

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Fibre optic interconnecting devices and passive components – Fibre optic fan-outs –
Part 1: Generic specification**

**Dispositifs d'interconnexion et composants passifs à fibres optiques –
Systèmes d'éclatement pour fibres optiques –
Partie 1: Spécification générique**

WILLOW



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIBRE OPTIC FAN-OUTS –****Part 1: Generic specification****FOREWORD**

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International Standard IEC 61314-1 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This fourth edition cancels and replaces the third edition published in 2009 and constitutes a technical revision.

The specific technical changes from the previous edition are to reconsider a drawing showing the relationship between IEC 60874, IEC 61753, IEC 61754 series of standards, and updating the normative references.

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

FDIS	Report on voting
86B/3270/FDIS	86B/3300/RVD

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

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

A list of all parts of IEC 61314 series, under the general title *Fibre optic interconnecting devices and passive components – Fibre optic fan-outs* can be found on the IEC website.

Future standards in this series will carry the general new title as cited above. Titles of existing standards in this series will be updated at the time of the new edition.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

Withdrawn

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – FIBRE OPTIC FAN-OUTS –

Part 1: Generic specification

1 Scope

This part of IEC 61314 specifies requirements for fan-outs used in the fibre optics field to provide a safe transition from multifibre cable units to individual fibres or cables.

This standard corresponds to QC880000 of IEC Quality Assessment System.

This standard does not cover test and measurement procedures, which are described in IEC 61300 series.

2 Normative references

The following referenced documents are indispensable for the application of this document. 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, *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 60793-1-1, *Optical fibres – Part 1-1: Measurement methods and test procedures – General and guidance*

IEC 60794-1-1, *Optical fibre cables – Part 1-1: Generic specification – General*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 60869-1, *Fibre optic attenuators – Part 1: Generic specification*

IEC 60874-1, *Connectors for optical fibres and cables – Part 1: Generic specification*

IEC 61073-1, *Fibre optic interconnecting devices and passive components – Mechanical splices and fusion splice protectors for optical fibres and cables – Part 1: Generic specification*

IEC 61300 (all parts), *Fibre optic interconnecting devices and passive components*

IEC 61753 (all parts), *Fibre optic interconnecting devices and passive components performance standard*

IEC/TR 61930, *Fibre optic graphical symbology*

IEC/TR 61931, *Fibre optic – Terminology*

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

IECQ QC 001002-3, *IEC Quality Assessment System for Electronic Components (IECQ System) – Rules of procedure – Part 2: Documentation*

ISO 129, *Technical drawings – Indication of dimensions and tolerances*

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

ISO 1101, *Geometrical Product Specifications (GPS) – Geometrical tolerancing – Tolerances of form, orientation, location and run-out*

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, IEC 60874-1 and IEC/TR 61931 as well as the following apply.

3.1

fibre optic fan-out

passive component providing a transition from multifibre cable unit to individual fibres or cables having at least one fibre or cable end connectorised

3.2

transition box

part of the fan-out where a multifibre cable is separated into individual fibre or cables. It may contain splices

3.3

cable anchoring element

part of the fan-out where the cable strength members are secured

4 Requirements

4.1 General

The requirements for fan-outs covered by this specification are specified in this clause and in the relevant specification.

4.2 Classification

4.2.1 General

Fibre optic fan-outs are classified by the following categories:

- style;
- arrangement;
- variant;

- assessment level.

4.2.2 Style

Fan-out style shall be classified by the following categories:

- connector / splice type names (e.g. MT/FC, Bare Ribbon/SC);
- fan-out configuration (e.g. diagrams shown in Figures 1, 2 and 3).

Key applies to Figures 1 and 2.

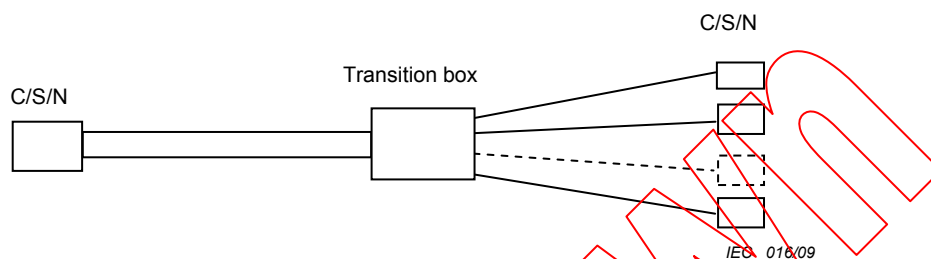


Figure 1 – Pigtail/patchcord fan-out

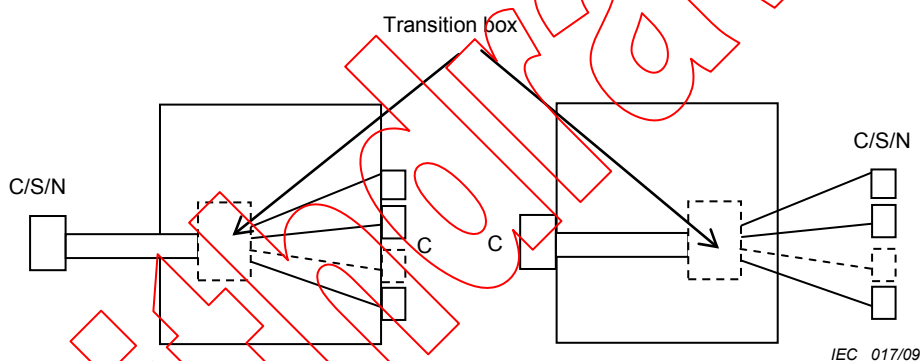
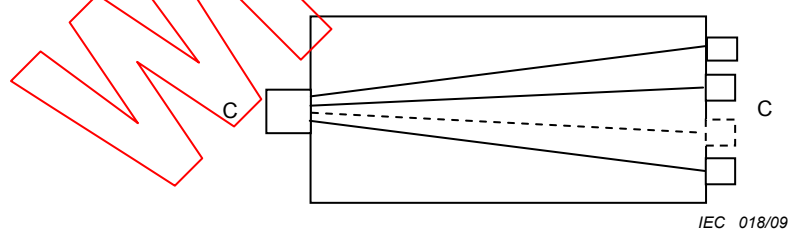


Figure 2 – Semi-compact fan-out



Key

- C connector
- S splice hardware (mechanical)
- N not terminated

Figure 3 – Compact fan-out

- category of fibres/cables in accordance with IEC 60793-1-1 and IEC 60794-1-1;
- length of fibres/cables.

4.2.3 Arrangement

The fan-out arrangement shall define the delivered fan-out form.

Examples of fan-out arrangements:

- kit arrangement;
- pigtail (one side connectorised) arrangement;
- patchcord (both sides connectorised) arrangement.

4.2.4 Variant

The fan-out variants define the variety of structurally similar components. Examples of feature variables which create variants include:

- number of fibres or channels;
- fibre or cable sizes;
- transition box dimensions
- mounting/fixing schemes.

4.2.5 Normative reference extensions

Normative reference extensions are used to identify integrated independent standards, specifications or other reference documents in other relevant specifications.

Unless specified exception is noted, additional requirements imposed by an extension are mandatory. Usage is primarily intended to merge associated components to form hybrid devices, or integrated functional application requirements that are dependent on technical expertise other than fibre optics.

Published reference documents produced by the ITU, consistent with the scope statements of the relevant IEC specification series, may be used as extensions. Published documents produced by other regional standardisation bodies such as ANSI, CENELEC, JIS, DIN etc., may be referenced in a bibliography, attached to the generic specification.

Some optical fibre splice configurations require special qualification provisions which shall not be imposed universally. This accommodates individual component design configurations, specialised field tooling or specific application processes. In this case, requirements are necessary to assure repeatable performance or adequate safety, and provide additional guidance for complete product specification. These extensions are mandatory when used to prepare, assemble or install an optical fibre splice either for field application usage or preparation of qualification test specimens. The relevant specification shall clarify all stipulations. However, design and style-dependent extensions shall not be imposed universally.

In the event of conflicting requirements, precedence, in descending order, shall be: generic over mandatory extension, over blank detail, over detail, over application specific extension.

Examples of optical connector extensions are given as follows:

- using IEC 61754-4 and IEC 61754-20 to partially define a future IEC 60874 specification for a duplex type "SC"/"LC" hybrid connector adapter;
- using IEC 61754-13 and IEC 60869-1 to partially define a future IEC 60874 specification for an integrated type "FC" attenuated optical connector;
- using IEC 61754-20 and IEC 61073-1 to partially define a future IEC 60874 specification for a duplex "LC" receptacle incorporating integral mechanical splices.

Other examples of requirements for normative extensions are:

- a) Some commercial or residential building applications may require direct reference to specific safety codes and regulations or incorporate other specific material flammability or toxicity requirements for specialised locations.

- b) Specialised field tooling may require an extension to implement specific ocular safety, electrical shock, burn hazard avoidance requirements, or require isolation procedures to prevent potential ignition of combustible gases.

4.3 Documentation

4.3.1 Symbols

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

4.3.2 Specification system

4.3.2.1 General

This specification is part of a three-level IEC specification system. Subsidiary specifications shall consist of blank detail specifications and detail specifications. This system is shown in Table 1. There are no sectional specifications for fan-outs.

Table 1 – Three-level IEC specification structure

Specification level	Examples of information to be included	Applicable to
Basic	– Assessment system rules – Inspection rules – Optical measuring methods – Environmental test methods – Sampling plans – Identification rule – Marking standards – Dimensional standards – Terminology – Symbol standards – Preferred number series – SI units	Two or more component families or sub-families
Generic	– Specific terminology – Specific symbols – Specific units – Preferred values – Marking – Quality assessment procedures – Selection of tests – Qualification approval procedures – Capability approval procedures	Component family
Blank detail	– Quality conformation test schedule – Inspection requirements – Information common to a number of types	Groups of types having a common test schedule
Detail	– Individual values – Specific information – Completed quality conformance test schedules	Individual type

4.3.2.2 Blank detail specification

Blank detail specifications are not, by themselves, a specification level. They are associated with the generic specification.

Each blank detail specification shall contain:

- the minimum mandatory test schedules and performance requirements;
- one or more assessment levels;
- the preferred format for stating the required information in the detail specification;
- in case of hybrid components, including connectors, addition of appropriate entry fields to show the reference normative document, document title and issue date.

4.3.2.3 Detail specification

A specific fan-out is described by a corresponding detail specification, which is prepared by filling in the blanks of the blank detail specification. Within the constraints imposed by this generic specification, the blank detail specification may be filled in by any national committee of the IEC, thereby defining a particular fan-out design as an official IEC standard.

Detail specifications shall specify the following, as applicable:

- style (see 4.2.2);
- arrangement (see 4.2.3)
- variant(s) (see 4.2.4);
- part identification number for each variant (see 4.8.1)
- drawings, dimensions required (see 4.3.3);
- performance requirements (see 4.7).

4.3.3 Drawings

4.3.3.1 General

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

4.3.3.2 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.

4.3.3.3 Dimensional system

All dimensions shall be given in accordance with ISO 129, 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.

4.3.3.4 Performance

The performance requirements for fibre optic fan-outs are defined in the performance standard series of documents IEC 61753.

4.3.4 Tests and measurements

4.3.4.1 Test and measurement procedures

The test and measurement procedures for optical, mechanical, climatic, and environmental characteristics of fan-outs to be used shall be defined and selected preferentially from the IEC 61300 series.

The size measurement method to be used shall be specified in the relevant specification for dimensions which are specified within a total tolerance zone of 0,1 mm or less.

4.3.4.2 Reference components

Reference components, if required, shall be specified in the relevant specification.

4.3.4.3 Gauges

Gauges, if required, shall be specified in the relevant specification.

4.3.5 Test reports

Test reports shall be prepared for each test conducted as required by the relevant specification. The reports shall be included in the qualification report and in the periodic inspection report.

Test reports shall contain the following information:

- title of test and date;
- specimen description including the type of fibre, connector or other coupling device. The description shall also include the variant identification number (see 4.8.1);
- test equipment used and date of latest calibration;
- all applicable test details;
- all measurement values and observations;
- sufficiently detailed documentation to provide traceable information for failure analysis.

4.3.6 Instructions for use

Instructions for use, when required, shall be given by the manufacturer and shall include:

- assembly and connection instructions;
- cleaning method;
- safety aspects;
- additional information as necessary.

4.4 Standardisation system

4.4.1 Interface standards

Interface standards provide both manufacturer and user with all the information they require to make or use products conforming to the physical features of that standard interface. Interface standards fully define and dimension the features essential for the mating and unmating of optical fibre connectors and other components. They also serve to position the optical datum target, where defined, relative to other reference data.

Interface standards ensure that connectors and adapters that comply with the standard will fit together. The standards may also contain tolerance grades for ferrules and alignment devices. Tolerance grades are used to provide different levels of alignment precision.