

Connectors for optical fibres and cables —

Part 1: Generic specification

The European Standard EN 60874-1:1999 has the status of a
British Standard

ICS 33.180.20

National foreword

This British Standard is the English language version of EN 60874-1:1999. It is identical with IEC 60874-1:1999.

The UK participation in its preparation was entrusted by Technical Committee GEL/86, Fibre optics, to Subcommittee GEL/86/2, Interconnecting devices and passive components, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

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**Connectors for optical fibres and cables
Part 1: Generic specification
(IEC 60874-1:1999)**

Connecteurs pour fibres et câbles
optiques
Partie 1: Spécification générique
(CEI 60874-1:1999)

Steckverbinder für Lichtwellenleiter und
Lichtwellenleiterkabel
Teil 1: Fachgrundspezifikation
(IEC 60874-1:1999)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 86B/1198/FDIS, future edition 4 of IEC 60874-1, prepared by SC 86B, Fibre optic interconnecting devices and passive components, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60874-1 on 1999-08-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2000-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2002-08-01

Annexes designated "normative" are part of the body of the standard.

In this standard, annex ZA is normative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60874-1:1999 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- | | |
|--------------|---|
| IEC 60068 | NOTE: Harmonized as HD 323 series and as EN 60068 series. |
| IEC 61754-2 | NOTE: Harmonized as EN 61754-2:1997 (not modified). |
| IEC 61754-4 | NOTE: Harmonized as EN 61754-4:1997 (not modified). |
| IEC 61754-13 | NOTE: Harmonized as EN 61754-13:1999 (not modified). |
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INTRODUCTION

This part of IEC 60874 is divided into three clauses.

Clause 1 is entitled "General" and contains general information pertaining to this generic specification.

Clause 2 is entitled "Requirements" and contains all the requirements to be met by connectors covered by this standard. This includes requirements for classification, the IEC specification system, documentation, materials, workmanship, quality, performance, identification, and packaging.

Clause 3 is entitled "Quality assessment procedures" and contains all of the procedures which must be followed for proper quality assessment of products covered by this standard.

CONNECTORS FOR OPTICAL FIBRES AND CABLES –

Part 1: Generic specification

1 General

1.1 Scope

This part of IEC 60874 applies to fibre optic connectors sets and individual components (i.e. adaptors, plugs, sockets) for all types, sizes and structures of fibres and cables. It includes:

- connector set requirements;
- quality assessment procedures.

This standard does not cover test and measurement procedures, which are described in IEC 61300-1, IEC 61300-2 and IEC 61300-3.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60874. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60874 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

References made to a specific clause or subclause of a standard include all subclauses of the reference unless otherwise specified.

QC 001002-2:1998, *IEC Quality Assessment System for Electronic Components (IECQ) – Basic Rules – Part 2: Documents*

QC 001002-3:1998, *IEC Quality Assessment System for Electronic Components (IECQ) – Basic Rules – Part 3: Approval procedure*

IEC Guide 102:1996, *Electronic components – Specification structures for quality assessment (Qualification approval and capability approval)*

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

IEC 60050(731):1991, *International Electrotechnical Vocabulary (IEV) – Chapter 731: Optical fibre communication*

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

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

IEC 60695-2-2:1991, *Fire hazard testing – Part 2: Test methods – Section 2: Needle-flame test*

IEC 60793-1 (all parts), *Optical fibres – Part 1: Generic specification*

IEC 60825-1:1993, *Safety of laser products – Part 1: Equipment classification, requirements and user's guide*

IEC 60874-1-1:1994, *Connectors for optical fibres and cables – Part 1-1: Blank detail specification – Environmental categories*

IEC 61300-1:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 1: General and guidance*

IEC 61300-2 (all parts), *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2: Tests*

IEC 61300-3 (all parts), *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3: Examinations and measurements*

IEC 61313-1:1995, *Fibre optic passive components and cable assemblies – Part 1: Capability approval – Generic specification*

IEC 61930:1998, *Fibre optic graphic symbology*

IEC 61931:1998, *Fibre optic terminology*

ISO 129:1985, *Technical drawings – Dimensioning – General principles, definitions, methods of execution and special indications*

ISO 286-1:1988, *ISO system of limits and fits – Part 1: Bases of tolerances, deviations and fits*

ISO 370:1975, *Toleranced dimensions – Conversion from inches into millimetres and vice versa*

ISO 1101:1983, *Technical drawings – Geometrical tolerancing – Tolerancing of form, orientation, location and run-out – Generalities, definitions, symbols, indications on drawings*

ISO 8601:1988, *Data elements and interchange formats – Information interchange – Representation of dates and times*

1.3 Definitions

For the purposes of this part of IEC 60874, the definitions contained in IEC 60050(731) and IEC 61931, as well as the following definitions, apply. They apply to all specifications (e.g. sectional and detail specifications, test and measurement procedures and interface standards).

1.3.1

(optical) (fibre) connector

component normally attached to an optical cable or piece of apparatus, for the purpose of providing frequent optical interconnection/disconnection of optical fibres or cables. This usually consists of two plugs mated together in an adaptor

1.3.2

plug

male-type part of a connector

1.3.3

ferrule

precise part of the plug, usually aligned in the sleeve of an adaptor. It confines the end(s) of a single or multiple optical fibres

NOTE 1 – Typically, individual fibres or fibres in a bundle are cemented together within a ferrule of a diameter designed to yield a maximum packing fraction.

NOTE 2 – Non-rigid materials such as shrink tubing may also be used in ferrules for special applications.

NOTE 3 – A ferrule generally provides a means of location within a connector.

1.3.4

adaptor

female-part of a connector in which one or two plugs are inserted and aligned

1.3.5

sleeve

precision part of the adaptor used to mechanically align two ferrules

1.3.6

alignment pins

cylindrical rods used for alignment in some types of connectors. Typically they are used in pairs and inserted into specific guide holes in the two plugs (usually for multifibre connectors) to provide the alignment

1.3.7

butting optical coupling

coupling in which the optical ports are in contact with each other

1.3.8

non-butting optical coupling

coupling in which the optical ports are not in contact with each other

1.3.9

expanded beam optical coupling

coupling in which the optical ports use lens technology

1.3.10

plug-adaptor-plug configuration

configuration in which two plugs mate through an adaptor. The mechanical coupling takes place between the plugs and the adaptor

1.3.11

(optical fibre) connector set

complete assembly of components (plug-adaptor-plug) required to provide demountable coupling between two or more optical fibre cables

1.3.12

receptacle

structure for interfacing a plug with an active component. Typically it is formed by a semi-adaptor and a structure containing and aligning the active component

1.3.13

plug-receptacle configuration

configuration in which a plug mates in a receptacle

1.3.14

reference (optical fibre) connector component

tighter toleranced or selected connector component (e.g. plug, adaptor, etc.) which is used for measuring purposes

NOTE – Test and measurement methods may refer to it. The characteristics or the selection procedure are given in the relevant specification.

1.3.15

fully intermateable connector set

connector sets from different sources are considered fully intermateable when connector components from one source will mate with complementary components from other sources without mechanical damage and with optical properties maintained within specified limits

1.3.16

mechanical intermateable connector set

connector sets from different sources are considered mechanical intermateable when connector components from one source will mate with complementary components from other sources without mechanical damage but without regard to optical properties

1.3.17

interchangeable connector set

connector sets are considered to be interchangeable when they share common installation geometry and have the same functional performance

1.3.18

mating face dimension

dimension of the features which determine the mating fit between components of an optical connector set

1.3.19

optical datum target

theoretical datum point on a connector interface where the optical fibre core centre should be positioned by the plug or by the adaptor receptacle

1.3.20

mechanical reference plane (datum plane)

the plane of a plug or adaptor which is perpendicular to the fibre axis and is located on a physical feature of the component. It is the datum plane from which all features of the component are measured in the direction of the fibre axis

NOTE – The mechanical reference planes of the plug and the adaptor should coincide when the two components are properly mated. Accordingly, each should be located on the feature that fixes or establishes the relative position of the two components when they are properly mated.

1.3.21

(optical fibre) connector set kit

series of components necessary to make a complete connector set