

# TECHNICAL REPORT



## Guidance on colour coding of optical fibre cables



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2019 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

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

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

Preview generated by EVS

# TECHNICAL REPORT



---

## Guidance on colour coding of optical fibre cables

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 33.180.10

ISBN 978-2-8322-6517-8

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

CONTENTS .....	2
FOREWORD .....	5
INTRODUCTION .....	7
0.1 General .....	7
0.2 Background in other documents .....	7
1 Scope .....	8
2 Normative references .....	8
3 Terms and definitions .....	8
4 Rationale .....	8
5 Fibre colour coding .....	9
5.1 Intent .....	9
5.2 Historic IEC 60794-2 colour code (for guidance) .....	9
5.3 Colour coding for fibres 13 through 16 .....	10
5.4 Other coding schemes .....	10
6 Unit and group coding .....	10
6.1 Unit coding .....	10
6.2 Group coding .....	11
6.3 Coding of tubes in composite cables, IEC 60794-2 .....	11
6.4 Other coding schemes .....	11
7 Jacket colour coding .....	11
7.1 General .....	11
7.2 IEC 60794-2 jacket colour code .....	12
7.2.1 Historic IEC jacket colour code .....	12
7.2.2 Current IEC jacket colour code .....	12
7.3 Jacket coding by striping .....	13
7.4 Other jacket colour code .....	13
8 Guidance on the measurement of colour .....	13
8.1 General .....	13
8.2 Preparation of specimens for colour measurement .....	13
8.3 Specification of colour .....	13
Annex A (informative) German colour code .....	14
A.1 Fibre colour coding .....	14
A.2 German counting code for tubes stranded in a layer .....	14
A.3 Jacket colour coding .....	15
Annex B (informative) North-American colour code .....	16
B.1 Fibre colour coding .....	16
B.2 Unit coding .....	19
B.3 Jacket colour coding .....	19
Annex C (informative) Swedish colour code S12 .....	21
C.1 Fibre colour coding S12 .....	21
C.2 Unit coding scheme S12 .....	21
C.2.1 General .....	21
C.2.2 Sequence for individual fibres within a tube/fibre-unit/bundle and for individual tubes/fibre-units/yarns, etc. ....	21
C.2.3 Sequence for tubes stranded around a central part .....	21
C.3 Jacket colour coding .....	22

Annex D (informative) Swiss colour code .....	23
D.1 Fibre colour coding .....	23
D.2 Unit coding .....	24
D.3 Jacket colour coding .....	24
Annex E (informative) Chinese colour code .....	26
E.1 Fibre colour coding .....	26
E.2 Unit coding .....	27
E.3 Jacket colour coding .....	29
Annex F (informative) Japanese colour code .....	30
F.1 Fibre colour coding .....	30
F.2 Unit coding by identification strip .....	31
F.3 Jacket colour coding of multi-fibre indoor cable .....	32
Annex G (informative) Brazilian colour code .....	33
G.1 Fibre colour coding .....	33
G.2 Unit colour coding of buffer tubes .....	33
G.3 Jacket colour coding .....	33
Bibliography .....	34
Figure C.1 – Sequence of tubes by position .....	22
Figure D.1 – Example of an 18-way stranded loose tube cable .....	24
Figure D.2 – Example of an outdoor cable, black with orange stripes .....	25
Figure E.1 – Sequence of tubes by position .....	27
Figure E.2 – Example of a 24-tube stranded loose tube cable .....	28
Figure E.3 – Example of T Mark Colour Code .....	29
Figure F.1 – Colour coding scheme based on optical fibre ribbon .....	30
Figure F.2 – Identification strip to bundle several optical fibre ribbons .....	31
Figure F.3 – Overview of high-count indoor cable .....	32
Table 1 – Colour coding sequence for individual fibres or buffers .....	10
Table 2 – Colours for individual fibres, buffers, or other elements 13 through 16 .....	10
Table 3 – Colour coding scheme for tubes in hybrid or composite cables .....	11
Table 4 – Colour coding of cable outer sheaths .....	12
Table 5 – Colour coding of cable outer sheaths by fibre type .....	12
Table 6 – Example of centroid values for base colours in Munsell and R*a*L systems .....	13
Table A.1 – Colour coding sequence for individual fibres .....	14
Table A.2 – Counting code and colours from the German specification .....	15
Table B.1 – Individual fibre, unit, and group identification for up to 12 elements in a set .....	16
Table B.2 - Individual fiber, unit, and group identification for up to 16 elements in a set .....	18
Table B.3 – Sample identification markings .....	19
Table B.4 – North American preferred coding scheme for indoor cable jackets .....	20
Table C.1 – Sequence for individual fibres within a tube/fibre-unit/bundle and for individual tubes/fibre-units/yarns, etc. ....	21
Table D.1 – Colour coding sequence for individual fibres or buffers in mini-breakout cables .....	23
Table D.2 – Colour coding for buffered fibres in simplex, duplex or breakout cables .....	24

Table D.3 – Colour coding and sequence for loose tubes stranded around a central part .....	24
Table D.4 – Colour coding for sub-cables and outer sheaths of indoor cables .....	25
Table D.5 – Colour for outer sheaths of outdoor cables .....	25
Table E.1 – Colour coding for individual fibres .....	26
Table E.2 – Colour coding for fibre counts up to 24 .....	26
Table E.3 – Colour coding for loose tubes up to 12 .....	27
Table E.4 – Colour coding for loose tubes up to 24 .....	28
Table E.5 – Chinese colour coding scheme for indoor cable jackets .....	29
Table F.1 – Japanese colour coding for underground optical cable .....	30
Table F.2 – Japanese colour coding for aerial optical cable .....	31
Table F.3 – Colour coding of identification strip .....	31
Table F.4 – Jacket colour coding in high-count indoor cable .....	32
Table G.1 – Brazilian colour coding for fibre identification .....	33

This document is a preview generated by EVS

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**GUIDANCE ON COLOUR CODING OF OPTICAL FIBRE CABLES****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the References cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a Technical Report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 63194, which is a Technical Report, has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

The text of this Technical Report is based on the following documents:

Draft TR	Report on voting
86A/1870/DTR	86A/1891A/RVDTR

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

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

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

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

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**



## INTRODUCTION

### 0.1 General

Colour coding of fibres is a useful method to uniquely identify fibres within a cable. For most fibre system architectures, such identification is considered essential.

A number of schemes for fibre identification have evolved in various regions. Attempts to unify the schemes have not yet been successful, as they are embedded in the system architecture.

Jacket colour coding is frequently used for a variety of reasons – most commonly in indoor cables.

Colour coding of both fibres and jackets has been addressed in IEC 60794-2 [5] [6]<sup>1</sup> and in IEC 60794-3-11. The intent of this document is to collect that and other relevant information for application to all cable types defined by IEC 60794 (all parts).

### 0.2 Background in other documents

IEC 60304 [1] defines the 12 colours currently identified for fibre identification, but does not specify which colour is for which fibre number. IEC 60794-2:2002 [5] does define a colour code, but this has been determined to have been construed as not representing any existing major colour code; furthermore, it was never adopted by any region. Further discussion of both documents is included in the text that follows.

IEC 60794-1-1 [4] contains specific language on the intent of colour coding, and notes that it is "as agreed". This document expands on that intent, offering several specific examples that exist in the various regions. Where the information is available, this document notes the regional specifications from which these examples are taken.

---

<sup>1</sup> Numbers in square brackets refer to the Bibliography.

## GUIDANCE ON COLOUR CODING OF OPTICAL FIBRE CABLES

### 1 Scope

This document examines the need for and intent of colour coding of optical fibre cables. Further, this document lists the major colour codes in various regions throughout the world. Noting that decades of discussion of a universal recommended colour coding scheme has failed to bring about an agreement, this document does not intend to promote any listed colour code above any other.

This document includes regional information on the colour coding of units when different from the fibre code, and of jackets to convey information about the types of fibres within, or the types of performance expected. It also includes information on colours beyond the basic 12 set out in IEC 60304.

This document is not a normative document, but, rather, a guide to the subject of colour coding of cables.

### 2 Normative references

There are no normative references in this document.

### 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 Rationale

The need to uniquely identify a particular fibre within a cable is a common and rational requirement for cable standards. The determination of which fibre is which – without having to resort to "ringing it out" – is a key criteria in cable system management. A definition of an agreed cable colour coding scheme has been discussed in past years. But it has not been possible to reach agreement within the IEC because several embedded regional coding schemes exist that are part and parcel of the fibre system architecture.

The regional coding schemes are presented in Annexes A to G, as follows:

- Annex A: Germany;
- Annex B: North America;
- Annex C: Sweden;
- Annex D: Switzerland;
- Annex E: China;
- Annex F: Japan;
- Annex G: Brazil.