

# Engineering Standard

SAES-B-008

30 April 2005

## Restrictions to Use of Cellars, Pits, and Trenches

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## Saudi Aramco DeskTop Standards

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## 1 Scope

- 1.1 This Standard provides the minimum mandatory requirements for the use of below-grade unventilated enclosures such as cellars, pits, valve boxes, telecommunication service points and trenches in which hazardous vapors may collect. This applies for all on-site and off-site facilities, pipeways, cross-country transportation pipeline corridors, flowlines, trunklines, gaslift pipelines, and test pipelines.
- 1.2 The requirements of this Standard are not applicable to cellars for oil or gas wells, drainage culverts, and piping and pits that are part of sanitary sewer systems.

## 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, Loss Prevention 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 of the Loss Prevention 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.

### 3.1 Saudi Aramco References

Saudi Aramco Engineering Procedure

[SAEP-302](#)

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

Saudi Aramco Engineering Standards

[SAES-B-064](#)

*Onshore and Nearshore Pipeline Safety*

[SAES-B-068](#)

*Electrical Area Classification*

[SAES-T-632](#)

*Communications Cable Splicing*

[SAES-T-633](#)

*Communications Splice Closures*

3.2 Industry Codes and Standards

National Fire Protection Association

*NFPA 49*

*Hazardous Chemical Data*

American Society of Mechanical Engineers

*ASME B31.8*

*Gas Transmission and Distribution Piping  
Systems*

**4 Definitions**

**Combustible Liquid:** A liquid that has a flash point greater than 54°C. For purposes of this Standard, the words "combustible liquid near or above its flash point" shall mean a combustible liquid which is at any temperature above or within 8°C of its flash point.

**Combustible Gas:** A gas which can form an ignitable mixture (as defined in NFPA 49) with air.

**Confined Space:** Any space that:

- a) has limited or restricted means of entry or exit,
- b) is not designed for human occupancy,
- c) contains or has the potential to contain a hazardous atmosphere,
- d) contains any other recognized serious safety or health hazards. Examples of confined spaces include tanks, vessels, vessel skirts, vaults, manholes, sewers, valve boxes, and structures or excavations four (4) feet deep or deeper. Areas above floating roof tanks where the top of the roof is more than 4 feet below the rim of the tank are also considered confined spaces.

**Flammable Liquid:** A liquid that has a flash point equal to or less than 54°C.

**Potentially Toxic Material:** In the context of this Standard is a liquid, gas, or solid with a total concentration of 5% or greater of materials with a Health Category rating of "3" or greater per NFPA 49 or the Saudi Aramco Chemical Hazards Bulletin at any operating condition.

**Plant piping:** For purposes of this Standard, all piping, above or below grade, within the perimeter fence.

**Connections in plant piping:** For purposes of this Standard, any flanged connection, valve, vent, drain, or screwed piping connection.

**Valve Box:** An enclosure large enough to permit entry of a person and that otherwise qualifies as a confined space as defined above, either covered or open at the top, and that contains a valve or other component of underground piping.

*Commentary:*

*This definition excludes a casing which provides access only to the top of a valve or other components such as flanges, from ground level and provides less than 0.3 m air space around the valve body.*

**Electrically Classified Area:** This is the area shown on electrically classified area drawings produced under [SAES-B-068](#) for all facilities where flammable liquids, gases or vapors are produced, processed, stored or handled.

## 5 Restrictions

- 5.1 Below-grade pipe trenches that are open or that are covered but not backfilled shall not be used.
- 5.2 Valves and piping that contain hydrocarbons or potentially toxic materials shall not be allowed inside valve boxes, manholes or other sub-grade enclosures.

*Exception:*

*In situations where there is no other alternative, each shall be reviewed and approved by the Manager, Loss Prevention. If so permitted, they shall meet the following requirements:*

- 1) *Sub-grade enclosures shall meet ASME B31.8, Sections 847 and 853.5.*
  - 2) *A warning sign requiring a confined space entry permit shall be posted nearby, installed, or painted on the valve box.*
  - 3) *Valve service and valve number shall be marked clearly and prominently on the valve box.*
  - 4) *The valve box entrance shall be kept locked and the key kept under the custody of the responsible Proponent Operating Department.*
  - 5) *A ladder and a stairway on opposite sides of the box shall be provided.*
  - 6) *The walls of the valve box shall extend no less than 0.6 m above the finished and stabilized grade. Valve boxes shall be designed to prevent the accumulation of blowing sand or surface water into the box.*
- 5.3 All permanent outdoor below-grade pits and manholes other than those associated with sanitary sewer systems, cable pull/splice boxes, cable chambers, service points, and valve boxes are prohibited in the following locations:
    - a) Inside electrically classified areas.
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- b) Within 60 m of tanks, vessels, process equipment, and connections in plant piping, containing flammable liquid, combustible liquid near or above its flash point, combustible gas, or potentially toxic material.
- c) Within 60 m of surface drainage swales, diked areas, or impounding areas serving tanks, vessels, equipment, or connections in plant piping containing flammable liquid, combustible liquid near or above its flash point, combustible gas, or potentially toxic material.

*Exception to c):*

*Splice chambers for communications cables are permitted provided that chambers are at least 30 m from surface drainage swales, and similar hazards and chamber depth does not exceed 750 mm (2.5 ft). Cable splices must meet [SAES-T-632](#) and [SAES-T-633](#).*

- d) Within the designated corridors of pipelines containing flammable liquid, combustible liquid near or above its flashpoint, combustible gas, or potentially toxic material, except as permitted by paragraph 10.6.1 of [SAES-B-064](#).

5.4 Buildings that are characterized by the following shall not have below-grade cellars, basements, or cable vaults:

- a) In plant areas, any building within 60 m of tanks, vessels, process equipment, or connections in plant piping, containing flammable liquid, combustible liquid near or above its flashpoint, combustible gas, or potentially toxic material.
- b) Within 60 m of surface drainage swales, diked areas, or impounding areas serving tanks and vessels, or process equipment noted in 5.3 (a).

5.5 All power, control, and communications cables and conduits entering buildings described by 5.4 (a) and (b) shall enter above grade through walls or floor using sealed conduit or sleeves.

*Exception:*

*For control room buildings, all cables shall enter the building underground but no cable vaults are allowed if 5.4 (a) applies. Where cables enter the building or pass through fire walls and partitions, the penetrations shall be fully sealed to prevent transmission of fire and vapors. The opening shall be protected by a steel-framed transit assembly with packing assembly for fire and watertight seal around the cable. Also, appropriate measures shall be taken to prevent transmission of fire or vapors inside the cables or conduits at the points of penetration.*

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**Revision Summary**

29 February 2004	Revised the "Next Planned Update". This revision was requested at the Haradh Project post-project review of Standards.
30 April 2005	Editorial revision.