SLOVENSKI STANDARD
oSIST prEN IEC 60875-1:2023

01-julij-2023

Optični spojni elementi in pasivne komponente - Valovnodolžinsko neselektivni optični sklopniki - 1. del: Splošna specifikacija

Fibre optic interconnecting devices and passive components - Non-wavelength-selective fibre optic branching devices - Part 1: Generic specification

Lichtwellenleiter - Verbindungselemente und passive Bauteile - Wellenlängenunabhängige Lichtwellenleiter-Verzweiger - Teil 1: Fachgrundspezifikation

Dispositifs d'interconnexion et composants passifs à fibres optiques - Dispositifs de couplage à fibres optiques ne dépendant pas de la longueur d'onde - Partie 1: Spécification générique

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IEC SC 86B : FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS	
SECRETARIAT: Japan	SECRETARY: Mr Shigeru Tomita
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	
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TITLE:

Fibre optic interconnecting devices and passive components - Non-wavelength-selective fibre optic branching devices - Part 1: Generic specification

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NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – NON-WAVELENGTH-SELECTIVE FIBRE OPTIC BRANCHING DEVICES –

Part 1: Generic specification

FOREWORD

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International Standard IEC 60875-1 has been prepared by subcommittee SC86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This seventh edition cancels and replaces the fifth edition published in 2015 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) removal of variant and reference extensions in clause classification
b) removal of specification system in clause documentation
c) removal of interface standards, reliability standards and interlinking in clause standardization system

99
100 *Note for draft: The removals were decisions at the Locarno meeting in 2016.*

101 The text of this standard is based on the following documents:

xxxx	Report on voting
86B/xxxx/xxxx	86B/xxxx/xxxx

102
103 Full information on the voting for the approval of this standard can be found in the report on
104 voting indicated in the above table.

105 The French version of this standard has not been voted upon.

106 This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

107 A list of all parts in the IEC 60875 series, published under the general title *Fibre optic*
108 *interconnecting and passive components – Non-wavelength-selective fibre optic branching*
109 *devices*, can be found on the IEC website.

110 The committee has decided that the contents of this publication will remain unchanged until
111 the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data
112 related to the specific publication. At this date, the publication will be

113 • reconfirmed,
114 • withdrawn,
115 • replaced by a revised edition, or
116 • amended.

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – NON-WAVELENGTH-SELECTIVE FIBRE OPTIC BRANCHING DEVICES –

Part 1: Generic specification

1 Scope

This part of IEC 60875 applies to non-wavelength-selective fibre optic branching devices, all exhibiting the following features:

– they are passive, in that they contain no optoelectronic or other transducing elements;

– they have three or more ports for the entry and/or exit of optical power, and share optical power among these ports in a predetermined fashion;

– the ports are optical fibres, or optical fibre connectors.

This document establishes uniform requirements for the optical, mechanical and environmental properties.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60050-731, *International Electrotechnical Vocabulary - Chapter 731: Optical fibre communication*

IEC 60617 (all parts), *Graphical symbols for diagrams*

IEC 60695-11-5, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60825 (all parts), *Safety of laser products*

IEC 61300 (all parts), *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures*

IEC 61754 (all parts), *Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces*

IEC 61930, *Fibre optic graphic symbology*

IEC 62009-9-1, *Fibre optic interconnecting devices and passive components – Reliability – Part 9-1: Qualification of passive optical components*

IEC TS 62627-09, *Fibre optic interconnecting devices and passive components – Vocabulary for passive optical devices*

ISO 129-1, *Technical drawings – Indication of dimensions and tolerances – Part 1: General principles*

ISO 286-1, *Geometrical product specifications (GPS) – ISO code system for tolerances on linear sizes – Part 1: Basis of tolerances, deviations and fits*

ISO 1101, *Geometrical product specification (GPS) – ISO code system for tolerances on linear sizes – Part 1: Basis of tolerances, deviations and fits*

ISO 8601, *Data elements and interchange formats – Information interchange – Representation of dates and times*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-731 and IEC TS 62627-09, as well as the following, apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

· IEC Electropedia: available at http://www.electropedia.org/

· ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Basic terms and definitions

3.1.1
optical pigtail
fibre or cable terminated with or without a connector at the end forming an optical port for an optical component

3.2 Component definitions

3.2.1
non-wavelength-selective branching device
(optical) coupler
(optical) splitter
bidirectional passive component possessing three or more ports which operates non-selectively over a specified range of wavelengths, divides or combines optical power coming into one or more input port(s) among its one or more output port(s) in a predetermined fashion, without any amplification, switching, or other active modulation

3.2.2
bidirectional non-wavelength-selective branching device
device whose transfer matrix element of t_{ij} is equal to t_{ji} for all i and j

3.2.3
non-bidirectional non-wavelength-selective branching device
device which at least one transfer matrix element of t_{ij} is not equal to t_{ji}

3.2.4
balanced coupler
non-wavelength-selective branching device which is designed and intended to produce that each output port power from the same input port is equal

3.2.5
unbalanced coupler
non-wavelength-selective branching device which is designed and intended to produce that at least one output port power from the same input port is not equal

3.2.6
tap-coupler
unbalanced coupler, typically the coupling ratio is from 1 % to 20 %

3.3 Performance parameter definitions

3.3.1

excess loss
(EL)
total power lost in a non-wavelength-selective branching device when an optical signal is launched into port i, defined as

$$EL_i = -10 \log_{10} \sum_j t_{ij}$$

where the summation is performed only over those values j for which i and j are conducting ports.

Note 1 to entry: For a non-wavelength-selective branching device with N input ports, there is an array of N values of excess loss, one for each input port i.

3.3.2
uniformity
(U)
difference between the maximum and minimum attenuation measured for all output ports for one input port

Note 1 to entry: For each input port, it is the maximum value over the operating wavelength range or ranges. The uniformity for a device with more than one input port is defined as the maximum value of uniformities of all input ports.

Note 2 to entry: Uniformity is expressed as difference of maximum and minimum value of each insertion loss from a common input port. It is expressed in decibels.

Note 3 to entry: Generally, uniformity for a passive device is defined as maximum value of uniformities of all ports.

3.3.3
coupling (or splitting) ratio
(CR)
for a given input port i, the ratio of light at a given output port k to the total light from all output ports where j represents the operational output ports.

Note 1 to entry: Coupling ratio is calculated by

$$CR_{ik} = t_{ik} \Big/ \sum_j t_{ij} \cdot$$

4 Requirement

4.1 Classification

4.1.1 General

Several technologies exist for the manufacturing of non-wavelength-selective branching devices. Typical technologies of non-wavelength selective branching devices are:

– Fused biconic taper;

– Planar lightwave circuit.

Some examples are given in Annex A.

Non-wavelength-selective branching devices shall be classified as follows:

– type;
– style.

4.1.2 Types

The main characteristics of each type are as follows:

– transmissive;
– reflective.

4.1.3 Style

Non-wavelength-selective branching devices may have fibre or cable type pigtails with or without optical connectors. If equipped with optical connectors, the optical connectors shall to meet the requirements of IEC 61754 series.

4.2 Documentation

4.2.1 Symbols

Graphical and letter symbols shall, whenever possible, be taken from IEC 60027 series, IEC 60617 series and IEC TR 61930.

4.2.2 Drawings

4.2.2.1 General

The drawings and dimensions given in detail specifications shall not restrict themselves to details of construction, nor shall they be used as manufacturing drawings.

4.2.2.2 Projection system

Either first angle or third angle projection shall be used for the drawings in documents covered by this specification. All drawings within a document shall use the same projection system and the drawings shall state which system is used.

4.2.2.3 Dimensional system

All dimensions shall be given in accordance with ISO 129-1, ISO 286-1 and ISO 1101.

The metric system shall be used in all specifications.

Dimensions shall not contain more than five significant digits.

When units are converted, a note shall be added in each relevant specification and the conversion between systems of units shall use a factor of 25,4 mm to 1 inch.

4.2.3 Measurements

4.2.3.1 Measurement method

The measurement method for optical, mechanical, climatic, and environmental characteristics of branching devices to be used shall be defined and selected preferentially from the IEC 61300 series.