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SERIES L: ENVIRONMENT AND ICTS, CLIMATE
CHANGE, E-WASTE, ENERGY EFFICIENCY;
CONSTRUCTION, INSTALLATION AND PROTECTION
OF CABLES AND OTHER ELEMENTS OF OUTSIDE
PLANT

Optical fibre cables – Cable structure and characteristics

Optical fibre cables for direct surface application

Recommendation ITU-T L.110

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ITU-T L-SERIES RECOMMENDATIONS

ENVIRONMENT AND ICTS, CLIMATE CHANGE, E-WASTE, ENERGY EFFICIENCY; CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

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Recommendation ITU-T L.110

Optical fibre cables for direct surface application

Summary

Recommendation ITU-T L.110 describes characteristics, construction and test methods of optical fibre cables for direct surface application. First, in order that an optical fibre demonstrates sufficient performance, characteristics that a cable should have are described. Then, the method of examining whether the cable has the required characteristic is described.

History

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Direct surface application, natural disaster, optical fibre cable, rapid network installation, rural and remote areas.

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Recommendation ITU-T L.110

Optical fibre cables for direct surface application

1 Scope

This Recommendation describes an optical fibre cable for direct surface application, which has a simple protection structure and easy operability needed for some applications, particularly when it is difficult to prepare conventional installation infrastructures, such as duct, pipe and pole. This Recommendation provides requirements for optical, mechanical and structural characteristics, and test methods for optical fibre cables for direct surface application. Optical fibre cables for direct surface application enable the rapid and/or temporary construction of an optical network. Potential applications include, but are not limited to, network recovery against natural disaster or rapid network installation into rural or remote areas with insufficient infrastructures.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T G.650.1] Recommendation ITU-T G.650.1 (2010), *Definitions and test methods for linear, deterministic attributes of single-mode fibre and cable.*
- [ITU-T G.650.2] Recommendation ITU-T G.650.2 (2007), *Definitions and test methods for statistical and non-linear related attributes of single-mode fibre and cable.*
- [ITU-T G.650.3] Recommendation ITU-T G.650.3 (2008), *Test methods for installed single-mode optical fibre cable links.*
- [ITU-T G.651.1] Recommendation ITU-T G.651.1 (2007), *Characteristics of a 50/125 μm multimode graded index optical fibre cable for the optical access network.*
- [ITU-T G.652] Recommendation ITU-T G.652 (2016), *Characteristics of a single-mode optical fibre and cable.*
- [ITU-T G.653] Recommendation ITU-T G.653 (2010), *Characteristics of a dispersion-shifted single-mode optical fibre and cable.*
- [ITU-T G.654] Recommendation ITU-T G.654 (2016), *Characteristics of a cut-off shifted single-mode optical fibre and cable.*
- [ITU-T G.655] Recommendation ITU-T G.655 (2009), *Characteristics of a non-zero dispersion-shifted single-mode optical fibre and cable.*
- [ITU-T G.656] Recommendation ITU-T G.656 (2010), *Characteristics of a fibre and cable with non-zero dispersion for wideband optical transport.*
- [ITU-T G.657] Recommendation ITU-T G.657 (2016), *Characteristics of a bending-loss insensitive single-mode optical fibre and cable.*
- [ITU-T K.29] Recommendation ITU-T K.29 (1992), *Coordinated protection schemes for telecommunication cables below ground.*

- [ITU-T K.47] Recommendation ITU-T K.47 (2012), *Protection of telecommunication lines against direct lightning flashes.*
- [ITU-T L.100] Recommendation ITU-T L.100/L.10 (2015), *Optical fibre cables for duct and tunnel application.*
- [ITU-T L.101] Recommendation ITU-T L.101/L.43 (2015), *Optical fibre cables for buried application.*
- [ITU-T L.102] Recommendation ITU-T L.102/L.26 (2015), *Optical fibre cables for aerial application.*
- [ITU-T L.126] Recommendation ITU-T L.126/L.27 (1996), *Method for estimating the concentration of hydrogen in optical fibre cables.*
- [ITU-T L.161] Recommendation ITU-T L.161/L.46 (2000), *Protection of telecommunication cables and plant from biological attack.*
- [ITU-T L.430] Recommendation ITU-T L.430/L.28 (2002) *External additional protection for marinized terrestrial cables.*
- [ITU-T L.1700] Recommendation ITU-T L.1700 (2016), *Requirement and framework for low-cost sustainable telecommunications infrastructure for rural communications in developing countries.*
- [IEC 60793-1-1] IEC 60793-1-1 (2017), *Optical fibres – Part 1-1: Measurement methods and test procedures – General guidance.*
- [IEC 60793-1-21] IEC 60793-1-21 (2001), *Optical fibres – Part 1-21: Measurement methods and test procedures – Coating geometry.*
- [IEC 60793-1-22] IEC 60793-1-22 (2001), *Optical fibres – Part 1-22: Measurement methods and test procedures – Length measurement.*
- [IEC 60793-1-30] IEC 60793-1-30 (2010), *Optical fibres – Part 1-30: Measurement methods and test procedures – Fibre proof test.*
- [IEC 60793-1-32] IEC 60793-1-32 (2010), *Optical fibres – Part 1-32: Measurement methods and test procedures – Coating strippability.*
- [IEC 60793-2-10] IEC 60793-2-10 (2017), *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres.*
- [IEC 60793-2-50] IEC 60793-2-50 (2015), *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres.*
- [IEC 60794-1-1] IEC 60794-1-1 (2015), *Optical fibre cables – Part 1-1: Generic specification – General.*
- [IEC 60794-1-2] IEC 60794-1-2 (2017), *Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures – General guidance.*
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- [IEC 60794-3-10] IEC 60794-3-10 (2015), *Optical fibre cables – Part 3-10: Outdoor cables – Family specification for duct, directly buried and lashed aerial optical telecommunication cables*.
- [IEC 60794-3-30] IEC 60794-3-30 (2008), *Optical fibre cables – Part 3-30: Outdoor cables – Family specification for optical telecommunication cables for lakes, river crossings and coastal application*.
- [IEC 60794-4] IEC 60794-4 (2003), *Optical fibre cables – Part 4: Sectional specification – Aerial optical cables along electrical power lines*.
- [IEC 60811-202] IEC 60811-202 (2012), *Electric and optical fibre cables – Test methods for non-metallic materials – Part 202: General tests – Measurement of thickness of non-metallic sheath*.
- [IEC 60811-203] IEC 60811-203 (2012), *Electric and optical fibre cables – Test methods for non-metallic materials – Part 203: General tests – Measurement of overall dimensions*.

3 Definitions

3.1 Terms defined elsewhere

For the purpose of this Recommendation, the definitions given in [ITU-T G.650.1], [ITU-T G.650.2], [ITU-T G.650.3], [ITU-T G.651.1] and [ITU-T L.102] apply.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 direct surface application: Cable deployment directly on the ground.

3.2.2 maximum allowable tension: The maximum tensile load that may be applied to the cable without detriment to the tensile performance requirement (optical performance, fibre strain).

3.2.3 rated tensile strength: Summation of the product of nominal cross-sectional area, minimum tensile strength and stranding factor for each load-bearing material in the cable construction.

3.2.4 strain margin: The amount of strain the cable can sustain without strain on the fibres due to cable elongation.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

DA	Double wire Armouring
DSA	Direct Surface Application
RA	Rocky Armour
SA	Single wire Armouring
SZ	Reverse oscillating stranding
WiMAX	Worldwide interoperability for Microwave Access