

# Engineering Standard

---

SAES-N-130

30 November 2004

## Installation Requirements – Fireclay Bricks

---

### Heat Transfer Equipment Standards Committee Members

*Al-Anizi, S.S., Chairman*

*Al-Anezi, M.A.*

*Al-Bagawi, J.J.*

*Al-Dossary, M.A.*

*Al-Gahtani, M.S.*

*Al-Hamam, I.H.*

*Al-Rumaih, A.M.*

*Fernandez, G.T.*

*Moore, M.A.*

*Naffa'a, M.Y.*

## Saudi Aramco DeskTop Standards

### Table of Contents

1	Scope.....	2
2	Conflicts and Deviations.....	2
3	References.....	2
4	Definitions.....	3
5	Responsibilities.....	3
6	Installation.....	3
7	Storage and Handling.....	4
8	Inspection and Repairs.....	4

## 1 Scope

- 1.1 This standard covers the minimum mandatory requirements for the installation, testing, and inspection of fireclay bricks that are used for bridges and dividing walls in boilers, sulfur recovery unit equipment and process heaters.
- 1.2 For equipment and refractory system not covered by this Standard, the Saudi Aramco Engineer is to be contacted for guidance in determining the extent to which this Standard is applicable.
- 1.3 This entire standard may be attached to and be made a part of contracts for brick installation.
- 1.4 This standard covers the installation of new fireclay bricks, and the repair of existing fireclay bricks.

## 2 Conflicts and Deviations

- 2.1 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 Department of Saudi Aramco, Dhahran.
- 2.2 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 Department of Saudi Aramco, Dhahran.

## 3 References

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.

Saudi Aramco Engineering Procedure

[SAEP-302](#)

*Instructions for Obtaining a Waiver of a  
Mandatory Saudi Aramco Engineering  
Requirement*

Saudi Aramco Engineering Standard

[SAES-N-100](#)

*Refractory Systems*

## Saudi Aramco Inspection Requirements

*Form 175-328110*

*Inspection Requirement for Refractories*

### 4 Definitions

**Equipment Manufacturer:** The company that is responsible for the fabrication of boilers and process heaters to which fireclay bricks are installed.

**MSDS:** Material Safety Data Sheets for refractory material, supplied by the Refractory Manufacturer.

**Refractory Inspector:** The person or company authorized by the Saudi Aramco Inspection Department to inspect refractory installations to the requirements of this Standard.

**Refractory Installer:** The company responsible for the installation of fireclay bricks.

**Refractory Systems:** A lining system that is designed to resist high temperatures, hot gases, and the action of erosive materials. Components include anchors, reinforcement, vapor barriers, and refractory materials needed for complete installation.

**Saudi Aramco Engineer:** The Supervisor of the Piping and Valves Unit, Consulting Services Department, Dhahran.

### 5 Responsibilities

- 5.1 The Refractory Installer is responsible for installing refractory systems in accordance with the requirements of this standard and of the specific requirements of the Refractory Manufacturer and the Equipment Manufacturer.
- 5.2 The Refractory Installer is also responsible for preparing a complete installation procedure in accordance with the requirements of the Refractory Manufacturer, the Equipment Manufacturer, and this standard. The installation procedure is to be approved by the Saudi Aramco Engineer prior to installation.
- 5.3 The Equipment Manufacturer is responsible for preparing fully detailed engineering drawings of the refractory system. As a minimum, the drawings shall include anchorage design including spacing and orientation, refractory thicknesses, all materials, surface preparation, and welding details.

### 6 Installation

- 6.1 Expansion joints shall be provided in both vertical and horizontal directions of walls, at wall edges, around burner tiles, and doors.
-

- 6.2 Floor brick shall not be mortared. A 1.3 cm gap for expansion shall be provided on 1.8-meter interval. This gap may be packed with fibrous refractory material in strip, not loose bulk, form.
- 6.3 All brick lining on vertical flat casing shall be tied back and supported by the structural steel framing members. All tie members shall be austenitic alloy material. A minimum of 15% of the bricks shall be tied back. Tie backs are not required when the radius of the curvature of cylindrical casing keys the bricks.
- 6.4 Brick lining shall be supported by metal support shelves welded to the casing and centered a minimum of 8 meters vertically. Shelves shall be slotted to provide for differential thermal expansion. The support material shall be selected based on a calculated surface temperature plus 10°C.

## 7 Storage and Handling

- 7.1 Prior to placement, fireclay bricks shall be protected from mechanical damage.
- 7.2 The Refractory Manufacturer's precautions, as specified on the MSDS sheets, must be strictly followed.

## 8 Inspection and Repairs

### 8.1 Inspection

All inspection shall be carried out in accordance with Saudi Aramco Inspection Requirements Form 175-328110 and the requirements of this standard.

### 8.2 Repairs

8.2.1 The method of repair shall be in accordance with the original installation procedure.

8.2.2 Where needed, additional supports shall be installed.

### 8.3 Checklist for Fireclay Brick Refractory Installation

The following is a checklist of activities that shall be used by the Refractory Installer for the installation of fireclay bricks.

#### Revision Summary

30 November 2004 Revised the "Next Planned Update". Reaffirmed the contents of the document and reissued with no other changes.

## Checklist for Fireclay Brick Refractory Installation

### PRIOR TO INSTALLATION:

#### Materials

- Verify the types of materials supplied, data sheets and mixing instructions.
- Verify availability of MSDS sheets.

#### Documents

- Verify approved detail drawings.

#### Equipment Mixers

- Verify number and type are adequate.
- Back up mixer is available.
- Brick saw is available.
- Location relative to work.
- Cleanliness.

### INSTALLATION:

- Verify all dimensions per detail drawings.
- Verify construction joints.
- Verify plumbness and straightness per detail drawings.
- Verify the integrity of bricks (complete or sections) used.