



The Fibreoptic Industry Association

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NEW OPTICAL FIBRE DESIGNATIONS FOR 2019

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Introduction

This paper provides information on the forthcoming changes to the way the optical fibres within the cables we regularly purchase and install are to be designated and highlights some concerns surrounding those changes.

For multimode optical fibre systems, the cabling standards of the ISO/IEC 11801 and EN 50173 series have a Category system OM3, OM4 and OM5 which relate to cabled optical fibre. The same approach is applied to cabled singlemode optical fibres of Category OS1a and OS2.

Each of these cabled optical fibres are built from optical fibres in accordance with BS EN [IEC] 60793-2-10 (for multimode) and BS EN [IEC] 60793-2-50 (for singlemode).

The designation of the optical fibres in these standards are being changed with the objective of more closely linking the optical fibre to the wider market place.

Multimode optical fibre

The 50/125 µm and 62,5/125 µm multimode optical fibres that we commonly use in telecommunications cabling are specified in BS EN [IEC] 60793-2-10. The 50/125 µm options are designated Category A1a. Historically, such optical fibres were available in a wide range of performance options but the focus on specific attenuation and bandwidth options for cabled product in ISO/IEC 11801 and EN 50173 standards led to a sub-group designation as shown in Table 1. The recent development of so-called bend-insensitive multimode optical fibres (BIMMF) required a further sub-designation of "a" or "b".

Table 1 – Optical fibre designations in BS EN [IEC] 60793-2-10:2017

Specified as a basis for cables of Category	Sub-group	Normal	Bend-insensitive
OM2*	A1a.1	A1a.1a	A1a.1b
OM3	A1a.2	A1a.2a	A1a.2b
OM4	A1a.3	A1a.3a	A1a.3b
OM5	A1a.4	A1a.4a	A1a.4b

* no longer referenced in the ISO/IEC 11801 and EN 50173 standards

So, for example, an optical fibre to be used to create a cable of OM4 performance with bend-insensitivity would be A1a.3b. However, it has to be emphasised that the cabled specification of attenuation is different than that of the optical fibre. Category OM4 applies to the performance of the optical fibre when cabled – not when the optical fibre is initially produced.

For example the requirement for an A1a.3 (a or b) optical fibre is 2,5/0,8 dB/km @ 850/1300 nm in order to allow the cabled requirement of a Category OM3 cable to meet its requirement of 3,5/1,0 dB/km @ 850/1300 nm.

In the 2019 edition of BS EN IEC 60793-2-10, it is proposed to change these designations - in theory to introduce greater clarity. The proposed changes are shown in Table 2 overleaf.

Table 2 – Optical fibre designations in BS EN IEC 60793-2-10:2019

Specified as a basis for cables of Category	Sub-group	Normal	Bend-insensitive
OM2*	A1-OM2	A1-OM2a	A1-OM2b
OM3	A1-OM3	A1-OM3a	A1-OM3b
OM4	A1-OM4	A1-OM4a	A1-OM4b
OM5	A1-OM5	A1-OM5a	A1-OM5b
* no longer referenced in the ISO/IEC 11801 and EN 50173 standards			

For information on 62,5/125 µm multimode optical fibres see Annex A of this White Paper.

Singlemode optical fibre

The **FIA** White Paper entitled “AN OVERVIEW OF SINGLEMODE OPTICAL FIBRE SPECIFICATIONS” shows and explains the role of the wide range of singlemode optical fibre specifications and designations of the existing BS EN [IEC] 60793-2-50. Table 3 shows, in the left-hand column, the existing IEC designations for the ITU-T specified optical fibres in the middle column.

The next edition of BS EN IEC 60793-2-50 has modified these designations by incorporating the ITU-T designations as shown in the right-hand column.

Table 3 – Optical fibre designations in BS EN IEC 60793-2-50:2019

BS EN [IEC] 60793-2-50:2016	ITU-T	BS EN IEC 60793-2-50:2019
Type B1.1	G652.B	Category B-652.D
Type B1.2_a	G654.A	Category B-654.A
Type B1.2_b	G654.B	Category B-654.B
Type B1.2_c	G654.C	Category B-654.C
-	G654.D	Category B-654.D
-	G654.E	Category B-654.E
Type B1.3	G652.D	Category B-652.D
Type B2	G.653.A G.653.B	Category B-653.A Category B-653-B
Type B4_c	G.655.C	Category B-655.C
Type B4_d	G.655.D	Category B-655.D
Type B4_e	G.655.E	Category B-655.E
Type B5	G.656	Category B-655
Type B6_a1	G.657.A1	Category B-657.A1
Type B6_a2	G.657.A2	Category B-657.A2
Type B6_b2	G.657.B2	Category B-657.B1
Type B6_b3	G.657.B3	Category B-657.B2

As described in the **FIA** White Paper entitled “THE TRUTH ABOUT OS1 (now OS1a) AND OS2”, the cabled optical fibre Categories OS1a and OS2 of the ISO/IEC 11801 and EN 50173 standards are currently constructed from:

- Type B1.3 and therefore the future Type B-652.D;
- Type B6_a1 or B6_a2 and therefore the future Type B-657.A1 or Type B-657.A2; and, in ISO/IEC 11801 standards only,
- Type B6_b2 or B6_b3 and therefore the future Type B-657.B2 or Type B-657.B3.

Why should these changes concern the **FIA**.

The changes to the singlemode optical fibre designations should be of no concern to the **FIA** members. However, the changes to the multimode optical fibre designations are of more concern since they represent an opportunity for confusion and misdirection.

As an example, it was highlighted above the performance of a multimode optical fibre of Category A1-OM4 is more tightly specified than a cabled optical fibre of OM4 in order to allow transmission performance changes during the cabling process. It is important that cable suppliers clearly state the cabled performance – and not “muddy the waters” by conflating the Category of the bare optical fibre in with that of the cable itself.

Annex A: 62,5/125 mm optical fibre

In earlier editions of ISO/IEC 11801 and EN 50173-1, OM1 and OM2 could be either 50/125 µm or 62,5/125 µm.

In BS EN [IEC] 60793-2-10:2017, the optical fibre corresponding to a cabled optical fibre Category of OM1 was only specified for the 62,5/125 µm variant and was designated Type A1b.

The new designation for this optical fibre is Category A2-OM1.

Neither OM1 or OM2 are included in ISO/IEC 11801-1:2017 or EN 50173-1:2018.

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BIBLIOGRAPHY

BS EN IEC 60793-2-10: Optical fibres - Product specifications - Sectional specification for category A1 multimode fibres

BS EN IEC 60793-2-50: Optical fibres - Product specifications - Sectional specification for class B single-mode fibres

BS EN 50173-1: Information technology - Generic cabling systems - General requirements

BS ISO/IEC 11801-1: Information technology - Generic cabling for customer premises: Part 1: General requirements

End of report

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