IEC 61156-3

Edition 3.0 2008-11

INTERNATIONAL STANDARD

Multicore and symmetrical pair/quad cables for digital communications – Part 3: Work area cable – Sectional specification

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE N

ICS 33.120.20

ISBN 978-2-88910-420-8

® Registered trademark of the International Electrotechnical Commission

CONTENTS

FOREWORD 4
1 General 6
1.1 Scope 6
1.2 Normative references 6
1.3 Installation considerations 6
2 Definitions, materials and cable construction 6
2.1 Definitions 6
2.2 Materials and cable construction 7
2.2.1 General remarks 7
2.2.2 Cable construction 7
2.2.3 Conductor 7
2.2.4 Insulation 7
2.2.5 Colour code of insulation 7
2.2.6 Cable element 7
2.2.7 Screening of the cable element 7
2.2.8 Cable make-up 8
2.2.9 Screening of the cable core 8
2.2.10 Sheath 8
2.2.11 Colour of sheath 8
2.2.12 Identification 8
2.2.13 Finished cable 8
3 Characteristics and requirements 8
3.1 General remarks 8
3.2 Electrical characteristics 9
3.2.1 Conductor resistance 9
3.2.2 Resistance unbalance 9
3.2.3 Dielectric strength 9
3.2.4 Insulation resistance 9
3.2.5 Mutual capacitance 9
3.2.6 Capacitance unbalance 9
3.2.7 Transfer impedance 9
3.3 Transmission characteristics 9
3.3.1 Velocity of propagation (phase velocity) 9
3.3.2 Attenuation 10
3.3.3 Unbalance attenuation 10
3.3.4 Near-end crosstalk (NEXT) 10
3.3.5 Characteristic impedance 11
3.3.6 Structural Return Loss (SRL) 11
3.4 Mechanical and dimensional characteristics and requirements 12
3.4.1 Dimensional requirements 12
3.4.2 Elongation at break of the conductors 12
3.4.3 Elongation at break of the insulation 12
3.4.4 Elongation at break of the sheath 12
3.4.5 Tensile strength of the sheath 12
3.4.6 Crush test of the cable 12
3.4.7 Impact test of the cable 12
3.4.8 Repeated bending of the cable 12

3.4.9 Tensile performance of the cable 13
3.5 Environmental characteristics 13
3.5.1 Shrinkage of insulation 13
3.5.2 Wrapping test of insulation after thermal ageing 13
3.5.3 Bending test of insulation at low temperature 13
3.5.4 Elongation at break of the sheath after ageing 13
3.5.5 Tensile strength of the sheath after ageing 13
3.5.6 Sheath pressure test at high temperature 13
3.5.7 Cold bend test of the cable 13
3.5.8 Heat shock test 13
3.5.9 Flame propagation characteristics of a single cable 13
3.5.10 Flame propagation characteristics of bunched cables 13
3.5.11 Acid gas evolution 13
3.5.12 Smoke generation 14
3.5.13 Toxic gas emission 14
3.5.14 Combined flame and smoke test for cables in environmental air handling space 14
4 Introduction to the blank detail specification 14

Table 1 – Constants 10
Table 2 – NEXT, PSNEXT constants 11
Table 3 – Input impedance values 11
Table 4 – Function fitted impedance 11
Table 5 – Structural return loss (dB min) 12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

Part 3: Work area cable – Sectional specification

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
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 Normative 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.

International Standard IEC 61156-6 has been prepared by subcommittee 46C: Wires and symmetric cables, of IEC technical committee 46: Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories.

This third edition cancels and replaces the second edition published in 2003. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) new requirements for new cables Cat3, and Cat5 applications;
b) a better numbering in order to take into account the generic specification.

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

FDIS	Report on voting
46C/864/FDIS	46C/869/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.

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

This standard shall be read in conjunction with IEC 61156-1:2002.

The list of all the parts of the IEC 61156 series, under the general title *Multicore and symmetrical pair/quad cables for digital communications*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

A bilingual version of this publication may be issued at a later date.

MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

Part 3: Work area cable – Sectional specification

1 General

1.1 Scope

This sectional specification relates to IEC 61156-1:2002. The cables are specifically intended for work area wiring as defined in ISO/IEC 11801.

This specification defines individually screened, common overall core screen and unscreened pairs or quads in cables for work area wiring. These cables are suitable for the various communication systems for which the reference is given in the relevant detail specification.

The cables covered by this sectional specification are intended to operate with voltages and currents normally adopted for communication systems. These cables should not be connected to low impedance sources, for example, the public mains electricity supply.

The recommended temperature range during installation is 0 °C to +50 °C. The actual temperature range during installation shall be indicated in the relevant detail specification. The normal operating temperature range shall be –40 °C to +60 °C.

1.2 Normative references

The following referenced documents are indispensable for the application 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 61156-1:2002[1], *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

IEC 60304, *Standard colours for insulation for low-frequecny cables and wires*

IEC 60344, *Calculation of d.c. resistance of plain and coated copper conductors of low-frequency cables and wires - Application guide*

ISO/IEC 11801*, Information technology – Generic cabling for customer premises*

---

[1] A more recent version of this standard exists (2007), but as not all of the tests cited herein are addressed by the newer edition, it has been decided that the 2002 edition is to be used.