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PROTECTION OF CABLES AND OTHER ELEMENTS OF
OUTSIDE PLANT

Performance requirements for passive optical nodes: Sealed closures for outdoor environments

ITU-T Recommendation L.13

ITU-T Recommendation L.13

Performance requirements for passive optical nodes: Sealed closures for outdoor environments

Summary

This Recommendation refers to passive optical nodes in outdoor environments. It deals with the design of the closure housing as well as the fibre organizer taking into account mechanical and environmental characteristics as well as the characteristics of the optical fibre organizer.

The following elements are added for this revision:

- a test plan for the performance evaluation of sealed optical closures in 2 basic environments: underground (OS) or above ground (OA);
- the simulation of the effect of interventions related to network maintenance.

Appendices were added:

- a checklist for a systematic product characterization according to L.51;
- a list of additional requirements to reflect special environments (e.g., tunnels) or local conditions.

Source

ITU-T Recommendation L.13 was approved by ITU-T Study Group 6 (2001-2004) under the ITU-T Recommendation A.8 procedure on 11 April 2003.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

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In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Introduction

A node occurs at each opening or end of a cable sheath. When an optical node resides in an outdoor environment, it is generally contained in a sealed enclosure. This is commonly also referred to as an optical closure, optical cable joint or optical sheath joint. In this Recommendation the term "optical closure" will be used.

An optical closure comprises a mechanical structure (closure housing) that is attached to the ends of the sheaths joined and a means (organizer) for containing and protecting the fibres and passive optical devices. The optical closure will:

- restore the integrity of the sheath, including mechanical continuity of strength members when required;
- protect the fibres, fibre joints and optical devices from the environment in all types of outdoor plant (aerial, direct buried, in ducts and underwater);
- provide for the organization of the fibre joints, passive devices and the storage of fibre overlength;
- provide electrical bonding and grounding of the metal parts of the sheath and strength members where required. The method of achieving electrical continuity will vary with the type of cable sheath and the type and location of the strength members. Further information is given in ITU-T Recs K.11, K.25 and ITU-T Manual "Protection of telecommunication lines and equipment against lightning discharges".

This Recommendation acknowledges that the cable sheaths used with optical fibre cables are of similar design to those used with copper cables. Thus, the methods used for jointing optical fibre cable sheaths are based on those used in sheath joints for conventional copper cable; reference may be made to the Handbook "Outside plant technologies for public networks" and L-series Recommendations.

Compared to the previous version, this Recommendation provides the means for characterization and evaluation of the performance of optical closures according to the principles of ITU-T Rec. L.51. This includes both mechanical integrity and optical stability of the product, simulating the effect of environmental factors, as well as interventions related to network maintenance. It contains a basic test program for optical closures which is globally applicable. Additional requirements can be agreed upon between customer and supplier to reflect local or special conditions. All functions and features that a product may contain must be reflected in the mix of test samples that are subjected to the test program.

ITU-T Recommendation L.13

Performance requirements for passive optical nodes: Sealed closures for outdoor environments

1 Scope

This Recommendation:

- refers to passive optical nodes in outdoor environments;
- deals with the design of the closure housing as well as the fibre organizer;
- deals with mechanical and environmental characteristics of the optical closure;
- deals with the characteristics of the optical fibre organizers.

Following elements are added for this revision:

- a test plan for the performance evaluation of sealed optical closures in 2 basic environments: underground (OS) or above ground (OA);
- the simulation of the effect of interventions related to network maintenance;
- a checklist for a systematic product characterisation according to ITU-T Rec. L.51;
- a list of additional requirements to reflect special environments (e.g., tunnels) or local conditions.

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 Recommendation G.652 (2003), *Characteristics of a single-mode optical fibre and cable*.
- ITU-T Recommendation K.11 (1993), *Principles of protection against overvoltages and overcurrents*.
- ITU-T Recommendation K.25 (2000), *Protection of optical fibre cables*.
- ITU-T Recommendation L.51 (2003), *Passive node elements for fibre optic networks – General principles and definitions for characterization and performance evaluation*.
- IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*.
- IEC 60068-2-11:1981, *Environmental testing – Part 2: Tests. Test Ka: Salt mist*.
- IEC 60068-2-14:1984, *Environmental testing – Part 2: Tests. Test N: Change of temperature*.
- IEC 60068-2-17:1994, *Basic environmental testing procedures – Part 2: Tests – Test Q: Sealing*.
- IEC 60068-2-27:1987, *Environmental testing. Part 2: Tests. Test Ea and guidance: Shock*.
- IEC 60529:2001, *Degrees of protection provided by enclosures (IP Code)*.

- IEC 61300-2-1:2003, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-1: Tests – Vibration (sinusoidal).*
- IEC 61300-2-4:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-4: Tests – Fibre/cable retention.*
- IEC 61300-2-5:2002, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-5: Tests – Torsion/twist.*
- IEC 61300-2-9:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-9: Tests – Shock.*
- IEC 61300-2-10:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-10: Tests – Crush resistance.*
- IEC 61300-2-12:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-12: Tests – Impact.*
- IEC 61300-2-22:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature.*
- IEC 61300-2-23:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-23: Tests – Sealing for non-pressurized closures of fibre optic devices.*
- IEC 61300-2-26:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-26: Tests – Salt mist.*
- IEC 61300-2-33:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-33: Tests – Assembly and disassembly of closures.*
- IEC 61300-2-34:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-34: Tests – Resistance to solvents and contaminating fluids.*
- IEC 61300-2-37:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-37: Tests – Cable bending for closures.*
- IEC 61300-2-38:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-38: Tests – Sealing for pressurized closures of fibre optic devices.*
- IEC 61300-3-1:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-1: Examinations and measurements – Visual examination.*
- IEC 61300-3-3:2003, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-3: Examinations and measurements – Active monitoring changes in attenuation and return loss (multiple paths).*
- IEC 61300-3-28:2002, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-28: Examinations and measurements – Transient loss.*

3 Terms and definitions

This Recommendation defines the following terms:

3.1 optical closure: The term "optical closure" refers to a sealed sheath joint, including the fibre organizer system.