



IEC 61156-8

Edition 1.0 2009-05

INTERNATIONAL STANDARD

**Multicore and symmetrical pair/quad cables for digital communications –
Part 8: Symmetrical pair/quad cables with transmission characteristics up to
1 200 MHz – Work area wiring – Sectional specification**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

Q

ICS 33.120.20

ISBN 978-2-88910-428-4

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	6
4 Installation considerations.....	7
4.1 Installation conditions	7
4.2 Climatic conditions.....	7
5 Materials and cable construction	7
5.1 General remarks.....	7
5.2 Cable construction.....	7
5.2.1 Conductor.....	7
5.2.2 Insulation.....	7
5.2.3 Cable element	7
5.2.4 Cable make-up	8
5.2.5 Screening of cable core	8
5.2.6 Sheath.....	8
5.2.7 Identification	8
5.2.8 Finished cable	8
6 Characteristics and requirements.....	8
6.1 General remarks.....	8
6.2 Electrical characteristics	9
6.2.1 Conductor resistance.....	9
6.2.2 Resistance unbalance.....	9
6.2.3 Dielectric strength.....	9
6.2.4 Insulation resistance.....	9
6.2.5 Mutual capacitance	9
6.2.6 Capacitance unbalance.....	9
6.2.7 Transfer impedance.....	9
6.2.8 Coupling attenuation	10
6.2.9 Current-carrying capacity	10
6.2.10 Shield resistance	10
6.3 Transmission characteristics.....	10
6.3.1 Velocity of propagation (phase velocity)	10
6.3.2 Phase delay and differential delay (delay skew).....	10
6.3.3 Attenuation	11
6.3.4 Unbalance attenuation	11
6.3.5 Near-end crosstalk (<i>NEXT</i>).....	11
6.3.6 Far-end crosstalk (<i>FEXT</i>)	12
6.3.7 Alien (exogenous) near-end crosstalk	12
6.3.8 Alien (exogenous) far-end crosstalk	12
6.3.9 Alien (exogenous) crosstalk of bundled cables	12
6.3.10 Impedance.....	12
6.3.11 Return loss (<i>RL</i>).....	12
6.4 Mechanical and dimensional characteristics and requirements	13
6.4.1 Dimensional requirements.....	13
6.4.2 Elongation at break of the conductors	13

6.4.3	Tensile strength of the insulation.....	13
6.4.4	Elongation at break of the insulation.....	13
6.4.5	Adhesion of the insulation to the conductor	13
6.4.6	Elongation at break of the sheath	13
6.4.7	Tensile strength of the sheath	13
6.4.8	Crush test of the cable	13
6.4.9	Impact test of the cable.....	13
6.4.10	Bending under tension	13
6.4.11	Repeated bending of the cable.....	13
6.4.12	Tensile performance of the cable	13
6.4.13	Shock test of the cable.....	14
6.4.14	Bump test of the cable	14
6.4.15	Vibration test of a cable	14
6.5	Environmental characteristics	14
6.5.1	Shrinkage of insulation.....	14
6.5.2	Wrapping test of insulation after thermal ageing	14
6.5.3	Bending test of insulation at low temperature	14
6.5.4	Elongation at break of the sheath after ageing	14
6.5.5	Tensile strength of the sheath after ageing.....	14
6.5.6	Sheath pressure test at high temperature	14
6.5.7	Cold bend test of the cable	14
6.5.8	Heat shock test.....	14
6.5.9	Damp heat steady state	14
6.5.10	Solar radiation	15
6.5.11	Solvents and contaminating fluids.....	15
6.5.12	Salt mist and sulphur dioxide	15
6.5.13	Water immersion	15
6.5.14	Hygroscopicity	15
6.5.15	Wicking	15
6.5.16	Flame propagation characteristics of a single cable.....	15
6.5.17	Flame propagation characteristics of bunched cables.....	15
6.5.18	Halogen gas evolution.....	15
6.5.19	Smoke generation.....	15
6.5.20	Toxic gas emission	15
6.5.21	Integrated fire test	15
7	Introduction to the blank detail specification	16
	Bibliography	17
	Table 1 – Transfer impedance.....	10
	Table 2 – Coupling attenuation.....	10
	Table 3 – Attenuation, constant values	11
	Table 4 – Return loss (<i>RL</i>).....	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

Part 8: Symmetrical pair/quad cables with transmission characteristics up to 1 200 MHz – Work area wiring – 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 61156-8 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.

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

FDIS	Report on voting
46C/887/FDIS	46C/894/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.

A list of all 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.

The contents of the corrigendum of July 2009 have been included in this copy.

Withdrawn

MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

Part 8: Symmetrical pair/quad cables with transmission characteristics up to 1 200 MHz – Work area wiring – Sectional specification

1 Scope

This sectional specification relates to IEC 61156-1 and IEC 61156-7. The cables described herein are specified up to 1 200 MHz and are specifically designed to build patch, equipment, and work area cables as defined in ISO/IEC 11801 and ISO/IEC 15018.

It covers a cable having four individually screened (STP) pairs. The cable may be provided with a common screen over the cable core. The transmission characteristics are specified for a frequency range 4 MHz to 1 200 MHz and at 20 °C.

These cables can be used for various communication channels which use as many as four pairs simultaneously. In this sense, this sectional specification provides the cable characteristics required by system developers to evaluate new systems.

The cables covered by this sectional specification are intended to operate with voltages and currents normally encountered in communication systems. These cables are not intended to be used in conjunction with low impedance sources, for example the electric power supplies of public utility mains.

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

IEC 61156-1:2007, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

IEC 61156-7, *Multicore and symmetrical pair/quad cables for digital communications – Part 7: Symmetrical pair cables with transmission characteristics up to 1 200 MHz – Sectional specification for digital and analog communication cables*