



Engineering Standard

SAES-T-633

2 May 2012

Communications Splice Closures

Document Responsibility: Communications Standards Committee

Saudi Aramco DeskTop Standards

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Revised paragraphs are indicated in the right margin

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1 Scope

This standard prescribes mandatory compliance governing Communication Cable Splice Closures, and it is recognized as the engineering criteria to be applied to Saudi Aramco Communication Cable Splice Closures.

2 Conflicts and Deviations

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

3 References

The selection and design 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*

3.2 Industry Codes and Standards

National Fire Prevention Association

NFPA 70

National Electric Code (NEC)

4 General Requirements

- 4.1 Lead sheath splice closures shall not be used, since lead sheath cable is no longer used by Saudi Aramco for new Construction.
 - 4.2 Thermo fit (heat shrinkable) wrap around sleeves are available for cable sheath repairs and as splice closures on new cable Construction.
 - 4.3 When placing or handling encapsulating compounds, observe manufacturer's warnings and safety precautions, warnings and all other applicable Saudi Aramco safety standards and instructions.
 - 4.4 All direct buried or underground cable splice closures shall be filled with a re-entenable encapsulating compound.
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- 4.5 Due to the requirement for heat for the installation of the heat-shrinkable (thermo fit) sleeves (closures), discernment must be used in selecting locations in which it will be used and all applicable safety precautions and Loss Prevention standards adhered to. Installations are to be made in accordance with manufacturer's instructions.

5 Design

- 5.1 Splice Cases that are equipped to receive encapsulating compound, shall only be used on aerial and inside building cables.
- 5.2 The Reddi Seal Cable Closure is manufactured by Preformed Line Products (PLP) for use on filled cable in underground and buried plant splices. Whether used on filled or air core type cables, or whether splices are buried or underground, the closure must be filled with a reenterable encapsulating compound. It will not hold air pressure and the Reddi Seal end plates are not interchangeable with the pressurized Preformed Splice Case. Installation shall be in accordance with the manufacturer's instruction. This closure is available in three models. Refer to Table 1.

**Table 1 – Reddi Seal Cable Closures
Maximum End Plate Cable Capacity (1)
Single or Double Sheath Cable Diameters**

Reddi-Seal Closure Diameters	One Cable	Two Cables	Three Cables	Four Cables
10.16	5.59	4.93	4.32	3.68
16.51	10.41	9.78	9.14	8.51
24.13	18.03	14.40	16.76	16.15

Note: ⁽¹⁾ Always allow 0.64 cm clearance between cable holes.

5.3 Heat Shrinkable Splice Closures

Heat shrinkable splice sleeves and closures are generally available locally. Listed below are brief descriptions and uses of some locally available Heat-Shrinkable (Thermo fit) Sleeves (Closures). The list below is not comprehensive, but is typical of what is available in this type closure.

- 102L:

Heat-shrinkable caps for sealing cable ends in non-pressurized or low performance pressurized applications. It is a medium-wall molded cap internally coated with an adhesive or mastic sealant. The end cap is available in sizes to fit cables that range from 4 mm to 115 mm diameter.

For installation, the cap is centered over the ends of the cable and heat shrunk to form a seal of the cable ends.

- **XAGA 200:**

Consists of a heat-shrinkable wrap around sleeve with a stainless steel channel closure and a pre-formed non-hydroscopic laminate to insulate, compact, and shape the splice. To insure proper installation the wrap around sleeve is coated externally with a heat-sensitive paint that changes color when enough heat has been applied for proper installation. XAGA 200 has a splice capacity up to 200 pairs (.6 mm/22 AWG) in configurations up to three cables in and three cables out and is used for sealing and protection of unpressurized cable splices.

- **XAGA 200R:**

Is used for the sealing and protection of cable splices in the unpressurized telephone distribution network. A variable liner provides a laminated aluminum barrier against moisture vapor transmission as well as mechanical protection for the splice bundle. The shrinkable wrap around sleeve forms a watertight seal to the cable jacket. Up to three cables can enter each end of the sleeve. Each kit comes complete with filling compound for protection from water ingress. This sleeve comes in four sizes and can be used on a splice with a maximum of 120 mm diameter.

- **XAGA 250:**

Is used to seal telephone cable splices for filled or unpressurized air core cable. This wrap around, heat-shrinkable splice closure will accommodate in-line as well as branch splices on polyethylene or lead sheath cable. It may be used for direct buried, aerial, and underground installations. It provides a watertight seal that is also reenterable for cable repair and rearrangements. It is constructed of a material formulated to resist UV radiation and atmospheric contamination. A splice encapsulation kit does not come with the XAGA 250, but is available in a separate kit. The XAGA 250 comes in different sizes and can be used on splices with maximum diameters of 200 mm.

- **WRST:**

Wrap-around repair sleeves are split sleeves closed by a slide-on metal channel. WRST sleeves are suitable for all types of cables in direct buried, underground, or aerial applications. It is designed for use over transitions in a cable where a large shrink ratio is required. This sleeve is suited for repairing all types of sheath openings and sheath damage (trouble openings,

fire and steam damage, cable bend repair, and etc.). It comes in several sizes and can be used on cables from 10 mm to 190 mm diameter.

- 5.4 On underground and buried cable splices, Saudi Aramco uses splice cases in which the splice can be encapsulated.
- 5.5 The Preformed Stainless Steel Splice Closure (a non-filled type splice closure) or equivalent may be used on underground cables when the splice will be located inside a manhole. This type installation may require an annual preventive maintenance program (pressure test of splice closures, etc.) for verification of splice integrity. Installation materials and procedures shall comply with the manufacturers' recommendations.
- 5.6 All direct buried or underground cable splice closures shall be filled with a re-enterable encapsulating compound on air core as well as filled cables. The splice closure used shall be a type that is manufactured to hold encapsulating compound. The Pressure Wrap Kit, or a similar product utilizing a perforated web liner, shall be used in all encapsulated re-enterable splice closures.
- 5.7 The 3M Company's RJ Series Better Buried Closure system (Material is available from a local vendor) provides acceptable closures for this purpose. Although basically manufactured for buried splices, when used with the 3M Brand RJ Series support assembly, these closures can be used in manholes and cable vaults. This closure comes in different series and sizes that will accommodate cables with outside diameters ranging from 25 mm to 101 mm. A support assembly shall be used with 125 mm and larger diameter filled closures installed in manholes.
- 5.8 The 3M Better Buried Closure body sleeve halves and end caps are made of material that withstands acids, detergents, chemicals and other harmful elements for assurance of direct buried splice integrity. The Better Buried Closures are available as complete closure kits, component kits or as individual parts to meet specific application requirements for direct buried straight and butt splices, cable repair and other direct buried applications such as tap splicing and sheath repairs. Some of this material is already on the SAMS stock list under the 18-021-xxx series of stock numbers.

6 Installation

- 6.1 Cable splice closures shall be installed in accordance with the manufacturer's instruction unless directed otherwise in this Standard.
 - 6.2 All applicable safety precautions and Loss Prevention standards must be adhered to in the use and installation of the Cable Repair Auto wrap. Choose with care
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the locations in which this repair method will be used, due to the presence of heat and 120 volt electrical source. Comply to NFPA 70 safety precautions.

- 6.3 Use fiberglass or some other fireproof material as a shield to protect adjacent cables etc., from heat used in placing heat-shrinkable sleeves.

7 Testing and Inspection

All quality assurance (QA) Inspections shall be done by a qualified communications inspector. All splice closures shall be flash tested and inspected for proper seals. Buried and underground splices shall be inspected to assure proper fill (of encapsulating compound) in the closure and use of the recommended (by closure manufacturer) encapsulating compound.

Revision Summary

9 March 2009	Revised the "Next Planned Update". Removed all references to GTE Practices, relocated some paragraphs to appropriate sections and reissued with editorial changes.
7 June 2011	Editorial revision to remove committee members' list and removed reference to GTE Practices in paragraph 4.3.
2 May 2012	Editorial revision to change the primary contact.