Materials System Specification

01-SAMSS-038 6 February 2012
Small Quantity Purchase of Pipe
from Stockist and Approved Pipe Mills

Document Responsibility: Materials and Corrosion Control Standards Committee

Saudi Aramco DeskTop Standards

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1 Scope

1.1 This specification defines the minimum mandatory requirements for the direct charge purchase of seamless and longitudinal seam submerged-arc welded pipe in quantities less than a mill run to be purchased in accordance with 01-SAMSS-035. This Specification is therefore applicable when a request for quotation on a pipe order yields no bids to 01-SAMSS-035 because of the small size of the order. Pipe orders large enough to be purchased in accordance with 01-SAMSS-035 shall not be broken into smaller orders for the purpose of substituting this specification. Pipes procured from stockist must be from manufacturers approved by Saudi Aramco. In addition to stockists, small quantity pipes can be directly procured from any approved vendor in accordance with this standard. Requirements of 01-SAMSS-035 do not apply for pipes procured to this specification.

Commentary Notes:

1. This specification is meant for use on small pipe orders that are placed with sources other than pipe mills because the quantities involved are too small for a mill run (≥50 tons). The intent is to use common API standard as much as possible, with only those additional requirements that are deemed necessary to ensure safe, reliable operation in the intended services.

2. All approved pipe mills in Saudi Aramco RVL shall be considered as approved stockists. Hence, small quantity pipes in accordance to this standard can be procured directly from any approved pipe mill. Any additional tests required to meet this standard can be more readily performed in a pipe mill as compared to a stockist due to availability all required equipment and qualified manpower.

1.2 This specification applies only to seamless and longitudinal seam submerged-arc welded pipe in strength grades equivalent to API SPEC 5L Grade B through API SPEC 5L Grade X65. Heat treatment condition of the pipes should be in compliance with the following:

Seamless pipe: Q, R, or N

Welded pipe: M, Q or N

1.3 This specification does not apply to the following:

1.3.1 Low pressure (maximum operating pressure 175.5 psi) utility pipe (bare, galvanized, or cement-lined) unless specified in the Purchase Order. Pipes intended for utility applications should be procured in accordance with SAES-S-010 or SAES-S-060.

1.3.2 Submerged-arc spiral welded pipe, electric resistance welded pipe, or high frequency induction welded pipe.

2 Conflicts and Deviations

2.1 Any conflicts between this specification and other applicable Saudi Aramco Materials System Specifications (SAMSSs), Engineering Standards (SAESs), Standard Drawings (SASDs), or industry standards, codes, and forms shall be resolved in writing by the Company or Buyer Representative through the Manager, Consulting Services Department of Saudi Aramco, Dhahran.

2.2 Direct all requests to deviate from this specification in writing to the Company or Buyer Representative, who shall follow internal company procedure SAEP-302 and forward such requests to the Manager, Consulting Services Department of Saudi Aramco, Dhahran.

3 References

Pipe supplied to this specification shall comply with the latest edition of the references listed below except where noted otherwise.

3.1 Saudi Aramco References

Saudi Aramco Engineering Procedure

SAEP-302	*Instructions for Obtaining a Waiver of a Mandatory Saudi Aramco Engineering Requirement*
SAEP-347	*Supplying Materials from Stockists*

Saudi Aramco Materials System Specification

01-SAMSS-035	*API Line Pipe*

Saudi Aramco Engineering Standard

SAES-L-131	*Fracture Control of Line Pipe*
SAES-S-010	*Sanitary Sewers*
SAES-S-060	*Saudi Aramco Plumbing Code*

Saudi Aramco Inspection Requirements

Form 175-010600	*Small Direct Charge Purchases of Seamless or Longitudinal Seam Submerged-Arc Welded Pipe*

3.2 Industry Codes and Standards

American Petroleum Institute

API SPEC 5L/ISO 3183	*Specification for Line Pipe*

4 General Requirements

4.1 The following requirements apply to both seamless and longitudinally welded pipes.

4.2 If the pipes are intended for one or more of the following services, it must be stated in the purchase order:

a) Sour Service
b) Class IV service
c) Offshore Service

4.3 The requirements stated in Saudi Aramco Engineering Procedure SAEP-347 shall apply.

4.4 The certification requirements of API SPEC 5L /ISO 3183, paragraph 10.1.3 applies to all orders. The original mill test certificate (MTC) shall be produced to Saudi Aramco for verification only.

4.5 Saudi Aramco reserves the right to request for the original purchase order placed by the stockist for the procurement of pipes from the mill.

4.6 Saudi Aramco reserves the right to verify the authenticity of the material and mill test certificates from the source.

4.7 The stockist/approved pipe mill must engage Saudi Aramco Approved Third Party Inspection Agency to inspect the pipes at the source prior to procurement. The scope of inspection is limited to produced pipes and in-process inspection is not required. The mill test certificate shall contain the approval of the concerned Third Party Agency (preferably the inspector's SAP Number).

4.8 Saudi Aramco reserves the right to request samples for testing.

4.9 Pipe purchased in accordance with this specification is subject to the requirements of Inspection Form 175-010600 in addition to the inspection requirements in the base specifications.

4.10 API SPEC 5L pipes, as reported in the MTC, must have been manufactured to PSL 2 requirements. It is not acceptable to upgrade PSL 1 pipes to PSL 2 pipes by additional testing in third party lab.

4.11 The maximum allowable carbon equivalent for all grades and wall thicknesses of pipe purchased in accordance with this specification shall be CE (IIW) = 0.42 if the carbon content is > 0.12% or PCM = 0.25 if the carbon content is ≤ 0.12% as calculated by the formula specified in API SPEC 5L/ISO 3183.

4.12 Pipe manufactured as Grade X60 or X65 (for sour and non-sour) may be substituted for a lower grade if it meets all requirements for the lower grade except maximum yield strength.

4.13 HIC resistant steel pipe is acceptable for use in sweet applications without containing white stripe.

4.14 Chemical Composition

The product analysis shall not exceed the following:

Silicon	:	0.38% for SAW and 0.40% for seamless
Titanium	:	0.04%
Vanadium	:	0.08%

Boron content shall be shown in the heat analysis or product analysis and shall not exceed 0.0005%.

4.15 Hardness Testing

Hardness testing shall be conducted as per the requirements of Annex H of API SPEC 5L/ISO 3183. Hardness test is required on all line items of every purchase order (including pipes intended for non-sour service). Only Vickers hardness tester shall be used. Maximum acceptable hardness, including weld cap, is 250 HV using 5 or 10 kg load. If hardness is not reported in the MTC, it is acceptable to carry out hardness testing in an approved third party lab.

4.16 Fracture Toughness Requirements

4.16.1 If the pipes are intended for Class IV service, impact test shall be carried out at 0°C or colder in accordance with Annex G of API SPEC 5L/ISO 3183. The energy values shall meet the requirement stated in the purchase order. Energy values shall be calculated as per Saudi Aramco Engineering Standard SAES-L-131 and API SPEC 5L.

4.16.2 If the pipes are intended for Class IV service, DWTT shall be carried out at 0°C or colder in accordance with Annex G of API SPEC 5L/ISO 3183. The acceptance criteria for DWTT shall be as per API SPEC 5L.

Commentary Note:

Class IV Service is for gas, two-phase flow, and liquid lines such as NGL, whose vapor pressure exceeds 100 psia.2. Pipes manufactured to the requirements of Annex G of API SPEC 5L/ISO 3183 can be used

for other than Class IV service provided the pipes are in compliance with all the other requirements of this specification.

4.17 Offshore Service

Pipes intended for offshore service shall meet the requirements of Annexure J and K of API SPEC 5L/ISO 3183 and the same shall be reflected in the MTC.

Commentary Note:

Pipes manufactured to the requirements of Annexure J and K of API SPEC 5L/ISO 3183 can be used for onshore applications provided the pipes are in compliance with all the other requirements of this specification.

4.18 Marking

4.18.1 Each pipe shall contain the manufacturer's hard stamped logo using low stress die stamping per paragraph 11.2.3 of API SPEC 5L/ISO 3183. It is acceptable to stamp the logo at the bevel edge or on the external surface close to the pipe end.

4.18.2 Pipes purchased for non-sour service shall be identified by painting a white longitudinal stripe, 50 mm wide by 450 mm minimum length, on the inside surface of both ends. This stripe is intended to provide identification until the pipe is installed. The pipe shall be hard stamped as "Non-Sour" along with the pipe identification details.

4.18.3 All marking shall be done by the pipe mill. It is not acceptable for the stockist to perform any marking, including restoration of lost identification.

5 Seamless Pipes

5.1 Subject to the additional general requirements in Section 4 above, seamless pipe is acceptable in accordance with this specification if it is purchased according to API SPEC 5L Grade B through X65 (PSL 2).

5.2 Sour Service

5.2.1 Pipe intended for sour service shall comply with Annexure H and K of API SPEC 5L/ISO 3183.

5.2.2 All pipes must have been stamped as sour service pipe ("S") by the pipe mill in accordance with API SPEC 5L. It is not acceptable to upgrade non-sour service pipes to sour service pipes by HIC testing.

5.3 Saudi Aramco inspector reserves the right to request for random thickness measurements along the length of the pipes.

6 Longitudinal SAW Pipes

6.1 Subject to the additional general requirements in Section 4 above, submerged-arc welded (SAW) pipe is acceptable in accordance with this specification if it is purchased according to API SPEC 5L Grade B through X65 (PSL 2).

6.2 Cold Expansion

SAW straight-seam pipe shall be subjected to cold expansion as per API SPEC 5L/ISO 3183 requirement.

Heat-treatment of pipe may be used in lieu of cold expansion, provided that heat treatment does not have an adverse effect on the mechanical properties and pipe roundness. All required final inspection and testing per the applicable code and standard shall be conducted after cold expansion or heat treatment.

6.3 Sour Service

6.3.1 Pipes intended for sour service shall not be manufactured from pseudo-HIC resistant plate.

Commentary Note:

Pseudo-HIC Resistant Plate is plate that is not fabricated utilizing the quality control/assurance and fabrication measures to intentionally produce HIC resistant steel.

6.3.2 Pipes intended for sour service must have been manufactured and tested in accordance with Annexure H and K of API SPEC 5L and the same should be reflected in the MTC.

6.3.3 Acceptance criteria for HIC test shall be as follows:

a) Crack Length Ratio (CLR) $\leq$ 10%

b) Crack Thickness Ratio (CTR) $\leq$ 3%

6.3.4 All pipes must have been stamped as sour service pipe ("S") by the pipe mill in accordance with API SPEC 5L. It is not acceptable to upgrade non-sour service pipes to sour service pipes by HIC testing.

Commentary Note:

Pipes manufactured for sour service can be used for non-sour service provided the pipes are in compliance with all the other requirements,

including hardness testing, of this specification.

Revision Summary

7 September 2009	Major revision.
21 June 2011	Editorial revision to remove the committee members list.
19 September 2011	Editorial revision to delete paragraph 4.18.1 as this requirement is impractical and causes confusion.
6 February 2012	Minor revision to allow for the procurement of small quantity pipes directly from approved vendors in RVL.