

GENERAL SPECIFICATION

TELECOMMUNICATION

GS EP TEL 414

Telecommunication Cables

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1. Scope

The purpose of this General Specification is to define the minimum requirements for design, manufacture and testing of telecommunication cables.

This Specification applies to any and all industrial sites (offshore and onshore), and associated office and technical buildings. This specification does not cover subsea optical cables, which are described in the [GS EP TEL 190](#).

Electrical cables used to power telecommunication systems shall be in accordance with [GS EP ELE 161](#). Instrument cables used to interconnect contacts or signals to telecommunication systems shall be in accordance with [GS EP INS 116](#).

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published at the effective date of this document.

Reference	Title
ASTM D2863	Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
EN 50288-7	Multi-element metallic cables used in analogue and digital communication and control - Part 7: Sectional specification for instrumentation and control cables
IEC 60079-14	Explosive atmospheres - Part 14: Electrical installations design, selection and erection
IEC 60092-350	Electrical Installation in Ships - Part 350 : General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications
IEC 60092-360	Electrical Installation in Ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables
IEC 60189-2	Low-frequency cables and wires with PVC insulation and PVC sheath. Part 2: Cables in pairs, triples, quads and quintuples for inside installations
IEC 60227-1	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 1: General requirements
IEC 60228	Conductors of insulated cables
IEC 60287	Electric cables - Calculation of the current rating

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Reference	Title
IEC 60331-1	Tests for electric cables under fire conditions - Circuit integrity – Part 1: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter exceeding 20 mm
IEC 60331-2	Tests for electric cables under fire conditions - Circuit integrity – Part 2: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter not exceeding 20 mm
IEC 60331-21	Tests for electric cables under fire conditions - Circuit integrity - Part 21: Procedures and requirements - Cables of rated voltage up to and including 0,6/1,0 kV
IEC 60331-23	Tests for electric cables under fire conditions - Circuit integrity – Part 23: Procedures and requirements - Electric data cables
IEC 60331-25	Tests for electric cables under fire conditions - Circuit integrity – Part 25: Procedures and requirements - Optical fibre cables
IEC 60332-3-22	Tests on electric cables under fire conditions - Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category A
IEC 60332-3-24	Tests on electric cables under fire conditions - Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C
IEC 60445	Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductors termination and conductors
IEC 60502-1	Power cables with extruded insulation and their accessories for rated voltages from 1kV up to 30 kV - Part 1: Cables for rated voltages of 1kV and 3 kV
IEC 60754	Test on gases evolved during combustion of materials from cables
IEC 61034	Measurement of smoke density of cables burning under defined conditions
ISO/IEC 11801/A2	Information Technology - Generic Cabling for Customer Premises - Amendment 2
ISO 7989	Steel wire and wire products - Non-ferrous metallic coatings on steel wire
ITU-T G.651.1	Characteristics of a 50/125 µm multimode graded index optical fibre cable for the optical access network
ITU-T G.652	Characteristics of a single-mode optical fibre cable
ANSI/TIA-568-C.2	Balanced Twisted-Pair Telecommunications Cabling and Components Standard

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Reference	Title
ANSI/TIA-598-D	Optical Fiber Cable Color Coding
TIA-492AAAD	Detail Specification for 850-nm Laser-Optimized 50-µm Core Diameter/125-µm Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fiber
TIA-492CAAB	Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers with Low Water Peak
UL 1581	Reference standard for electrical wires, cables and flexible cords - Part about Physical properties after immersion in oil, and part about Carbon - Arc and Xenon-Arc tests (section 1200)

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published.

Reference	Title
GS EP ELE 161	Electrical cables
GS EP INS 116	Instrument Cables
GS EP TEL 140	Public Address and General Alarm (PAGA)
GS EP TEL 190	Offshore optical fibres based telecommunications
GS EP TEL 410	Installation rules

3. General Requirements

3.1 Environmental Conditions

All indoor and outdoor cables shall be suitable for continuous and reliable operation in the service conditions stated in the environmental data specification of the Project (i.e. general design specification / equipment design conditions).

All climatic constraints shall be taken into account: marine environment (salt spray), extreme wind conditions, lightning and storm, extreme temperatures (high or low), high or low humidity, frost, dust, solar radiation, etc...

All indoor cables shall also be capable of operating for a short time at a temperature higher than nominal to cover for a shutdown of air conditioning.

All cables shall be robustly constructed, highly reliable and suitably protected against the corrosive effects of a humid, salt, dust, and H₂S laden atmosphere. Cables shall not be affected by tropical rain or by the operation of deluge systems.

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Only cables that are particularly suitable for this environment shall be selected and specified, whilst requiring minimal maintenance.

3.2 Guiding Principles

The specifications listed in this section shall be considered as minimum requirements.

All cables shall have the interstices filled with non-hygroscopic filler such that the transmission of gas and hydrocarbons along the length of the cable, under normal pressure is not possible.

All cables shall be circular in cross section. No joints / splices shall be permitted in any cable conductor, screen drain wire, or armour.

Cables will be installed indoors and outdoors. Cables shall be suitable for installation as stated below:

- Directly buried in the ground
- Run in duct banks
- Fastened to cable trays or cable ladders
- Transit in standard MCT's

All cables shall be designed according to the environmental conditions of the area they will be installed: water, frost, dust, oil, sunlight, UV, aliphatic and/or aromatic hydrocarbons:

- UV resistance: As per [UL 1581](#) section 1200
- Oxygen index: > 30 as per [ASTM D2863](#) except for core insulation
- Resistance to aliphatic hydrocarbons: If cables may come into contact with aliphatic hydrocarbons, compound shall meet the requirements of [IEC 60227-1](#) (ST9) and [UL 1581](#) Part about Physical properties after immersion in oil
- Resistance to aromatic hydrocarbons: If cables may come into contact with aromatic hydrocarbons, they shall be fitted with a sealed lead sheath as per [EN 50288-7](#) (or other appropriate material, subject to Company approval)

Cables, and their associated cable glands, shall be selected to reduce the effects of "coldflow characteristics" of the cable as per [IEC 60079-14](#). Particular care shall be taken to ensure cable sheathing material and tensile strength is suitable.

Cables shall be gas / vapour tight and shall burn without releasing any toxic gases.

3.3 Smoke Emission

All cables routed indoor, even partially, or located within any room / enclosure which is normally manned, shall be low smoke, halogen free (also called LSZH – low smoke zero halogen) in accordance with [IEC 61034](#) and [IEC 60754](#):

- Acid gas generation: HCl < 0.5% as per [IEC 60754](#)
- Cable Light Transmittance: > 60% as per [IEC 61034](#)