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**Fibre optic interconnecting devices and passive components – Fibre optic
connector optical interfaces –
Part 3-31: End face geometry – Flat PC PPS rectangular ferrule multimode fibres**

IEC PAS 63267-3-31:2020

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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – FIBRE OPTIC CONNECTOR OPTICAL INTERFACES –

Part 3-31: End face geometry – Flat PC PPS rectangular ferrule multimode fibres

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The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
86B/4231/PAS	86B/4249/RVDPAS

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – FIBRE OPTIC CONNECTOR OPTICAL INTERFACES –

Part 3-31: End face geometry – Flat PC PPS rectangular ferrule multimode fibres

1 Scope

This part of IEC 63267 defines certain dimensional limits of a flat PC rectangular polyphenylene sulphide (PPS) ferrule optical interface in order to meet specific longitudinal offset requirements for fibre-to-fibre interconnection. Ferrules made from the material specified in this PAS are suitable for use in categories C, U, E, and O as defined in IEC 61753-1.

Ferrule interface dimensions and features are contained in IEC 61754 (all parts), which deals with fibre optic connector interfaces.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 61300-3-30, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-30: Examinations and measurements – Polish angle and fibre position on single ferrule multimode connectors*, 2012
<https://standards.iteh.ai/catalog/standards/sist/0f0b90dc-9d1e-453b-88ab-ef5cd1874b12/iec-pas-63267-3-31-2020>

3 Terms and definitions

No terms and definitions are listed in this document.

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>

4 Description

The performance of a multimode flat PC rectangular ferrule optical interface is determined by the accuracy with which the optical datum targets of two mating ferrules are aligned with each other. There are three conditions affecting the alignment of the optical datum targets: lateral offset, angular offset, and longitudinal offset.

Parameters influencing the lateral and angular offset of the optical fibre axes include the following:

- fibre hole deviation from designated location;
- fibre cladding diameter relative to fibre hole clearance;
- fibre hole angular misalignment;
- fibre core concentricity relative to the cladding diameter;
- alignment pin diameter relative to the guide hole clearance.

Parameters influencing the longitudinal offset of the optical fibre axes include the following:

- fibre protrusion;
- fibre array minus coplanarity;
- adjacent fibre height differential;
- end face angle in the x-axis;
- end face angle in the y-axis;
- end face radius in the x-axis;
- end face radius in the y-axis;
- fibre tip spherical radii;
- axial force on ferrule end face;
- ferrule and fibre material constants;
- frictional force of alignment pins in ferrule guide holes;
- core dip.

5 Interface parameters

This PAS defines the dimensional limits of flat PC rectangular ferrules with a single row of 12 fibres. The fibre centres are spaced with a nominal alignment pitch of 0,25 mm. Interface variant, which identify nominal ferrule cross-section, is given in Table 1. The fibre numbering conventions are illustrated in Figure 1.

End face geometry limits associated with longitudinal offset when < 50 % of the fibres have core dip are specified in Table 2. End face geometry limits associated with longitudinal offset when > 50 % of the fibres have core dip are specified in Table 3. In this case, geometry limit (GL) is not calculated and maximum minus coplanarity is reduced.

Table 1 – Optical interface variant information

Variant number ^{b, c}	Nominal ferrule cross-section ^a (mm x mm)	Number of fibres
1112	2,45 x 6,4	12
^a Refer to the applicable IEC 61754 series fibre optic connector interface standard for dimensional requirements. ^b The four digit variant code describes a combination of material type, nominal ferrule cross-section, and number of fibres. The first digit defines 1 for PPS ferrule materials; the second digit represents 2,45 mm x 4,4 mm with 0 and 2,45 mm x 6,4 mm with 1; and the last two digits designates the number of fibres. ^c All ferrule materials for rectangular type ferrules are intended to be intermateable, in the lowest specified performance category as described within IEC 61755-1, provided that the last three digits of the variant number are the same. It is also possible to mate ferrules with different fibre counts, in which case all mating fibres shall meet the designated performance category.		

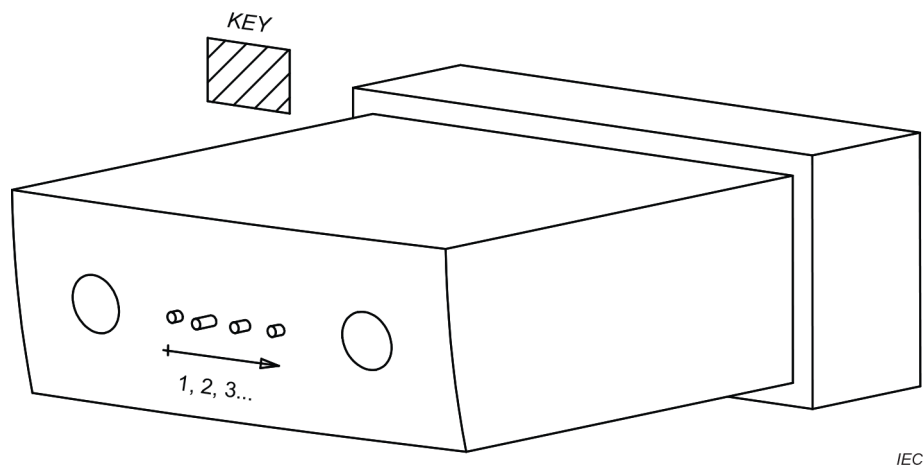


Figure 1 – Fibre numbering conventions

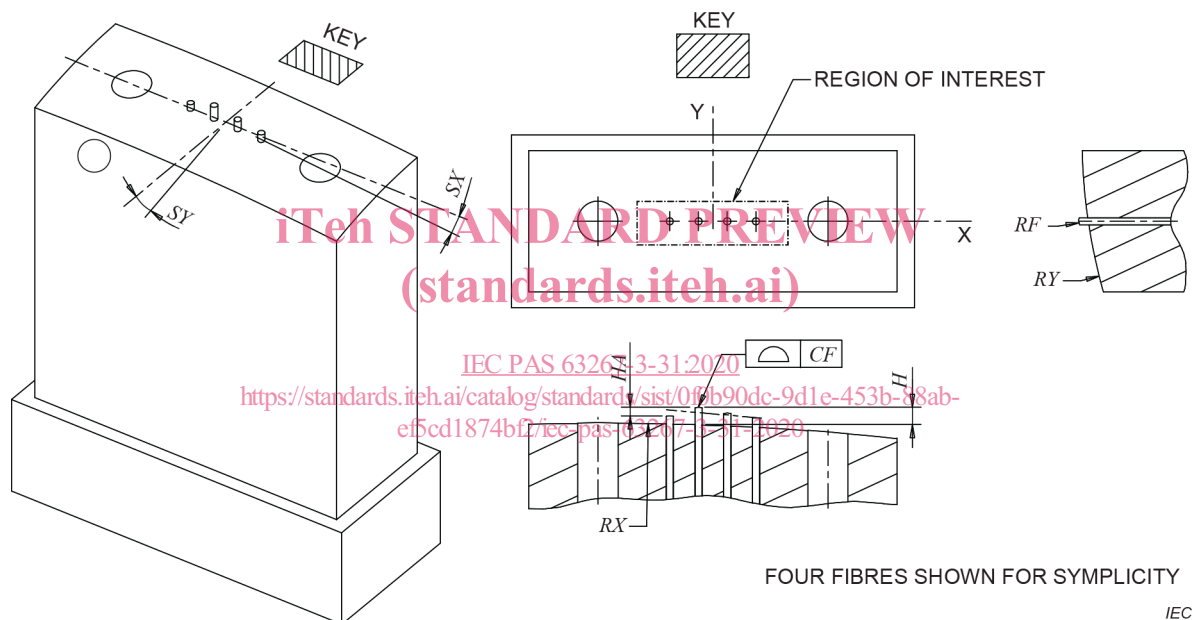


Figure 2 – Interface dimensions related to longitudinal offset

The optical interface coordinate system is established with an x-axis, which passes through the guide hole centres, a perpendicular y-axis that passes through the midpoint of the line connecting the guide hole centres, and an orthogonal z-axis pointing away from the ferrule. All parameters are illustrated as positive values with respect to the defined coordinate system. Concave ferrule radii are indicated by negative values.

Table 2 – Physical contact end face geometry dimensions having < 50 % fibres with core dip for optical interface variant 1112

Ref.	Parameter values		Units	Remarks
	Minimum	Maximum		
<i>CF</i>	-	0,4	μm	Minus coplanarity ^a
<i>SX</i>	-0,15	0,15	°	Ferrule surface x-angle ^b
<i>SY</i>	-0,2	0,2	°	Ferrule surface y-angle ^c
<i>H</i>	1	3,5	μm	Fibre height ^d
<i>HA</i>	0	0,3	μm	Adjacent fibre height differential
<i>RF</i>	1	-	mm	Fibre tip spherical radius ^e
<i>RX</i>	2 000 (convex) -10 000 (concave)	-	mm	Ferrule surface x-radius
<i>RY</i>	5	-	mm	Ferrule surface y-radius
<i>GL</i>	-	17,4		Geometry limit ^f
<i>CD</i>		120	nm	Core dip

The end face geometry shall be measured in accordance with IEC 61300-3-30.

The values in Table 2 shall be specified in the central surface region surrounding fibres of 2,900 mm wide and 0,675 mm high. Furthermore, the outside surface region is lower than the central surface region of interest.

NOTE 1 End face parameter requirements apply to performance grades B, C, and D.

NOTE 2 Refer to Figure 2 for dimensional references.

NOTE 3 The values in Table 2 shall be specified in the central surface region surrounding fibres of 2,900 mm wide and 0,675 mm high. Furthermore, the outside surface region is lower than the central surface region of interest.

NOTE 4 The values in Table 2 apply for polyphenylene sulphide (PPS) ferrules with a Young's modulus of 15 GPa to 20 GPa. Ferrule compression force: 7,8 N minimum and 11,8 N maximum.

^a Refer to Annex A for a description of minus coplanarity.

^b X-angle represents the slope of the ferrule surface as defined by a bi-parabolic fit in accordance with IEC 61300-3-30.

^c Y-angle represents the slope of the ferrule surface as defined by a bi-parabolic fit in accordance with IEC 61300-3-30.

^d A positive value indicates a fibre protrusion.

^e Fibre tip spherical radii fitting region is defined within IEC 61300-3-30.

^f Refer to Annex B for a description of parameter *GL*.

Table 3 – Physical contact end face geometry dimensions having > 50 % fibres with core dip for optical interface variant 1112

Ref.	Parameter values		Units	Remarks
	Minimum	Maximum		
<i>CF</i>	-	0,15	µm	Minus coplanarity ^a
<i>SX</i>	-0,15	0,15	°	Ferrule surface x-angle ^b
<i>SY</i>	-0,2	0,2	°	Ferrule surface y-angle ^c
<i>H</i>	1	3,5	µm	Fibre height ^d
<i>HA</i>	0	0,3	µm	Adjacent fibre height differential
<i>RF</i>	1	-	mm	Fibre tip spherical radius ^e
<i>RX</i>	2 000 (convex) -10 000 (concave)	-	mm	Ferrule surface x-radius
<i>RY</i>	5	-	mm	Ferrule surface y-radius
<i>CD</i>		120	nm	Core dip

The end face geometry shall be measured in accordance with IEC 61300-3-30.

The values in Table 3 shall be specified in the central surface region surrounding fibres of 2,900 mm wide and 0,675 mm high. Furthermore, the outside surface region is lower than the central surface region of interest.

NOTE 1 End face parameter requirements apply to performance grades B, C, and D.

NOTE 2 Refer to Figure 2 for dimensional references.

NOTE 3 The values in Table 3 apply for polyphenylene sulphide (PPS) ferrules with a Young's modulus of 15 GPa to 20 GPa. Ferrule compression force: 7,8 N minimum and 11,8 N maximum.

^a Refer to Annex A for a description of minus coplanarity.

^b X-angle represents the slope of the ferrule surface as defined by a bi-parabolic fit in accordance with IEC 61300-3-30.

^c Y-angle represents the slope of the ferrule surface as defined by a bi-parabolic fit in accordance with IEC 61300-3-30.

^d A positive value indicates a fibre protrusion.

^e Fibre tip spherical radii fitting region is defined within IEC 61300-3-30.