BS EN 61300-3-52:2014

BSI Standards Publication

Fibre optic interconnecting devices and passive components — Basic test and measurement procedures

Part 3-52: Examinations and measurements — Guide hole and alignment pin deformation constant, CD for 8 degree angled PC rectangular ferrule, single mode fibres

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Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-52: Examinations and measurements - Guide hole and alignment pin deformation constant, CD for 8 degree angled PC rectangular ferrule, single mode fibres

(IEC 61300-3-52:2014)

Dispositifs d'interconnexion et composants passifs à fibres optiques - Procédures fondamentales d'essais et de mesures - Partie 3-52: Examens et mesures - Constante CD de déformation de l'alésage de guidage et de la broche d'alignement, pour férule rectangulaire PC avec angle de 8 degrés, fibres unimodales (CEI 61300-3-52:2014)

Lichtwellenleiter - Verbindungselemente und passive Bauteile - Grundlegende Prüf- und Messverfahren - Teil 3-52: Messung - Deformationskonstante CD der Führungsbohrung und des Führungsstifts einer 8° abgeschrägten Rechteckferrule mit physikalischem Kontakt für Einmodenfasern (IEC 61300-3-52:2014)

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Foreword

The text of document 86B/3704/FDIS, future edition 1 of IEC 61300-3-52, 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 approved by CENELEC as EN 61300-3-52:2014.

The following dates are fixed:

– latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-12-13
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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61754-7	NOTE	Harmonized as EN 61754-7.
IEC 61754-10	NOTE	Harmonized as EN 61754-10.

CONTENTS

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 3-52: Examinations and measurements – Guide hole and alignment pin deformation constant, C_D for 8 degree angled PC rectangular ferrule, single mode fibres

1 Scope

This part of IEC 61300 describes a procedure to measure guide hole and alignment pin deformation constant, C_D for 8 degree angled PC rectangular ferrule multi-fibre connectors.

2 General description

2.1 General

Alignment pin and ferrule deformation dependence on applied force at the pin edge can vary for different ferrule design attributes including material properties, internal geometry and surface roughness. The amount of deformation influences the amount of y-direction translation and therefore the nominal y-offset location of the fibre cores, Y_i.

Y_i is described by the next expression and shown in Figure 1:

$$Y_i = \alpha\ (ID\text{-}OD)/2 + C_D$$

where

α is the coefficient that depends on the difference between guide hole pitches for mated plugs;

ID is the inside diameter of the guide hole;

OD is the outside diameter of the alignment pin;

C_D is the alignment pin and guide hole deformation constant for an applied force of 0,7 N to each hole corresponding to the nominal mating force value of 9,8 N.

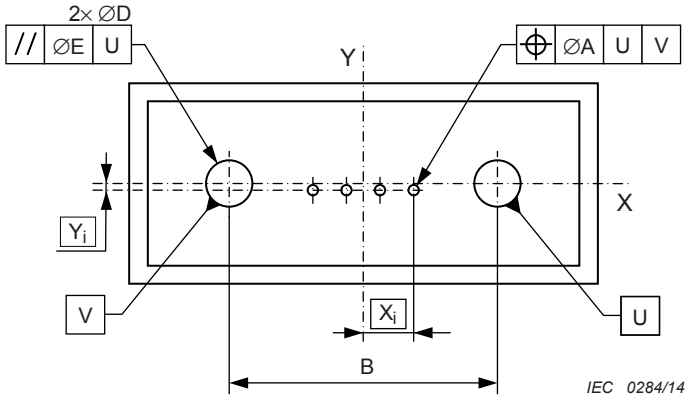


Figure 1 – Y_i and C_D definitions

2.2 Test conditions

For precise measurement such as design verification, the test condition shall be controlled as required in Table 1.

Table 1 – Test conditions

Condition	Requirement
Temperature T	22,0°C to 24,0 °C
MT ferrule adhesion	Adhesive shall not cover guide pins.
MT ferrule position	MT ferrule shall be centred on gauge block
Relative humidity RH	(50,0 ± 10,0) % RH
Maximum pin size	0,6988 mm

3 Apparatus

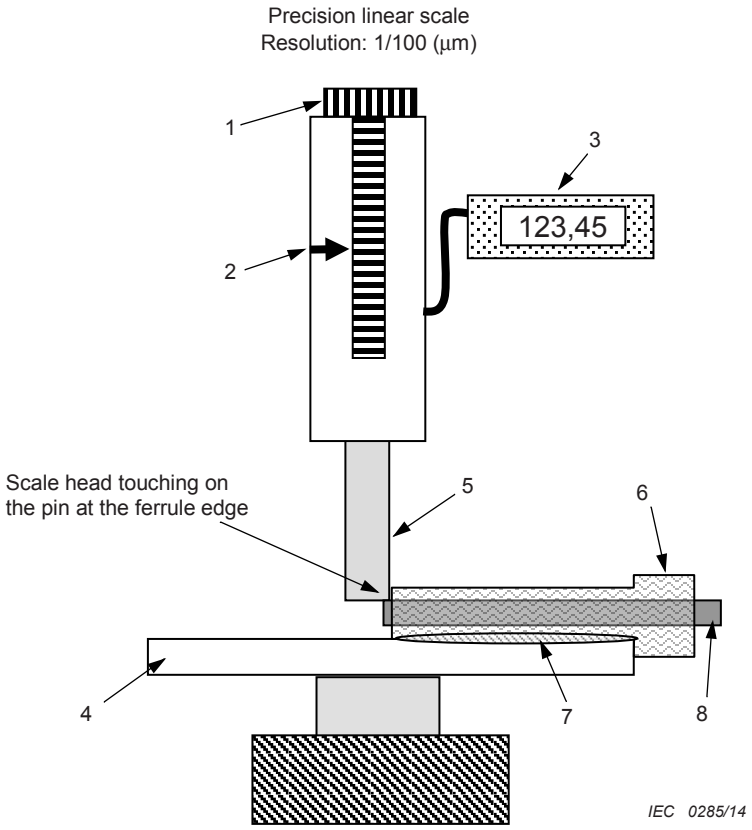
3.1 Precision linear scale

The structure of precision linear scale used for the C_D measurement is shown in Figure 2. The apparatus consists of a measurement force setter, a force indicator, a position indicator, a scale head touching the samples to be measured and a scale stage. The linear scale has a resolution of 1/100 μm and the measurement force setting up to 2,20 N.

The measurement procedure is as follows:

a) Measurement force applied between the scale head and the scale stage of the linear scale is adjusted by the measurement force setter.

b) The measurement force is read directly from the force indicator of the main body.



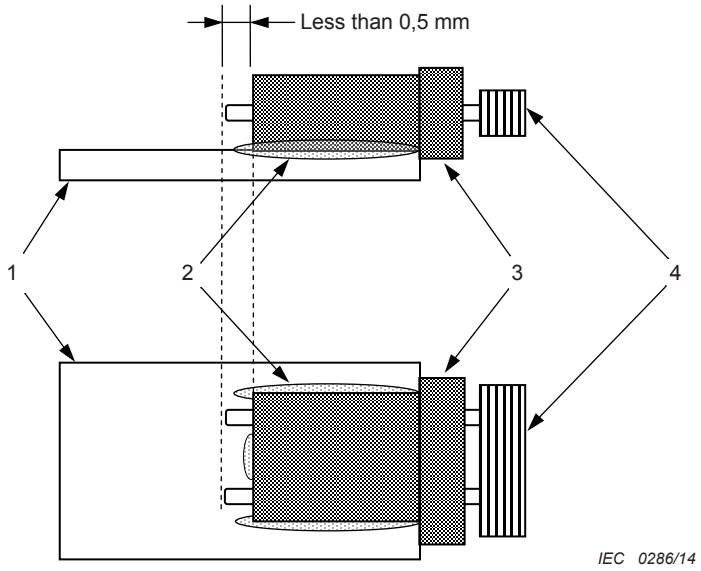
Key

1 measurement force setter
2 force indicator
3 position indicator
4 gauge block
5 scale head
6 MT ferrule
7 adhesive
8 alignment pin

Figure 2 – Precision linear scale and C_D measurement set-up

3.2 Sample preparation

Each sample MT ferrule is fixed with a cyanoacrylate type adhesive at the edge of a gauge block. A gauge block is employed due to its very fine surface roughness, surface hardness and parallelism between two surfaces. The MT ferrule shall be located centrally on the gauge block. The adhesive shall not touch the guide holes. Alignment pins are inserted into the guide holes with the pin top protrusions from the ferrule less than 0,5 mm, as shown in Figure 3.



Key

1 gauge block

2 adhesive

3 MT ferrule

4 alignment pins with pin clamp

Figure 3 – Sample preparation

4 Procedure

Details of the measurement procedure are as follows:

a) Before measuring, the surface of the sample gauge block and the ferrule need to be cleaned. The end of the alignment pin shall protrude from the ferrule by less than 0,5 mm.

b) The sample is placed stably between the scale head and the scale stage with the maximum measurement force as shown in Figure 2. Put the scale head in contact with the protruding guide pin and set to zero for displacement.

c) The measurement force is set to the minimum, 0,5 N, and the position indicator display is read. The measurement force is increased in constant steps; at each step, the position indicator display is read. The setting is changed to the maximum measurement force, 1,4 N, and the position indicator display is read.

d) This measurement is repeated five times for each guide hole, and the average values of the data are plotted in the graph, then a fitted line is applied to the plots. Then the inclination of deformation to the force is obtained. The C_D values for a 9,8 N mating force are obtained for the deformation at 0,7 N (≈ 9,8 N x sin8° x 0,5) of the measuring force.

5 Details to be specified

The following details shall be stated in the relevant specification:

– procedure of preparations;

– gauge block specification;

– alignment pin specification;

– acceptable value of guide hole and alignment pin deformation constant C_D;

– maximum measurement force applied to the sample;

– difference from this method.

– measurement uncertainty.

Bibliography

IEC 61754-7, *Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces – Part 7: Type MPO connector family*

IEC 61754-10, *Fibre optic connector interfaces – Part 10: Type Mini-MPO connector family*

IEC/PAS 61755-3-32, *Fibre optic connector optical interfaces – Part 3-32: Optical interface, 8 degrees angled PC end-face thermoset rectangular ferrule, single mode fibres*

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