Engineering Standard

SAES-T-628 28 April 2012

Telecommunications - Underground Cable

Document Responsibility: Communications Standards Committee

Saudi Aramco DeskTop Standards

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Previous Issue: 10 October 2011 Next Planned Update: 28 January 2014
Revised paragraphs are indicated in the right margin

Primary contact: Shehri, Ali A. on 966-3-8801335

1 Scope

This standard prescribes mandatory requirements governing the design and installation of telecommunications underground cables.

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.

A. Saudi Aramco References

Saudi Aramco Engineering Procedure

SAEP-302	*Instruction for Obtaining a Waiver of a Mandatory Saudi Aramco Engineering Requirement*

Saudi Aramco Engineering Standards

SAES-B-008	*Restrictions to Use of Cellars, Pits, and Trenches*
SAES-B-068	*Electrical Area Classification*
SAES-M-100	*Saudi Aramco Building Code*
SAES-O-119	*Work Permit Procedures*
SAES-T-000	*Telecommunications Standards Introduction and Indices*
SAES-T-018	*Telecommunications - Symbols, Abbreviations and Definitions*
SAES-T-603	*Telecommunications - Safeguards and Warning Devices*
SAES-T-624	*Telecommunications Outside Plant - Fiber Optics*
SAES-T-632	*Communications Cable Splicing*
SAES-T-634	*Telecommunications - Cable Testing and Acceptance*
SAES-T-903	*Telecommunications Outside Plant - Electrical Protection and Grounding*
SAES-T-911	*Communication Conduit System Design*

SAES-T-912	*Communications Feeder Cable*
SAES-T-914	*Telecommunications Distribution Cable*
SAES-T-920	*Telecommunications Cable Information*
SAES-T-938	*Telecommunications - Outside Plant Systems - Design*

Saudi Aramco Standard Drawings

AA-036373	*PVC Direct Buried/Encased Telecom. Conduit*
AB-036897	*Buried/Underground Cable Route Marker Post and Signs*

Saudi Aramco General Instructions

GI-0002.100	*Work Permits*
GI-0002.709	*Gas Testing Procedures*
GI-0005.002	*Loss Prevention Policy Implementation*
GI-1021	*Street and Road Closure: Excavations, Reinstatements and Traffic Controls*

B. Industry Codes and Standards

Building Industry Consulting Service International

BICSI	*Telecommunication Distribution Method Manual*

Institute of Electrical and Electronics Engineers, Inc.

IEEE C2	*National Electrical Safety Code*

National Fire Protection Association

NFPA 70	*National Electrical Code*

Rural Electric Administration

REA-PE-39	*Multi-Pair, Plastic Insulated, Filled, Telecommunications Cable*
REA-PE-89	*Filled Telecommunications Cable with Expanded Insulation*

Underwriters Laboratories, Inc.

UL 1479	*Standard for Safety Fire Tests of Through-Penetration Firestops*

C. Other References

Construction Safety Manual

Drafting Manual

Operations Instructions Manual

Refinery Instructions Manual

4 Design

4.1 Installation Rodding Ducts and Placing Pull Line (Rope) Underground Cable

All Fishline Ropes which are placed for future use shall be of non-biodegradable materials.

4.1.1 Placing a Pull Line or Cable

4.1.1.1 In all cases, where cable is to be placed in main conduit, thoroughly clean the ducts before the pull line or cable is placed.

4.1.1.2 Service laterals, which are old or which are suspected of being cluttered with sand or debris, must be thoroughly cleaned before cable is placed.

4.1.2 Mandrel Testing

Existing Conduits shall be tested in both directions with an appropriate size mandrel prior to placing an underground cable. Mandrels to be used for standard four inch (ID) PVC conduits are as follows:

1. Where the proposed cable will be 69 mm or smaller, the duct must pass a standard 3 inch diameter mandrel (12" long x 3" diameter).
2. Where the proposed cable will be larger than 69 mm, the duct must pass a standard D mandrel (12" long x 3-5/8" diameter).
3. Conduits that fail the standard D mandrel (12" long x 3" diameter) test may be suitable for subduct installations provided that:
   - The conduit pass a standard 3 inch diameter mandrel (12" long x 3" diameter) test
   - There are no difficulties during the subject installation due to narrow clearances or misaligned joints.

4.2 Underground Cable and Rubber Conduit Plugs - Installation and Removal

4.2.1 Overview

4.2.1.1 Conduit plugs in underground conduit protect the interiors of cable vaults (and other environments) by sealing them, preventing the unwanted entry of:

- Gases and foreign materials, water and moisture, rodents and insects.

  There are two basic kinds of conduit plugs which are blank conduit plugs and split conduit plugs.

All conduits which enter manholes, central office buildings, cable vaults and other buildings or enclosed areas shall be sealed with appropriate plugs or sealants.

All conduit ends (including road crossings, pole risers, between pedestals and/or cabinets) shall be plugged or sealed to prevent sand or debris from entering the duct.

4.2.1.2 All conduits entering central offices, cable vaults, or other buildings must be sealed at all times (except when work is in progress).

Commentary Note:

Whenever work extends overnight, a plug must be installed into the conduit until work resumes.

All conduits entering manholes shall be plugged or sealed in accordance with SAES-T-628.

All existing duct plugs that are not properly sealed constitute a potential safety hazard. When work is done in existing manholes or buildings, all conduit seals and plugs shall be inspected and brought up to the current Saudi Aramco Engineering Requirements.

Commentary Note:

The intent of this standard is to insure that the manhole and conduit system seals are maintained and safety hazards are highlighted and corrected. When an existing manhole and conduit system is found to have seals damaged or missing, a report identifying each seal (manhole no. and duct no., location) is to be issued promptly to the responsible maintenance and Operations agency so that immediate action can be taken to make repairs of these seals. The exception to this is when a project job order specifically calls for the repair of damaged seals in the scope of work and construction drawing.

4.2.1.3 After completing work in cable vaults, buildings and manholes, re-examine all conduit seals and secure or replace those which have been weakened as a result of cable movement, or have otherwise become defective because of construction work.

4.2.1.4 Refer to below table to determine which type of conduit plug is appropriate to use under specific conditions.

Table 1 – Conduit Plug Types Guidelines

Condition	Seal **With**
Conduits entering Central Office (CO) cable vaults, Controlled Environmental Vaults (CEvs), and other buildings.	• Blank conduit plugs for unoccupied Vacant conduits. • Simplex conduit plugs for sealing a single copper cable or fiber optic cable. • Triplex or Quadplex plugs for sealing multiple cables or innerducts within a conduit.
Conduits for drop wire and small entrance cables to buildings at manhole (if it is impractical to seal the conduit in the building).	Split conduit plugs, simplex, triplex, or quadplex.
Ducts containing cable ***or*** innerduct that are terminated on poles or building walls.	Split conduit plugs.
Ducts terminating on poles or building walls mat are for unoccupied riser conduit.	Blank duct plugs with Hex nuts.
• Conduits entering or leaving manholes. **OR** • Pull boxes whim contain electrical apparatus ***such*** as Pulse Code Modulation (PCM) carrier housings, etc.	• Split conduit plugs for conduit containing cable. • Blank plugs for unoccupied duct/innerduct. etc.
Conduit not connected to conduit system, **such** as: • Steel pipe clips under structures. • Submarine pipe crossings. • Between poles to buildings. • And similar construction.	• Split conduit plugs at both ends for occupied ducts with cable or innerduct. • Blank plugs at both ends for unoccupied ducts.

NOTE: Conduit plugs may be wed to seal riser conduit or other openings between cable vaults or other building areas. Cable plugs help support cables as the cables transit vertically between floors or horizontally between walk.

4.2.2 Conduit Plugs

4.2.2.1 All dirt, grease and loosely adhering materials must be removed from the conduit and the plug before installing duct plugs.

4.2.2.2 Addition - Rubber conduit plugs and PR-851 Sealing Compound are not fire retardant and must not be used to seal cable riser or other openings between cable vaults and switch rooms or in other building areas except at the conduit building entrance.

4.2.2.3 Rubber duct plugs are not acceptable for sealing conduits that pass through classified or hazardous areas [Refer to (NFPA 70) NEC Articles 500 & 501].

4.2.2.4 SEMCO's PR-855 U.L. Classified Firestop Sealant and 3M Brand Fire Barrier Caulk CP 25 and Putty 03 U.L. Classified Fire Stopping Sealant or equivalent sealants are acceptable fire retardant sealants for use inside buildings. All fire sealants used inside building (except at the building conduit entrance from the outside) must be listed as complying with UL 1479.

4.3 Cable Underground Conduit Sealing Kit PR-851 Description and Use

4.3.1 The Semco PR-851 conduit sealing kit (or equivalent) is also an acceptable underground conduit/duct sealant. The kit is used to seal all ducts in a manhole, handhole or pedestal and it shall also be used around cable in existing ducts, preventing gasses, water, and other foreign substances from entering:

- Cable vaults
- Buildings
- Manholes, Handholes
- Pedestals/Cross Connect Cabinets
- Pull Boxes

4.3.2 All conduits must be sealed in accordance with paragraph 4.2.1.1 above.

4.4 Cable Underground Installation Precautions

This section provides safety precautions, which must be taken when working in underground manholes for unvented cable vaults.

4.4.1. Protection of Manholes

4.4.1.1 Always protect open manholes with standard manhole guards and warning devices such as those outlined in SAES-T-603, the Construction Safety Manual, Roadworks Section II part 8.1.8 and GI-1021.

4.4.1.2 Adequate protection must be placed around pulling lines and/or cable to protect the public and workers from bodily injury.

4.4.2 Testing for Combustible Gas in Manholes or Unvented Cable Vaults

4.4.2.1 Every manhole or unvented cable vault to be opened or reopened after having been closed for any period of time shall be tested for combustible and toxic gas in accordance with paragraph 4.6 below. No manhole or unvented cable vault shall be entered until the test indicates a 0% level.

4.4.2.2 If a dangerous amount of combustible or toxic gas is detected in manholes or unvented cable vaults, the condition must be reported to the supervisor. The requirements of GI-0002.100, Work Permits must be followed.

4.4.2.3 Before entering manholes, tests shall be made for detection of hazardous gases using the appropriate gas testing equipment as outlined in GI-0002.709, Gas Testing Procedures and SAES-T-603.

4.4.3 Protection of Cables

Care shall be taken to prevent damage to existing cables in manholes when setting up the pulling apparatus or placing tools of any kind. Do not step on cables or rack hooks when entering or leaving a manhole; always use an approved ladder.

4.4.4. Open Flames and Arc Producing Devices

It is strictly prohibited to take matches, lighters, storage batteries or any items capable of producing a spark or flame (other than approved items or tools) into a manhole, or to use torches, lanterns, lighted cigars, cigarettes, pipes, furnaces, or other types of open flame within 3 meters of an open manhole even though tests indicate the absence of gas. Refer to GI-0002.100, Work Permit Procedures.

4.4.5. Warning Devices on Cable Reels

Cable reels and equipment which must be left on the street overnight shall be properly lighted during the night. Approved warning devices shall be used as covered in paragraph 4.4.1.1 above.

4.5 **Underground Cable Open Flames in Manholes Procedures**

This section provides instructions and safety precautions when using flames in manholes

These instructions are not applicable in locations where Saudi Aramco/Loss Prevention regulations prohibit the use of open flames in manholes. Also, refer to paragraph 4.4.4 above.

4.5.1. Open Flames

4.5.1.1 The use of any item capable of producing a "hot spark" or flame in or around a manhole is prohibited. Exceptions must be handled in accordance with GI-0002.100, Work Permits.

4.5.1.2 Hard hats, safety shoes and approved eye protection must be worn by all persons working in the manhole.

Reference: Construction Safety Manual I Administration Attachment I.9

4.6 **Underground Manholes and Cable Vaults Testing and Ventilating Procedures**

This section describes procedures for testing for the presence of combustible and toxic gas in manholes, unvented cable vaults, and buildings that have underground cable entrances and continuous manhole ventilation by means of power blowers.

4.6.1 Overview

4.6.1.1 The most common contaminants found in manholes include:

a) Vapors or gases which have escaped from underground storage or piping of liquids or gases such as gasoline, natural gas, liquefied petroleum gas, propane and butane.

b) Gases from fermentation of naturally occurring organic matter such as methane, carbon dioxide, and hydrogen sulfide.

c) Gases created as by-product of combustion (from vehicles or equipment) such as carbon dioxide and carbon monoxide.

4.6.1.2 Pre-entry combustible gas tests are made to ensure that there is no risk of explosion while, or immediately after, removing a manhole cover. Continuous forced ventilation ensures a continuing adequate oxygen supply and prevents possible buildup of combustible or toxic gases or vapors. Periodic combustible gas tests provide an additional margin of safety that ensures that no combustible gas is building up in the manhole.

Refer to Work Permit Systems in GI-0002.100, and Gas Testing Procedures in GI-0002.709.

4.6.2 Safety Precautions

4.6.2.1 Prior to pre-entry tests, place warning devices, such as traffic cones, men-working signs, flags, and manhole guards, at the manhole. The work area

protection setup operation shall be done with promptness to minimize exposure of personnel to traffic. (See SAES-T-603 and GI-1021).

4.6.2.2 A manhole cover shall not be removed until the manhole has been tested (pre-entry) for combustible gases directly beneath the cover.

4.6.2.3 Manholes shall not be entered until they have been thoroughly tested and proven safe for entry in accordance with GI-0002.709, and ventilated with fresh air from a manhole blower for a minimum purge time (see Table 2).

All electrical switching connections and disconnections must be made outside a manhole, at least 3 meters from the manhole opening.

4.6.3 Testing and Ventilating Manholes

4.6.3.1 Combustible gas tests must be made by using one of the appropriate combustible gas detectors outlined in GI-0002.709 and SAES-T-603, paragraph 4.2.1.

4.6.3.2 Using Combustible Gas Detector - Lower the sampling hose approximately 150 mm through a hole in the manhole cover. Make the first pre-entry test. If there are no holes in the manhole cover: Open the cover approximately 75 mm. Make the first pre-entry test. If manhole or confined space entry has been proven to be safe per tests in accordance with GI-0002.709, perform the following:

a) Prior to entry, purge the manhole with power blower having a minimum output capacity of 14.1 cubic meters per minute for the period of time shown on the manhole ventilation chart (Table 2) prior to entry. Minimum ventilation time in all situations must not be less than 5 minutes.

Commentary Note:

Prior to placing output hose of a power blower into a manhole, purge the hose by directing a flow of air through it at street level and away from the open manhole. To minimize the intake of exhaust fumes from passing vehicles, the blower intake should be positioned away from the flow of traffic.

b) Subsequent tests for combustible gas must be made in accordance with GI-0002.709 or at least every 2 hours whichever is shorter. When a tent is used over the manhole, subsequent tests must be made at least every hour.

4.6.32.1 When plugged Cable Ducts are opened, additional tests for combustible gas must be made near the ducts to verify that combustible gas is not entering the manhole.

4.6.32.2 Ventilation Set Up

Continuous forced-draft ventilation with a minimum of 14.1 cubic meters per minute must continue as long as the manhole is open.

WARNING: If the blower stops, the manhole shall be vacated at once and the blower hose shall be removed from the manhole. When the blower is reactivated, the blower hose shall be purged, prior to placing it back into the manhole.

4.6.32.3 Upon entering the manhole, arrange the outlet end of the blower hose on the cable rack to direct the flow of air horizontally, midway between the manhole's floor and roof toward an end wall and away from the work area if possible.

Table 2 – Manhole Ventilation Chart

Effective Blower Capacity Cubic Feet (Meter) Per Minute							
Manhole Volume Cubic Feet (Cubic Meter)		**500 (14.1)**	**600 (17.0)**	**700 (19.8)**	**800 (22.6)**	**900 (25.5)**	**1000 (28.3)**
100	(2.8)	5	5	5	5	5	5
200	(5.7)	5	5	5	5	5	5
300	(8.5)	5	5	5	5	5	5
400	(11.5)	6	5	5	5	5	5
500	(11.5)	8	7	6	5	5	5
600	(14.1)	10	8	7	6	5	5
700	(19.8)	11	9	8	7	6	5
800	(22.6)	13	10	9	8	7	6
900	(25.5)	14	11	10	9	8	7
1000	(28.3)	15	12	11	10	9	8

4.6.4 Testing and Ventilating Cable Vaults and Unattended Telephone Equipment Buildings for Gas

Cable vaults, which do not have natural or mechanical ventilation and unattended building with an underground cable entrance must also be proven safe prior to entry or beginning work operation, in accordance with GI-0002.709.

If gas is detected, notify Supervisor and Fire Department.

4.7 Cable Underground Placing in Main Conduit

This section outlines the procedures for placing cables in conduits between manholes.

4.7.1 Loading Cable Reel

In most instances, the cable reel should be loaded so that the cable may be fed from the top of it. In every instance caution must be exercised so that reverse cable bending is not encountered when placing the cable in the underground conduit system.

4.7.2 Positioning Equipment at the Job

Whenever possible, locate the trailer on the side of the manhole nearest the conduit section in which the cable is to be placed. Position the trailer so the cable is fed from the top of the reel, in a long arc, into the cable feeder and duct.

WARNING: Whenever a cable trailer is released from a truck, the prescribed safety chain shall be left attached to the truck and the trailer until the tongue of the trailer is placed on the ground. The truck shall be located so that exhaust fumes will not enter the manhole.

Always use safety blocks under the trailer's wheels when it is detached from the truck.

Whenever it is necessary to place trailers on sidewalks or other areas not capable of supporting them, place planking under the trailer wheels and tongue to prevent surface damage.

4.7.3 Placing the Cable

4.7.3.1 Generously lubricate the first 20 feet of cable to reduce initial duct friction. The amount of the lubricant required during the remainder of the pull should be determined by the conditions being encountered. Bends, long pulls, pulling through manholes, etc., may require more lubricant. Only lubricants specifically approved by Saudi Aramco may be used.

4.7.3.2 Pull cable slowly until at least two feet of it has entered the duct. This may be determined by measuring the distance from the duct face to the top of the cable feeder, plus two feet. An equal distance should then be measured from the end of the cable and marked with vinyl tape. When the tape marking reaches the funnel of the cable feeder, the required two feet of cable are in the duct. From this point, the cable may be pulled, steadily and continuously, at the rate of 80 to 100 feet per minute.

4.7.3.3 When the cable has been pulled to within 6 meters of the manhole, as determined by the quantity of cable remaining on the reel, the pulling speed should be reduced. Continue pulling the cable at the reduced speed until the swivel link is 150 mm from the sheave located in the manhole.

4.7.3.4 If it is necessary to stop cable between manholes, because of reel trouble or other reasons, the tension on the winch line should be maintained unless the operator is asked to release the line tension. When continuing the pull, the speed must be increased gradually until the cable moves freely.

4.7.3.5 An approved luffing grip must be used to pull the additional specified quantity of cable into the manhole.

WARNING: Workmen shall not remain in the manhole during the luffing operation pulls unless so directed by the supervisor.

4.7.3.6 The cable ends in the manhole shall be cleaned and placed on manhole hooks or tied to the racks with lashing wire.

Commentary Note:

Avoid unnecessary bending of the cables in attaching them to cable hooks or racks. All cable bend radii shall be 10 times the cable diameter or greater.

4.8 Cable Guards - at Riser Poles and Buildings Installation

This section provides instructions for:

- Placing guards at riser poles and buildings.
- Clamping cable to riser poles.

4.8.1 Placing U-Cable Guard

4.8.1.1 Install U-Cable guards to protect cables which are leaving underground conduit systems or direct-buried at poles and buildings.

If installation is Required	Then install a(n)
Immediately above a conduit	2.50 meter (8') Guard.
In sites without a conduit	2.74 meter (9') Guard (One foot must be buried below the ground).

4.8.1.2 A minimum of two U-cable guard straps shall be placed on each U-cable guard. One strap shall be located 150 mm below the top of the U-cable guard and one 150 mm above the earth surface or the end of the conduit pipe bend. The cable shall be clamped to the pole or building at 600 mm

intervals with the first clamp being placed 125 mm above the top of the U-cable guard.

4.9 Placing Underground Cable in Subsidiary Conduit

This practice covers the placing of cable in subsidiary conduit, that is, from a manhole to a pole for building or between poles in an isolated dip.

4.9.1 Setting up Equipment

4.9.1.1 When cable is to be placed in a duct which extends from a manhole to a pole or to a building wall, it is preferable to set up the cable reel at the end of the duct nearest the bend so that the cable can be fed from the reel into the duct in a long smooth arc.

4.9.1.2 Cable can usually be placed in subsidiary ducts with only one 90 bend and less than 46 meters in length, without the use of lubricant. If the duct length exceeds 46 meters or if it contains the equivalent of more than one 90 degree bend, use an approved cable lubricant.

4.9.1.3 Leave sufficient cable at each end of the duct to permit setting up and splicing. Secure the cable to the pole, up to the strand level, with cable straps, leaving sufficient cable at the strand level to make the splice. If a short piece of fuse cable is to be placed at the pole, it is only necessary to leave enough cable to reach to the strand level, since the first splice out of the underground will be made a minimum of 600 mm below the strand level.

4.10 Splicing Arrangements in Manholes

This Section outlines splicing arrangement in manholes.

4.10.1 Installation Principles

When racking cables in manholes:

- Changes in cable level must be kept to a minimum.
- It shall be carefully determined that racking of a given cable in the proposed manner will not block or restrict the use of any vacant duct or racking position.
- When bending cables, make the radius of the bend as large as possible. The radius of the bend must be a minimum of 10 times the diameter of the cable.

4.10.2 Racking Space

4.10.2.1 A minimum space of 385 mm shall be maintained in all manholes between the roof of the manhole and the center of the top main cable for racking stub and lateral cables.

4.10.2.2 A minimum space of 385 mm shall be maintained between the manhole floor and the center of the bottom main cable.

4.10.2.3 The vertical spacing of splices shown in Table 2 should be observed where either single or double racking is employed.

Table 2 – Vertical Spacing of Splices

Staggered Splices	195 mm
Non-staggered Splices	230 mm

4.10.2.4 Hook hole positions in all manholes number from the top of the cable rack down (refer to SAES-T-911).

4.10.3 Staggered Splices

Staggered splices are employed in those manholes where there are a large number of entering ducts and the length of the manhole is sufficient to place three racks.

4.10.4 Double Racking

Double racking is primarily used where a four-wide duct structure enters the manhole.

4.10.5 Ducts Entering at Different Levels

Where the main conduit structures enter the manhole at different levels, the cable racks and cables should be so arranged that an equal amount of the required bending will be done at each end.

4.10.6 Difference in Number of Ducts

When two main conduit structures having different numbers of ducts enter a manhole, the racking positions in the manhole must be based on the structure with the largest number of ducts.

4.10.7 Cable Hooks

The cable and the completed splice shall be supported with cable hooks at each cable rack.

4.10.8 Splice Closure

Where distance between cable racks is such that it appears that sagging might occur, the splice should be secured to a piece of pipe or other support material laid across the cable hooks. Secure the closure tightly to the pipe with lashed cable supports.

4.11 Cable Underground Removal

This section outlines procedures for removal of underground cable.

4.11.1 Cutting Cables

Underground cable that is to be removed will generally be cut out of service by the Saudi Aramco telecommunications proponent splicing forces. However, in certain cases, such as where several consecutive sections are involved, the PMT forces may be called upon to cut the cable in the intermediate manholes. In these cases, the cable must be carefully identified before cutting, to ensure that a working cable is not cut.

4.11.2 Precautions

4.11.2.1 Before starting any pulling operations, the work area must be guarded with the appropriate warning devices as outlined in SAES-T-603. Testing of manhole atmosphere must also be done prior to entering the manhole (see paragraph 4.6 above).

4.11.2.2 A cable which has been in a duct for some time may require considerably more force to break loose than will be required to keep it in motion. Because of the severe strains which may be placed in the winch line, no workman will be permitted in the manhole when the initial pull is made or at any other time when the winch appears to be heavily loaded.

4.11.2.3 When the cable removing apparatus has been set up and the grip has been placed on the cable, a slight tension should be pulled in the line to determine whether the grip will remain in place. Before full tension is applied, the workmen must leave the manhole. He should be in the manhole during the puling operation only if it is essential to the performance of the work and it is apparent that the tension in the winch line is normal. If the cable pulls in a succession of sharp jerks, there is a possibility of the line breaking, and no workman should be in the manhole.

4.11.2.4 When a workman is in a manhole, he must be the originator of the starting and stopping signals.

4.11.3 Removing Subsidiary Cable

Subsidiary cable should generally be removed at the manhole end to reduce the strain on the riser bend.

4.12 Bonded ASP Cable Installation Underground Placing/Splicing

This section provides Outside Plant Engineering placing and splicing procedures unique to bonded ASP cable.

4.12.1 Bonded ASP (Aluminium Steel Polyethylene) cable consists of:

A core of dual expanded plastic insulated conductors (foam skin) which are color-coded, arranged in twisted pairs and binder groups.

- A plastic core wrap.
- A corrugated aluminium shield.
- A corrugated steel tape wrap.
- An outer polyethylene jacket bonded to the steel.

The core is filled with ETPR (Extended Thermal Plastic Rubber) 80 degrees centigrade compound.

4.12.2 Engineering Considerations

Bonded ASP cable should be the first choice for copper cable placement in underground conduit in the following situations:

New underground cable routes originating at the central office. Extensions of existing underground cable routes, including site laterals.

Bonded ASP cable offers the following advantages:

- Can be direct-buried.

  Not restricted in application.

- Can be: Spliced above ground in pedestals, cross-connect boxes, etc. Placed on riser poles.

4.12.3 Placing Considerations

4.12.3.1 During installation and splicing Operations of bonded ASP cables, bends with radii less than 10 times the cable diameter shall be avoided.

5 Installation

Underground Telecommunication cable installation shall be in accordance with this and other appropriate standards as referenced in paragraph 3 above. Installation methods and procedures, shall comply with SAES-T-603, "Safeguards and Warning Devices" and with all applicable safety standards.

6 Testing and Inspection

The testing and inspection of new underground telecommunication cables shall be done in accordance with SAES-T-634, "Telecommunications-Cable Testing and Identification."

Revision Summary

28 January 2009	Revised the "Next Planned Update." Reaffirmed the contents of the document, and reissued with editorial revision to remove references to GTE Practices.
10 October 2011	Editorial revision to reflect a comment posted and change the document's Primary Contact person.
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