Engineering Standard

SAES-T-243 31 December, 2003

Telecommunications: Protection
Equipment in Communication Buildings

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Previous Issue: 31 October, 2000 Next Planned Update: 1 January, 2009
Revised paragraphs are indicated in the right margin

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1 Scope

This Standard prescribes mandatory requirements for electrical protection in switching centers, central offices (CO) and other telecommunication equipment buildings.

2 Conflicts and Deviations

Any deviations, providing less than the mandatory requirements of this standard require written approval as per Saudi Aramco Engineering Procedure SAEP-302.

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-P-111	*Grounding*
SAES-T-634	*Telecommunications - Cable Testing and Acceptance*
SAES-T-795	*Communication Facility Grounding Systems*
SAES-T-887	*Telecommunications - Electrical Coordination & Protection at Power Plants and Radio Stations*
SAES-T-903	*Telecommunications - Outside Plant Electrical Protection and Grounding*

Saudi Aramco Standard Drawings

AA-036765	*Grounding for Remote Communication Sites*
AA-036391	*Grounding System for Telecommunication Building Facilities*

3.2 Industry Codes and Standards

General Telephone and Electronics

GTE 243-109-100	*Type C-311 Connector - Description and Use*
GTE 243-120-200	*Type C-303, C-310, and C-377 Connectors - Description and Installation*
GTE 243-130-200	*Type 700 Connector - Description and Installation*
GTE 605-100-100	*Cable bonding and Grounding Joint and Non-Joint Construction*
GTE 887-000-050	*Electrical Protection Engineering Fundamentals*

4 Design

The GTE 243 Series on "Distribution and Protection Equipment" is hereby recognized as Saudi Aramco Engineering Standard SAES-T-243 as modified below. Mandatory requirements are listed herein.

4.1 Protection Types

4.1.1 Cables Entering CO Buildings

4.1.1.1 GTE 887-000-050, (paragraph 8.05), GTE 605-100-100, (page 5) - The shields and armors of all cables (including the metallic members of fiber optic cables) entering switching centers, central offices and other telecommunication equipment buildings (includes radio and microwave buildings) must be bonded to each other and connected to the CO ground (CEGB or Cable Entrance Ground Bar).

4.1.1.2 GTE 605-100-100, (page 6) - If cable insulation joints are required, refer to SAES-T-903.

4.1.2 GTE 887-000-050, (paragraph 7.14) - All outside plant metallic twisted cable pairs entering switching centers, central offices and other telecommunication equipment buildings (includes radio and microwave buildings) shall be protected with fail safe solid state protectors.

4.1.3 Telecommunication digital facilities shall not be located where the maximum Ground Potential Rise (GPR) exceeds 300 V peak, or where the Electromagnetic field originated by a fault in the power system would impose more than 3.33 Joules within the digital communication facility. Refer to SAES-T-887.

4.1.4 UL Listings

GTE 887-000-050, (paragraph 5.07) - Central office protectors shall be UL (Underwriter's Laboratories) listed as a complete assembly. Refer to paragraph 3.4 above for the appropriate industry standard.

4.1.5 Fail Safe

GTE 887-000-050, (paragraph 5.08) - Arresters used on Saudi Aramco telecommunication circuits must be a type that always fail in the shorted/ grounded condition.

4.1.6 Ground Resistance Minimum Requirements Summary:

GTE 887-000-050, (paragraph 7.19)

- 3 ohms for communications facilities with Electronic Switching and Transmission Systems
- 2 ohms for communications facilities with communications Towers
- 25 ohms foe Microwave Remote Repeater Site (no switching or multiplex equipment)

For communication facility grounding systems refer to SAES-T-795, SAES-P-111, AA-036765 and AB-036391.

4.1.7 Fuse Cable Protection

GTE 887-000-050, (paragraphs 6.05 & 7.08)

a) Fuse cable of a minimum length of 2 m of fine gauge (24 or 26 AWG) cable shall be installed if the outside plant entrance cable contains 22 AWG or larger gauge conductors. Refer to Table 1.

b) No additional fuse cable is required if the entrance cable contains 24 or 26 AWG copper conductors and the central office connector stub (tip cable) contains conductors which are at least two gauges larger than the conductors in the entrance cable (i.e., 22 AWG for 24 AWG entrance/fuse cable). Refer to Table 1.

Table 1

Gauge of Outside Plant Entrance Cable	Gauge of Fuse Cable	Gauge of Tip Cable Must Be
19 or 22	24	22
19 or 22	26(1)	24 or 22
24	None	22
24	26	24 or 22
26	None	24 or 22

Note: (1) Not recommended.

4.1.8 GTE 887-000-050, (paragraphs 7.04) - Terminating cable conductors shall be two gauges larger than the fuse cable conductors. Indoor PVC sheath cables must not be exposed to sunlight. When the tip splice is located in the CO equipment room, the outside polyethylene sheath cable must be wrapped with arc and fire-retardant tape from the tip splice to the building entrance point.

4.1.9 Heat Coils

GTE 887-000-050, (paragraphs 7.02) - Heat coils protect equipment against prolonged currents of small magnitude which might eventually cause a fire or damage equipment. Central office protectors shall be equipped with heat coils unless the equipment manufacturer directs otherwise. The manufacturers' instructions must be followed to avoid the possibility of violating the warranty conditions of the manufacturer.

4.2 Protection Devices, Solid State Protectors

Solid state protectors shall be used for CO protection.

4.3 Protector Application Guidelines

4.3.1 All new telecommunication equipment projects shall specify five-pin/four pin protector modules equipped with 300 V solid state protection devices.

4.3.2 For installation examples of the five-pin protector modules, refer to GTE 243-109-100, GTE 243-120-200, and GTE 243-130-200.

4.3.3 Digital Switches and Remote Line Concentrators

Existing protectors need to be replaced for maintenance and repair purpose etc. shall be replaced with solid state protectors.

5 Installation

The installation of CO protectors shall be in accordance with this standard and other related standards (paragraph 3 above) and with the design documentation approved by Saudi Aramco at the time of design.

6 Testing and Inspection

All CO protectors shall be UL listed or equivalent. All CO cable protection shall be tested with the cable in accordance with SAES-T-634.

Revision Summary

31 December, 2003	Revised the "Next Planned Update". Reaffirmed the contents of the document, and reissued with minor changes to Section 2.