INTERNATIONAL STANDARD

IEC 60874-10-3

QC 910003XX0003

First edition
1997-06

Connectors for optical fibres and cables –

Part 10-3:
Detail specification for fibre optic adaptor type BFOC/2,5 for single and multimode fibre

Reference number
IEC 60874-10-3: 1997(E)

Validité de la présente publication

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– IEC 60417: *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets;*

– IEC 60617: *Graphical symbols for diagrams;*

and for medical electrical equipment,

– IEC 60878: *Graphical symbols for electromedical equipment in medical practice.*

The symbols and signs contained in the present publication have either been taken from IEC 60027, IEC 60417, IEC 60617 and/or IEC 60878, or have been specifically approved for the purpose of this publication.

IEC publications prepared by the same technical committee

The attention of readers is drawn to the end pages of this publication which list the IEC publications issued by the technical committee which has prepared the present publication.

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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PRICE CODE M

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONNECTORS FOR OPTICAL FIBRES AND CABLES –

Part 10-3: Detail specification for fibre optic adaptor type BFOC/2,5 for single and multimode fibre

FOREWORD

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International Standard IEC 60874-10-3 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

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

FDIS	Report on voting
86B/870/FDIS	86B/971/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.

The QC number that appears on the front cover of this publication is the specification number in the IEC Quality Assessment System for Electronic Components (IECQ).

The references to clauses or subclauses of IEC 60874-1 indicated in this part apply to the third edition of IEC 60874-1.

CONNECTORS FOR OPTICAL FIBRES AND CABLES

Part 10-3: Detail specification for fibre optic adaptor type BFOC/2,5 for single and multimode fibre

NATIONAL STANDARDS ORGANIZATION:	..... Date: .....

DETAIL SPECIFICATION IEC QC 910003XX0003.

FIBRE OPTIC COMPONENT OF ASSESSED QUALITY IN ACCORDANCE WITH

- GENERIC SPECIFICATION: QC 910000, IEC 60874-1
- BLANK DETAIL SPECIFICATION: QC 910004, IEC 60874-1-1

FIBRE OPTIC CONNECTOR

CLASSIFICATION:

Type: Name: BFOC/2,5

Configuration: plug-adaptor-plug
Coupling: bayonet
Control dimensions:
– Adaptor: see figures 1 and 2

Variants: see page 5

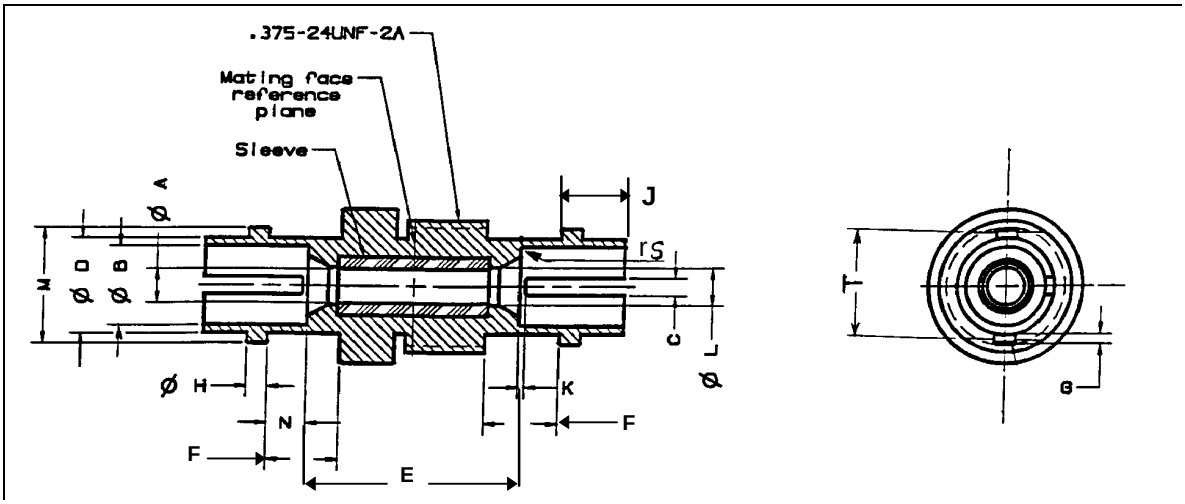
Climatic category: 10/60/4

Environmental category: 4

Assessment level: A

QUALIFICATION PROCEDURE: Fixed sample procedure

SAFETY WARNING: Take care when handling small diameter optical fibre to prevent puncturing the skin, especially in the eye area. Direct viewing of the end of an optical fibre when it is propagating energy is not recommended unless prior assurance is obtained as to the safe energy output level.



Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	–	–	1
B	5,49	5,82	
C	1,12	1,47	
D	6,86	7,04	
E	13,98	15,24	
F	4,80	5,56	
G	0,58	0,84	2
H	1,07	1,57	
J	–	4,99	
K	–	0,71	
L	2,64	2,84	
M	–	8,53	
N	2,36	3,53	
rS	–	0,15	radius
T	7,50	7,75	

NOTES

1 The connector alignment feature is a resilient alignment sleeve. The gauge retention force shall be measured with two gauge pins, each inserted to the middle of the alignment feature. The gauge retention force shall be from 2,9 N to 5,9 N.

2 Double dimension to preclude one pin being larger than the other.

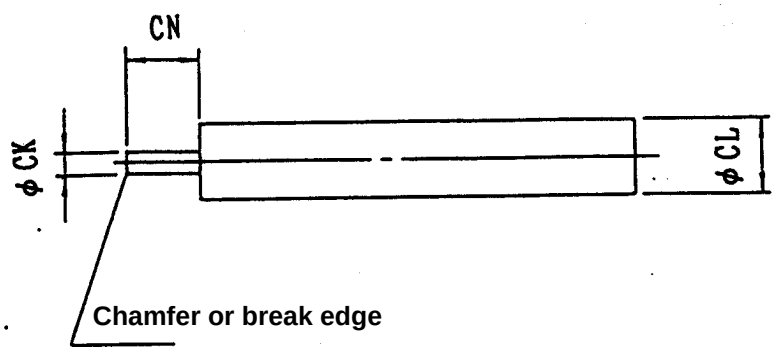
3 Where a tolerance of form is not specified, the limits of the dimensions for a feature control the form as well as the size.

4 Where interrelated features of size (features shown with a common axis or centre plane) have no geometric tolerance of location or run out specified, the limits of the dimensions for a feature control the location tolerance as well as the size.

5 Where perpendicular features (features shown at right angles) have no geometric tolerance of orientation or run out specified, the limits of the dimensions for a feature control the orientation tolerance as well as the size.

6 Thread form indicated is an “American National Standard Unified External Screw Thread”. Numeric references are inch-based values.

Figure 1 – Adaptor outline and mating face dimensions

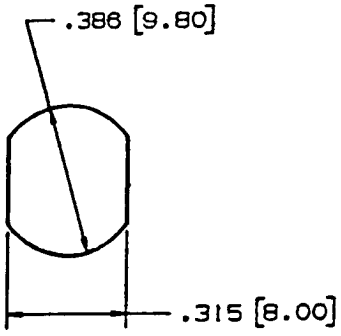


Reference	Dimensions mm		Notes
	Minimum	Maximum	
CK	2,4985	2,4995	1
CL	–	5,4	
CN	7,75	–	

NOTE

1 Surface roughness grade N4 (0,2 μRa)

Figure 2 – Dimension of a pin gauge for an adaptor

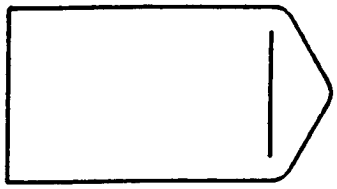


RECOMMENDED PANEL CUTOUT

HEX NUT

19,53 x 2,29 mm. Thick
(0,375 x 0,09)

INTERNAL TOOTH
LOCKWASHER



PROTECTIVE CAP

10,41 max. × 0,46
(0,410 max. × 0,018)

NOTES

1 Maximum panel thickness 4,70 mm for adaptor variant.

2 Tolerance is ±0,005 unless otherwise specified.

3 Dimensions are in millimetres.

4 Inch equivalents, in brackets, are given for general information only.

Figure 3 – Panel piercing and mounting detail

VARIANT IDENTIFICATION NUMBERS Number: QC 910X01/0004-ZZZZ			
ZZZZ	Component name	Variant feature	
		Sleeve material	Mounting
1001	Adaptor	Ceramic	Threaded
1002	Adaptor	Ceramic	Flanged
1003	Adaptor	Metal	Threaded
1004	Adaptor	Metal	Flanged
1005	Adaptor	Plastic	Threaded
1006	Adaptor	Plastic	Flanged

SUPPLEMENTARY INFORMATION
Component marking:
The name and manufacturer's identification mark shall be permanently identified.

TABLE 1

FIXED SAMPLE TEST SCHEDULE FOR QUALIFICATION APPROVAL

Test sequence	Reference IEC 60874-1 (IEC 61300)	*n*
Group 0		
– Visual examination	4.4.1 (3-1)	20
– Dimensions	4.4.2 (3-1)	
Group 1		
– Attenuation	4.4.7 (3-4)	20
Group 2		
– Cold	4.5.17 (2-17)	
– Dry heat	4.5.18 (2-18)	6
– Damp heat (steady state)	4.5.19 (2-19)	
Group 3		
– Engagement and separation force	4.4.5 (3-11)	6
– Mechanical endurance	4.5.32 (2-2)	
Group 4		
– Vibration	4.5.1 (2-1)	4
– Change of temperature (test Nb)	4.5.22 (2-22)	
Group 5		
– Strength of coupling mechanism	4.5.6 (2-6)	4

NOTES

1 *n* = sample size (number of plugs).

2 To satisfy the qualification approval requirements of the detail specification there shall be no failures of any in the sample groups for any test parameter. If a failure does occur this shall be investigated and the cause of failure identified and corrected. The test which is affected shall then be repeated using the minimum sample size stated in this detail specification.

A fully documented test report and supporting data shall be prepared and shall be available for inspection. Failures and the corrective action taken to eliminate failures shall be documented and evidence must be presented to show that the corrective action will have no detrimental effect on the performance in any of the other tests. Design changes, as opposed to improvements in quality control, will usually be deemed to necessitate a repeat of the full qualification programme.

3 Unless otherwise indicated, the test details, measurements and performance requirements are given in table 4.

4 Only group 1 tests shall be carried out using a reference connector. All other tests shall be carried out using regular products.

TABLE 2

LOT-BY-LOT QUALITY CONFORMANCE INSPECTION SCHEDULE
GROUPS A AND B

Test sequence	Reference IEC 60874-1 (IEC 61300)	Assessment level A	
		IL	AQL
Group A			
– Visual examination	4.4.1 (3-1)	II	4 %
Group B			
– Attenuation	4.4.7 (3-4)	II	4 %

NOTES

1 Unless otherwise indicated, the details, measurements and performance requirements are given in table 4.

2 IL = Inspection level; AQL = Acceptable quality level.

3 Only attenuation and return loss tests shall be carried out using a reference connector. All other tests shall be carried out using regular products.

TABLE 3

PERIODIC QUALITY CONFORMANCE INSPECTION SCHEDULE
GROUPS C AND D

Test sequence	Reference IEC 60874-1 (IEC 61300)	Assessment level A	
		n	*p*
Group C0			
– Visual examination – Dimensions	4.4.1 (3-1) 4.4.2 (3-1)	18	24
Group C1			
– Attenuation	4.4.7 (3-4)	18	24
Group C2			
– Cold – Dry heat – Damp heat (steady state)	4.5.17 (2-17) 4.5.18 (2-18) 4.5.19 (2-19)	6	24
Group D0			
– Visual examination – Dimensions	4.4.1 (3-1) 4.4.2 (3-1)	20	48
Group D1			
– Attenuation	4.4.7 (3-4)	20	48
Group D2			
– Cold – Dry heat – Damp heat (steady state)	4.5.17 (2-17) 4.5.18 (2-18) 4.5.19 (2-19)	6	48
Group D3			
– Engagement and separation force – Mechanical endurance	4.4.5 (3-11) 4.5.2 (2-2)	6	48
Group D4			
– Vibration – Change of temperature (test Nb)	4.5.1 (2-1) 4.5.22 (2-22)	4	48
Group D5			
– Strength of coupling mechanism	4.5.6 (2-6)	4	48

NOTES

1 *n* = sample size (number of plugs); *p* = periodicity in months.

2 To satisfy the conformance inspection requirements of the detail specification there shall be no failures of any in the sample groups for any test parameter. If a failure does occur this shall be investigated and the cause of failure identified and corrected. The test which is affected shall then be repeated using the minimum sample size stated in this detail specification.

A fully documented test report and supporting data shall be prepared and shall be available for inspection. Failures and the corrective action taken to eliminate failures shall be documented and evidence shall be presented to show that the corrective action will have no detrimental effect on the performance in any of the other tests. Design changes, as opposed to improvements in quality control, will usually be deemed to necessitate a repeat of the full qualification programme.

3 Unless otherwise indicated, the details, measurements and performance requirements are given in table 4.

4 Only C1 and D1 tests shall be carried out using a reference connector. All other tests shall be carried out using regular products.

TABLE 4

DETAILS, MEASUREMENTS AND PERFORMANCE REQUIREMENTS

Visual examination 4.4.1 (61300-3-1)

Requirements:

– Marking shall be clear

Dimensions 4.4.2 (61300-3-1)

Requirements:

– All size dimensions shall be in accordance with this specification

Attenuation 4.4.7 (61300-3-4)

Details:

– Method No. 8
– Number of measurements to be averaged: 5
– Source: LD
– Peak wavelength: 1,3 μm
– Preconditioning procedure: the ferrule endface of the reference plug shall be cleaned using lint free material
– Length L1: 2 m
– Length L2: 2 m

Reference plug

Reference plug shall be in accordance with IEC 60874-10-1 and IEC 60874-10-2

– Ferrule outer diameter is 2,449 mm ± 0,0003 mm
– Concentricity of the fibre core with the outer diameter of the ferrule is less than 0,6 μm
– Eccentricity of a spherical polished ferrule endface is less than 30 μm

Requirements:

– Allowable insertion loss: less than 0,2 dB against two reference plugs

Cold 4.5.17 (61300-2-17)

Details:

– Temperature; –10 °C
– Duration: 96 h
– Specimen optically functioning
– Conditioning procedure: specimen lowered to test temperature and returned to room temperature at a rate not to exceed 1°/min
– Deviations: none
– Plugs shall be in accordance with IEC 60874-10-1 and IEC 60874-10-2
– Change in attenuation during test: less than 0,2 dB

Dry heat 4.5.18 (61300-2-18)

Details:

– Temperature: 60 °C
– Duration: 96 h
– Specimen optically functioning
– Conditioning procedure: specimen raised to test temperature and returned to room temperature at a rate not to exceed 1°/min
– Deviations: none
– Plugs shall be in accordance with IEC 60874-10-1 and IEC 60874-10-2
– Change in attenuation during test: less than 0,2 dB

(continued)

TABLE 4 (continued)

DETAILS, MEASUREMENTS AND PERFORMANCE REQUIREMENTS

Damp heat (steady state) 4.5.19 (61300-2-19)

Details:

– Temperature: 40 °C
– Relative humidity: 90-95 %
– Duration: 96 h
– Precautions regarding surface moisture removal: none
– Specimen optically functioning
– Conditioning procedure: specimen raised to test temperature and returned to room temperature at a rate not to exceed 1°/min
– Deviations: none
– Plugs shall be in accordance with IEC 60874-10-1 and IEC 60874-10-2
– Change in attenuation during test: less than 0,2 dB

Strength of coupling mechanism 4.5.6 (61300-2-6)

Details:

– Magnitude: 68,6 N
– Rate of application of the tensile load: 50 N/min < load rate < 250 N/min
– Point of application of the tensile load: 22-28 cm from connector
– Specimen optically non-functioning
– Preconditioning procedure: none
– Recovery procedure: none
– Deviations: none
– Plugs shall be in accordance with IEC 60874-10-1 and IEC 60874-10-2

Initial measurements and performance requirements:

– Attenuation: less than 0,75 dB

Final measurements and performance requirements:

– Attenuation: less than 0,75 dB
– The specimen has no mechanical damage

Mechanical endurance 4.5.32 (61300-2-2)

Details:

– Cycles: 500
– Specimen optically functioning
– Preconditioning procedure: none
– Recovery procedure: clean plug and blow out adaptor with canned air after every 25 matings
– Deviations: none
– Plugs shall be in accordance with IEC 60874-10-1 and IEC 60874-10-2
– Change in attenuation during test: less than 0,2 dB

Engagement and separation force 4.5.4 (61300-3-11)

Details:

– Preconditioning procedure: none
– Deviation: as necessary
– Plugs shall be in accordance with IEC 60874-10-1 and IEC 60874-10-2

Requirements:

– Allowable engagement force: max. 19,6 N
– Allowable separation force: max. 19,6 N

(continued)

TABLE 4 (concluded)

DETAILS, MEASUREMENTS AND PERFORMANCE REQUIREMENTS

Change of temperature (Test Nb) 4.5.22 (61300-2-11)

Details:

– Test method: Nb
– High temperature: 60 °C
– Low temperature: –10 °C
– Duration of extreme temperature: 30 min
– Changeover time: 0,5 min
– Number of cycles: 5
– Specimen optically non-functioning
– Preconditioning procedure: with dust cap
– Recovery procedure: after test, specimens shall be maintained at room temperature condition for 2 h. Clean endface before final measurement
– Deviation: none
– Plugs shall be in accordance with IEC 60874-10-1 and IEC 60874-10-2

Initial measurements and performance requirements:

– Attenuation: less than 0,75 dB

Final measurements and performance requirements:

– Attenuation: less than 0,75 dB

Vibration 4.5.1 (61300-2-1)

Details:

– Frequency range: 10-55 Hz
– Vibration amplitude: 0,75 mm constant displacement
– Sweep time: 1 octave/min
– Endurance duration per axis: 30 min
– Method of mounting: An adaptor shall be mounted rigidly to the mounting fixture
– Specimen optically non-functioning
– Preconditioning procedure: none
– Recovery procedure: clean endface before final measurement
– Deviation: none
– Plugs shall be in accordance with IEC 60874-10-1 and IEC 60874-10-2

Initial measurements and performance requirements:

– Attenuation: less than 0,75 dB

Final measurements and performance requirements:

– Attenuation: less than 0,75 dB
– The specimen has no mechanical damage.

———————

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Tell us why you have the standard. (check as many as apply). I am:

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- ☐ a researcher
- ☐ an engineer
- ☐ a safety expert
- ☐ involved in testing
- ☐ with a government agency
- ☐ in industry
- ☐ other.....

3.

This standard was purchased from?

.....

4.

This standard will be used (check as many as apply):

- ☐ for reference
- ☐ in a standards library
- ☐ to develop a new product
- ☐ to write specifications
- ☐ to use in a tender
- ☐ for educational purposes
- ☐ for a lawsuit
- ☐ for quality assessment
- ☐ for certification
- ☐ for general information
- ☐ for design purposes
- ☐ for testing
- ☐ other.....

5.

This standard will be used in conjunction with (check as many as apply):

- ☐ IEC
- ☐ ISO
- ☐ corporate
- ☐ other (published by.....)
- ☐ other (published by.....)
- ☐ other (published by.....)

6.

This standard meets my needs (check one)

- ☐ not at all
- ☐ almost
- ☐ fairly well
- ☐ exactly

7.

Please rate the standard in the following areas as (1) bad, (2) below average, (3) average, (4) above average, (5) exceptional, (0) not applicable:

- ☐ clearly written
- ☐ logically arranged
- ☐ information given by tables
- ☐ illustrations
- ☐ technical information

8.

I would like to know how I can legally reproduce this standard for:

- ☐ internal use
- ☐ sales information
- ☐ product demonstration
- ☐ other.....

9.

In what medium of standard does your organization maintain most of its standards (check one):

- ☐ paper
- ☐ microfilm/microfiche
- ☐ mag tapes
- ☐ CD-ROM
- ☐ floppy disk
- ☐ on line

9A.

If your organization currently maintains part or all of its standards collection in electronic media, please indicate the format(s):

- ☐ raster image
- ☐ full text

10.

In what medium does your organization intend to maintain its standards collection in the future (check all that apply):

- ☐ paper
- ☐ microfilm/microfiche
- ☐ mag tape
- ☐ CD-ROM
- ☐ floppy disk
- ☐ on line

10A.

For electronic media which format will be chosen (check one)

- ☐ raster image
- ☐ full text

11.

My organization is in the following sector (e.g. engineering, manufacturing)

.....

12.

Does your organization have a standards library:

- ☐ yes
- ☐ no

13.

If you said yes to 12 then how many volumes:

.....

14.

Which standards organizations published the standards in your library (e.g. ISO, DIN, ANSI, BSI, etc.):

.....

15.

My organization supports the standards-making process (check as many as apply):

- ☐ buying standards
- ☐ using standards
- ☐ membership in standards organization
- ☐ serving on standards development committee
- ☐ other.....

16.

My organization uses (check one)

- ☐ French text only
- ☐ English text only
- ☐ Both English/French text

17.

Other comments:

.....

.....

.....

.....

.....

.....

18.

Please give us information about you and your company

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job title:.....

company: .....

address:.....

.....

.....

.....

No. employees at your location:.....

turnover/sales:.....

Publications de la CEI préparées par le Comité d'Etudes n° 86

60793:— Fibres optiques.

60793-1 (1992) Partie 1: Spécification générique.

60793-1-1 (1995) Partie 1: Spécification générique – Section 1: Généralités.

60793-1-2 (1995) Partie 1: Spécification générique – Section 2: Méthodes de mesure des dimensions.
Amendement 1 (1996).

60793-1-3 (1995) Partie 1: Spécification générique – Section 3: Méthodes de mesure des caractéristiques mécaniques.
Amendement 1 (1996).

60793-1-4 (1995) Partie 1: Spécification générique – Section 4: Méthodes de mesure des caractéristiques optiques et de transmission.
Amendement 1 (1996).

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