company approved) shall clearly state acceptable Welding Performance parameters for initial and weekly production.
- Procedure shall define Linear & Joint method performance targets and these quality targets shall be acceptable to COMPANY and approved before welding begins.
- Procedure shall detail NDT requirements of initial Welder production to determine acceptability of welder performance, especially with new welders.
 - First three joints as a minimum shall be examined.
 - Welders shall not make additional initial production welds until their "initial performance" has been verified and NDT results are acceptable per the procedure.
 - First three joints shall not be counted as routine daily production for project WRR.
- Procedure states maximum number of consecutive weeks when a welder exceeds performance targets. Severe weather or other factors beyond welder control may be considered.
- Procedure shall state the amount of NDT up to 100% when target repair rates are exceeded or when a welder has been removed from Work.
- Pipeline Projects using Semi-automatic / Automatic / Combination Processes may utilize even more stringent Weld Quality Guidelines than those listed above for Manual process.
- Level A, B & C Welders
 - In all cases, Welder performance should target "A" Classification results with the lowest possible Linear & Joint Repair Rates achievable.
 - Continuing Process Improvement, Cost Effectiveness is acceptable for Cat. A & B welders.
 - Cat. C welders are not cost effective and require close supervision)

8. Level D Welders

- a) Welders may exceed the 7.5% joint WRR weekly for a maximum period of 2-3 weeks with close surveillance on all repairs.
- b) Additional supervision / additional NDT (to 100%) is required until consistent results of 7.5% WRR or less (joint repair rate) are achieved.
- c) If WRR target is not achieved within 2-3 weeks, the options are: (i) welder may be considered candidate for re-training and retesting or (ii) revoke qualification and remove from production work.

Appendix II – Template Job Clearance Card

Welder Job Clearance Card			Photo
Saudi Aramco 4758-Eng (5/09)		Required by SAEP-324	
WBS			
Project			
Contractor			
Welder Name		Symbol	
Note: This clearance card is for welding on the above mentioned project only, and may be revoked if welder's performance is not satisfactory. Card must be returned when welder is removed from this project.			
PID Inspector Issuing Card	JCC No.	Date	

Welder Job Clearance Card (Back)	
PID Section	
Cleared For Welding On	
Material P-No's	
Process	
Electrodes/F-No's	
Position/Progression	
Min/Max Thickness	
Diameter Range	
JCC No.	

Appendix III – Flow Diagram Of Radiographic Requirement for 1st Three Production Welds

