

Engineering Procedure

SAEP-125

31 May, 2003

Preparation of Saudi
Aramco Engineering Standards

Document Responsibility: Standards Coordinator

Saudi Aramco DeskTop Standards

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1 Scope

This procedure establishes instructions for the development and use of Saudi Aramco Engineering Standards (SAESs). This procedure also assigns responsibilities for those associated with these documents.

2 Applicable Documents

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

Saudi Aramco Engineering Procedures

<u>SAEP-14</u>	<i>Project Proposals</i>
<u>SAEP-103</u>	<i>Metric Units of Weights and Measures</i>
<u>SAEP-119</u>	<i>Saudi Aramco Materials System Specifications</i>
<u>SAEP-133</u>	<i>Instructions for the Development of "Regulated Vendors List" Engineering Standards</i>
<u>SAEP-134</u>	<i>Saudi Aramco Engineering Procedure Preparations</i>
<u>SAEP-301</u>	<i>Mandatory Saudi Aramco Engineering Requirements</i>
<u>SAEP-302</u>	<i>Instructions for Obtaining a Waiver of a Mandatory Saudi Aramco Engineering Requirements</i>

Saudi Aramco Engineering Standard

<u>SAES-A-112</u>	<i>Environmental and Seismic Design Criteria</i>
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Saudi Aramco Standard Drawing

<i>AE-036411</i>	<i>Drawing and Equipment Index Key</i>
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3 Instructions

3.1 Definition and Application

SAESs are standards, approved by Saudi Aramco Management, that establish minimum mandatory requirements for the selection, design, construction, maintenance, and repair of equipment and facilities. The requirements in these standards apply Company-wide. All capital, non-capital and expense projects under the control of Engineering and Operations Services shall use SAESs in effect on the Project Proposal approval date. See [SAEP-14](#). Maintenance

projects and all other work performed without Project Proposals shall use SAESs in effect when the work is authorized.

Standards are generally not applied retroactively to the maintenance and repair of existing facilities. However, new or revised standards which impact existing facilities regarding safety, environmental protection, health, or security shall be reviewed by operating organizations with Industrial Security, Loss Prevention, Consulting Services, Process & Control Systems Department, and others, to determine applicability and extent of implementation. For on-going or active projects, operating organizations shall include Project Management in their review to evaluate cost and schedule impact. Review decisions shall be documented for appropriate levels of Management.

The development and maintenance of "Regulated Vendors List" Engineering Standards are governed by [SAEP-133](#).

3.2 Format

Base the structure of all SAES documents on one of two styles: Exception or Narrative.

3.2.1 Exception-style SAESs define requirements as additions, modifications or deletions to the requirements in an industry standard, using the industry standard's chapter/ sections/paragraph numbering system. Use this style when an industry standard already defines the majority of Saudi Aramco's requirements. This is the preferred style because it reduces the number of requirements that must be generated and maintained. It also offers the benefit of alerting users to the Company's special requirements. See Attachment I for details of this style. Avoid repeating unchanged parts of the industry standard in the SAESs.

3.2.2 Narrative-style SAESs are used when the Standards Committee Chairman determines that an appropriate industry standard does not exist. He may supplement the content of one, or more, industry standards, but the requirements are not written as exceptions. Tailor the document structure of this style to meet the specific needs of the subject. See Attachment II for additional details associated with this style.

3.3 Contents

3.3.1 Write using simple, easy-to-understand language. Active sentences are preferred. They are usually shorter and more explicit than passive sentences. Use the verb "shall" to indicate mandatory requirements.

Establish the wording of the title as carefully as possible. It shall indicate, concisely and without ambiguity, the subject matter of the standard in such a way as to distinguish it from that of others, without going into unnecessary detail. Any necessary additional particulars shall be given in the scope.

Every standard shall begin with a scope section. Here, define without ambiguity, the subject of the standard and the aspect(s) it covers. The scope shall not contain requirements.

To assist Users of SAESs, locate requirements in SAESs that are most closely aligned with their discipline, as defined by Standard Drawing AE-036411.

Include in SAESs, all requirements needed by engineers, maintenance organizations, inspectors, contractors, vendors (for SAESs written for attachment to procurement documents), and any others involved with the selection, design, construction, maintenance, or repair of Company equipment and facilities.

To avoid the occurrence of duplicate or conflicting requirements, do not extract and repeat requirements from Saudi Aramco Materials System Specification (SAMSSs), or other SAESs. Instead, if a requirement is needed in both a SAES and a SAMSS, locate the requirement in the SAMSS and make reference to it in the SAES. Include all mandatory paragraphs shown in Attachment I.

Make reference to the content and details of Standard Drawings, to the extent they apply. To assist equipment or material specifiers in correctly using SAMSSs, include information needed to make decisions to fill-out equipment data sheets.

Include definitions of technical terms used in the SAES. Do not include nontechnical provisions already covered in Saudi Aramco's standard terms and conditions for contracting and purchasing, such as risk of loss, liability for failure or damages, warranties, rights to inspect, and other such legal matters. Check with the Law or Purchasing Departments if in doubt.

Pay attention to the way requirements are stated. Be aware that when design or construction alternatives (material selection, etc.) are allowed in an SAES, the decision-making criteria and thought process for a Lump-Sum-Turnkey contractor ("minimize first costs") may be completely different from and contrary to those for a Saudi Aramco engineer ("minimize total life-cycle costs"). Where there is a need to

review or approve certain technical items covered by the SAES (alternate designs, repairs, welder qualifications, test procedures, etc.) by someone in Saudi Aramco at Manager level, or below, indicate this responsibility by designating a specific position (Standard Committee Chairman, Unit Supervisor, Division Coordinator, etc.). Do not use general titles such as "the Saudi Aramco Engineer" unless this term is clearly defined within the body of the document. See Attachment I for an example.

To avoid any misunderstanding about the use of SAESs, specific authorization must be included within the body of the document to allow it to be referenced in and made a part of purchase orders. Without this authorization, it may not be included in purchase orders. See Attachment I for an example.

- 3.3.2 Give preference to referencing SAESs to the "latest edition" of an industry standard. However, the Standards Committee Chairman may decide that reference to a specific edition of the industry standard, will best satisfy the needs of the Company.
- 3.3.3 Use the International System (SI) of Units in SAESs, following the instructions of [SAEP-103](#), Metric Units of Weights and Measures.
- 3.3.4 Where additional information or explanation is needed to clarify the intent of a requirement or where there is a reasonable chance of misinterpreting or misapplying the requirement, include a commentary note. Make the note brief, limiting it to only the essential items. To distinguish it from the SAES requirements, label the note "COMMENTARY" and use *italics*. See Attachment I for an example.

3.4 Deviations

Deviations proposed by any organization that result in facilities meeting less than the minimum requirements require waiver approval in accordance with [SAEP-302](#) before proceeding with design or construction. For deviations identified after the start of design or construction, the waiver approval is required prior to design or construction completion.

3.5 Approval

Use the approval process outlined in [SAEP-301](#) "Mandatory Saudi Aramco Engineering Requirements" to develop new SAESs and revise existing SAESs. To keep SAESs current and up-to-date, conduct a major review and revision of every SAMSS at least every five (5) years, or other appropriate interval established for the document.

3.6 Distribution

The Standards Coordinator will ensure that the information of all approved SAESs is disseminated per [SAEP-301](#).

4 Responsibilities

Standards Committee Chairman (SCC)

The Standards Committee Chairman is responsible for doing the following:

- Determining the need for SAESs, and if required, developing them, making decisions about their style and contents.
- Verifying the cost-effectiveness and technical adequacy of the minimum technical requirements contained in the SAESs.
- Conducting a major review of every SAES at least once every five years.
- Forwarding draft documents to the Standards Coordinator to either route for BOE review or for the completion of approval, publication, and distribution processes per [SAEP-301](#).
- Coordinating the SAESs requirements with the RSA Representative.

Revision Summary

31 March, 2003	Revised the "Next Planned Update". Reaffirmed the contents of the document, and reissued with editorial changes.
31 May, 2003	Editorial revision to renumber SAEP-10 to SAEP-134 .

Attachment I – Exception Style Saudi Aramco Engineering Standard

The Exception style SAES is preferred. It shall follow the document structure outlined below.

TITLE AND TABLE OF CONTENTS (Mandatory)

The Title and Table of Contents identify the engineering standard and list its contents. Subheadings may be used to improve the usefulness of the Table of Contents.

SCOPE (Mandatory)

The Scope will define the facilities covered by the standard. In most cases the Scope will begin with:

"This standard defines the minimum mandatory requirements governing the design and installation of ____."

If the document's Scope is not unique to Saudi Aramco, summarize the Scope section of the industry standard. The Scope may include a description of areas specifically excluded from the document. (For example: "This standard does not apply to battery chargers and distribution systems used by communication facilities.") Do not include requirements in the Scope.

Include the following sentence in only those SAESs, where it is appropriate:

"This entire standard may be attached to and made a part of purchase orders."

Without this, the SAES may not be included in purchase orders.

CONFLICTS AND DEVIATIONS (Mandatory)

Include the following two paragraphs in each SAES:

"Any conflicts between this standard and other applicable Saudi Aramco Engineering Standards (SAESs), Materials System Specifications (SAMSSs), 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, Loss Prevention, etc.) Department of Saudi Aramco, Dhahran.

"Direct all requests to deviate from this standard 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, Loss Prevention, etc.) Department of Saudi Aramco, Dhahran."

REFERENCES (Mandatory)

List all documents that are referred to in the SAES. Do not list documents that are not referred to. Include the following requirement in this section:

"The selection of material and equipment, and the design, construction, maintenance, and repair of equipment and facilities covered by this standard shall comply with the latest edition of the references listed below, unless otherwise noted".

References are categorized by type under the following subheadings:

- Saudi Aramco References
- Industry Codes and Standards
- Other References

[SAES-A-112](#), "Environmental and Seismic Design Criteria", has been developed to consolidate this information and should be referenced in SAESs when environmental or seismic design criteria apply.

MODIFICATIONS TO INDUSTRY STANDARD (Mandatory)

Use the remainder of the document to identify the changes to individual paragraphs in the referenced industry standard. Begin the section with the following paragraph, inserting the name and number of the industrial standard in place of the parentheses.

"The following paragraph numbers refer to (industry standard) which is a part of this standard. The text in each paragraph is an addition, modification, exception, or deletion to the requirements of (industry standard), as noted."

COMMENTARY (Optional)

Section 3.3 of this procedure allows the use of short Commentary Notes that add information or requirement explanations to assist specification users in the proper interpretation and implementation of the document. Limit notes to essential information, without which there is a high probability of misinterpreting or misapplying the requirements. Locate the note immediately after the portion of the standard to which it applies. Begin the note with the word "COMMENTARY", and select an italics font for the note.

Attachment II – Narrative Style Saudi Aramco Engineering Standard

In case an appropriate industry standard does not exist, or there are none considered suitable for the Exception style format, write the SAES using the Narrative style format. Up to "Modifications to Industry Standard", the major sections in the body of this format are identical to and follow the same order as those shown in Attachment I. Select those "Optional" sections that apply to the equipment and facilities covered by SAESs, and add other sections as necessary.

TITLE AND TABLE OF CONTENTS (Mandatory)

SCOPE (Mandatory)

CONFLICTS AND DEVIATIONS (Mandatory)

REFERENCES (Mandatory)

GENERAL REQUIREMENTS (Optional)

(Use this section for definitions and for specifying other requirements of a general nature.)

MATERIALS (Optional)

(Use this section to cover mandatory material selection requirements.)

DESIGN (Optional)

(Use this section to cover mandatory design requirements.)

FABRICATION AND INSTALLATION (Optional)

(Use this section to cover mandatory fabrication and installation requirements, including those that facilitate maintenance.)

TESTING AND INSPECTION (Optional)

(Use this section to cover testing and inspection requirements, with their associated acceptance criteria, applicable to field fabrication and erection in the SAESs.)