INTERNATIONAL STANDARD

IEC 61156-5-2

First edition
2002-05

Multicore and symmetrical pair/quad cables for digital communications –

Part 5-2: Symmetrical pair/quad cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Capability approval – Sectional specification

Câbles multiconducteurs à paires symétriques et quartes pour transmissions numériques –

Partie 5-2:
Câbles à paires symétriques et quartes avec caractéristiques de transmission allant jusqu'à 600 MHz –
Câble capillaire – Agrément de savoir-faire
Spécification intermédiaire

Reference number
IEC 61156-5-2:2002(E)

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Publication numbering

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International Electrotechnical Commission
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

Part 5-2: Symmetrical pair/quad cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Capability Approval – Sectional specification

FOREWORD

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International Standard IEC 61156-5-2 has been prepared by subcommittee 46C: Wires and symmetric cables, of IEC technical committee 46: Cables, wires, waveguides, RF connectors and accessories for communication and signalling.

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

FDIS	Report on voting
46C/506/FDIS	46C/521/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.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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- withdrawn;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

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MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

Part 5-2: Symmetrical pair/quad cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Capability Approval – Sectional specification

1 General

1.1 Scope

This part of IEC 61156 applies to Capability Approval requirements for cables for digital communications in horizontal floor wiring in accordance with generic specification IEC 61156-1-1 and Clause 4 of the sectional specification IEC 61156-5.

Clause 2 refers to the content of the Capability Manual.

Clause 3 refers to the Quality Plans.

Clause 4 is related to the maintenance of the Capability Approval.

NOTE Quality assessment belongs to the negotiation between customers and manufacturers. The following clauses are intended to be a guide when there is a request for a third-party Capability Approval. However, it may also be used as the basis for second-party or self-certification.

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

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

IEC 61156-5, *Multicore and symmetrical pair/quad cables for digital communications – Part 5: Symmetrical pair/quad cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Sectional specification*

2 Contents of the Capability Manual

2.1 Description of the cable families related to the capability domain

This subclause of the Capability Manual describes the family/families of cables for which Capability Approval is required as follows.

a) Reference to the applicable standards (e.g. sectional specification, detail specifications, etc.).

b) Description of the cable constructional details, for example size of conductors, insulation material and insulation dimensions, type of cable element, i.e. pairs or quads, screening material and dimensions, screen construction, sheath material and dimensions, outer diameter, maximum cable size and maximum cable length.

c) Additional characteristics or requirements not covered by the applicable standard.

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2.2 Identification of the manufacturing process, equipment utilization and manufacturing instructions

For each family of cables the manufacturing processes shall be identified; for instance, by means of a flow chart as given in Annex A. For each manufacturing phase, it is required to specify:

a) description of available machinery and corresponding working instructions;

b) construction techniques;

c) process boundaries related to each phase of manufacturing;

d) test and inspection points in the manufacturing process.

An example of such manufacturing process step identification is given in Annex B.

2.3 Policy on rework and repair

This subclause describes the permissible operations of rework and repair and their related operative instructions.

3 Quality Plan

3.1 General

Reference is made to 2.2.4 of IEC 61156-1-1 with regard to process control. As a minimum, the following items shall be identified and considered:

a) identification of manufacturing stages;

b) identification of those characteristics which depend upon process phases and related tests;

c) identification of all testing procedures;

d) acceptance limits and criteria for the process and manufacturing stages;

e) sampling and sampling plan (type and frequency). An example of such a sampling plan is given in Annex C.

3.2 Selection of Capability Qualifying Components (CQCs)

It is necessary to point out that the manufacture of cables is composed of many process phases that are continuous and not independent of each other. Hence, the products in each phase are not discrete production components.

For this reason, the CQCs are presented by representative samples taken from each phase or from the finished products.

NOTE It is recommended that the trend of the results and/or statistical quality indices related to the tests carried out be examined.

3.3 Purchased raw materials

The Quality Plan shall include a list of the raw materials used for the manufacture of a cable family, their corresponding purchasing specifications, and procedures for incoming inspections.

3.4 Design criteria (if applicable)

The Quality Plan shall include a list of the documentation concerning the design of the cable family either directly or by reference to the manufacturer's internal instructional documents.

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The main items are

a) the design of each product family;
b) the material selection criteria;
c) rules for the dimensioning of the cable elements.

4 Maintenance of Capability Approval

The maintenance of the Capability Approval shall be based on the examination of

a) the documentation related to the process control carried out during the period considered;
b) the test results on the finished products;
c) the review of the manufacturing lines in accordance with the Capability Manual.

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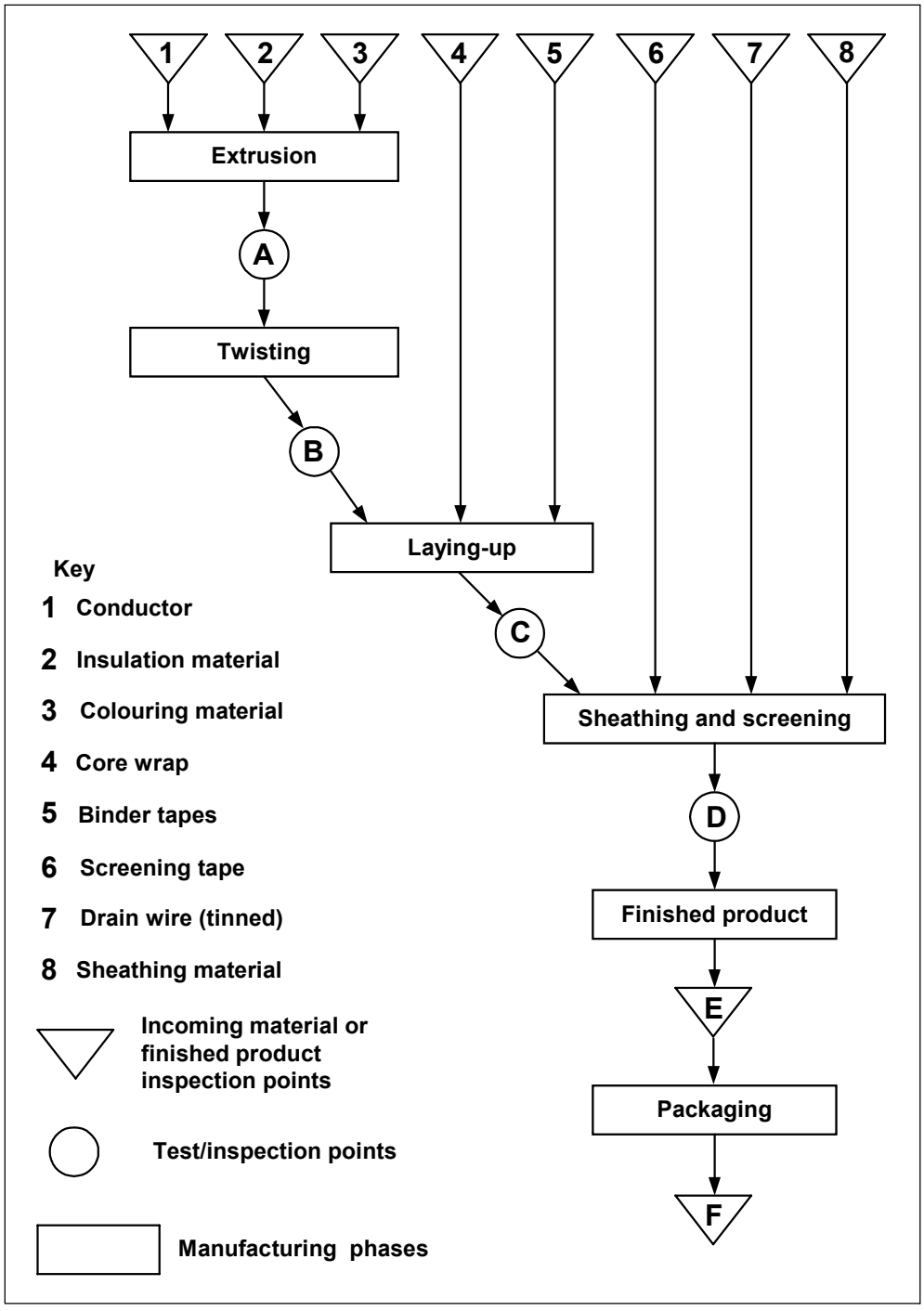
Annex A
(informative)

Manufacturing flow chart of the manufacturing process, equipment utilization and manufacturing instructions



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Annex B
(informative)

Family: Symmetrical pair/quad cables for horizontal floor wiring with transmission characteristics up to 250 MHz – Example of identification of the manufacturing process and its boundaries

Phase No.	Process	Process line	Working instruction	Process boundaries
1	Insulating	Extruder		Copper solid conductor : Min./Max. diameter
		XXXXX	XXXXX	Insulation thickness and diameter over the insulation
		XXXX	XXXX	Type of insulation
		XXXX		Colour marking
2	Twisting	Twisting lines		Pairs and/or quads
		XXXXX	XXXXX	Minimum lay length Maximum lay length
		XXXX	XXXX	
3	Laying-up			Pairs and/or quads
		XXXXX	XXXXX	Minimum lay length Maximum lay length
		XXXX	XXXX	
4	Screening	Taping line		Longitudinal minimum overlap/ Helical minimum overlap
		XXXXX	XXXXX	
		XXXX	XXXX	
5	Sheathing	Extruder		Type of material
		XXXXX	XXXXX	Min./Max. outer diameter
		XXXX	XXXX	Min./Max. thickness
6	Final tests	Testing department		Some tests may be performed externally
7	Packaging	Delivery department		Maximum cable length Maximum reel dimensions

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Annex C
(informative)

Family: Symmetrical pair/quad cables for horizontal floor wiring with transmission characteristics up to 250 MHz – Example of Quality Plan

Phase No. [a]	Manufacturing process phase	Tests	Process phase characteristics	Type of CQCs	Frequency
1a	Copper wire drawing	Diameter Elongation Resistance Torsion/UTS/UTE	Geometry Regularity Capacitance Integrity	Insulated wires on the reel	
1b	Insulation	Diameter Elongation Insulation resistance Spark testing	Geometry Regularity Capacitance Integrity	Insulated wires on the reel	
2	Twisting	Lay length Spark testing Unbalances	Flexibility Crosstalk Integrity (Transmission parameter)	Pairs on the reel	
3	Laying-up	Lay length Diameter Spark testing Unbalances	Flexibility Crosstalk (Transmission parameter)	Stranded pairs on the reel	
4	Screening	Overlap Continuity	EMI protection	Screened stranded pairs	
5	Sheathing	Diameter Thickness Spark testing Visual inspection	Geometry Integrity	Sheathed cables	
6	Final tests	Visual/dimensional inspection Impedance Attenuation NEXT, FEXT RL Fire behaviour Material characteristics	Compliance to the performances	Finished cable length Cable sample Material sample	
7	Packaging	Visual inspection	Cable delivery	Finished cable reels, packaging	

[a] The phases 1a-1b-2-3-4-5 could be tandemized according to a given scheme: for example, 1a+1b, 2+3+4 or 3+4 or 4+5, etc.

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Q2 Please tell us in what capacity(ies) you bought the standard *(tick all that apply).* I am the/a:

purchasing agent ❑
librarian ❑
researcher ❑
design engineer ❑
safety engineer ❑
testing engineer ❑
marketing specialist ❑
other.....

Q3 I work for/in/as a: *(tick all that apply)*

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consultant ❑
government ❑
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not at all ❑
nearly ❑
fairly well ❑
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standard is too academic ❑
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ISBN 2-8318-6353-8

ICS 33.120.20

Typeset and printed by the IEC Central Office
GENEVA, SWITZERLAND