BS EN 50525-2-12:2011

BSI Standards Publication

Electric cables — Low voltage energy cables of rated voltages up to and including 450/750 V (U_0/U)

Part 2-12: Cables for general applications — Cables with thermoplastic PVC insulation for extensible leads

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National foreword

This British Standard is the UK implementation of EN 50525-2-12:2011.

In the UK, the BS EN 50525 series of standards contain complex supersession details. The table below best summarizes the relationship between these standards:

Part 1 together with	Supersedes
2-81	BS 638-4:1996
2-41, 2-42	BS 6007: 2006
2-11 (in part), 2-12, 2-21 (in part), 2-71	BS 6500:2000
2-11 (in part), 2-21 (in part), 2-51 (in part), 2-83, 3-21	BS 7919:2001
2-31, 2-51 (in part)	**BS 6004:2000**
3-41	**BS 7211:1998**
2-22, 2-72, 2-82, 3-11, 3-31	None

NOTE All British Standards will remain current until they are withdrawn on 31 December 2012. British Standards in bold are only partially superseded, and new editions of BS 6004 and BS 7211 will be introduced on 1 January 2013.

National Annex NA (informative) gives information on the origins and identification of particular cable types.

The UK participation in its preparation was entrusted to Technical Committee GEL/20/17, Electric Cables - Low voltage.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Date	Text affected

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EN 50525-2-12

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English version

Electric cables - Low voltage energy cables of rated voltages up to and including 450/750 V (U_0/U) - Part 2-12: Cables for general applications - Cables with thermoplastic PVC insulation for extensible leads

Câbles électriques -
Câbles d'énergie basse tension de tension assignée au plus égale à 450/750 V (U_0/U) -
Partie 2-12: Câbles pour applications générales -
Câbles isolés en PVC thermoplastique pour cordons extensibles

Kabel und Leitungen -
Starkstromleitungen mit Nennspannungen bis 450/750 V (U_0/U) -
Teil 2-12: Starkstromleitungen für allgemeine Anwendungen -
Wendelleitungen mit thermoplastischer PVC-Isolierung

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN 50525-2-12:2011 E

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 20, Electric cables.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50525-2-12 on 2011-01-17.

This document, which is one of a multipart series, supersedes HD 21.10 S2:2001.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2012-01-17
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-01-17

Contents

Tables

1 Scope

EN 50525-2-12 applies to thermoplastic (PVC) insulated and PVC sheathed extensible leads.

The cables are of rated voltages U_0/U up to and including 300/500 V.

The cables are intended for the connection of domestic appliances to the fixed supply.

Circular cables and flat cables are included.

The maximum conductor operating temperature for each of the cables in this standard is 70 °C.

NOTE HD 516 contains extensive guidance on the safe use of cables in this standard.

This EN 50525-2-12 should be read in conjunction with EN 50525-1, which specifies general requirements.

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.

NOTE One or more references to the standards below are in respect of a specific sub-division of that standard, for instance a clause, a table, a class or a type. Cross-references to these standards are undated and, at all times, the latest version applies.

EN 50363-3	Insulating, sheathing and covering materials for low voltage energy cables - Part 3: PVC insulating compounds
EN 50363-4-1	Insulating, sheathing and covering materials for low voltage energy cables - Part 4-1: PVC sheathing compounds
EN 50395	Electrical test methods for low voltage energy cables
EN 50396	Non electrical test methods for low voltage energy cables
EN 50525-1	Electric cables - Low voltage energy cables of rated voltages up to and including 450/750 V (U_0/U) - Part 1: General requirements
EN 60228	Conductors of insulated cables (IEC 60228)
EN 60811-1-2	Insulating and sheathing materials of electric and optical cables - Common test methods - Part 1-2: General application - Thermal ageing methods (IEC 60811-1-2)
EN 60811-1-4	Insulating and sheathing materials of electric and optical cables - Common test methods - Part 1-4: General application - Tests at low temperature (IEC 60811-1-4)

3 Terms and definitions

For the purposes of this document the terms and definitions given in Clause 3 of EN 50525-1 apply.

4 General purpose cables

4.1 Light duty cables – H03VVH8-F and H03VVH2H8-F

4.1.1 Construction – Pre-coiling

4.1.1.1 Conductor

The conductor shall be class 5, according to EN 60228.

4.1.1.2 Sizes of cable

The sizes of cable shall be:

– circular cables – 0,5 mm^2 and 0,75 mm^2 – 2 and 3 core;

– flat cables – 0,5 mm^2 and 0,75 mm^2 – 2 core only.

4.1.1.3 Insulation

The insulation shall be polyvinyl chloride compound of Type TI 2 to EN 50363-3.

4.1.1.4 Assembly

The cables shall be assembled as follows:

– circular cable: the cores shall be twisted together;

– flat cable: the cores shall be laid parallel.

NOTE A tape may be applied around the core assembly before application of the sheath.

4.1.1.5 Sheath

The sheath shall be polyvinyl chloride compound of Type TM 2 to EN 50363-4-1.

The sheath shall fill the spaces between the cores, thus forming a filling.

4.1.1.6 Marking

The cable shall be marked with the CENELEC code H03VVH8-F for circular cables, or H03VVH2H8-F for flat cables. The marking shall comply with Clause 6 of EN 50525-1.

4.1.2 Construction – Post-coiling

The cables shall be coiled in the form of a helical lead and caused substantially to maintain this form during use.

Slight deformation of the cables, created by the coil forming process, is acceptable provided that the thickness of the insulation and sheath meet the requirements.

The original marking, if any, on the pre-coiled cable may be affected by the coiling process but this is acceptable provided that traceability is not impaired.

The producer of the extensible lead, if different from the producer of the pre-coiled cable, shall apply an additional mark, as indication of origin, as required by Annex A.

4.1.3 Requirements

Each cable shall comply with the appropriate requirements given in EN 50525-1, and the particular requirements of this Part.

Testing at the pre-coiling stage shall be in accordance with Annex B, and the relevant tests indicated in column 6. Testing at the post-coiling stage shall be in accordance with Annex C, and the relevant tests indicated in column 6.

The dimensions of the cables (pre-coiling) and the thickness of insulation and sheath (post-coiling) shall conform to Table D.1 for the relevant size. The requirements of 5.3.3 of EN 50525-1 shall apply for the insulation thickness and of 5.7.3 of EN 50525-1 for the sheath thickness.

The requirements to be met for the compatibility test shall be as given in Annex E.

The requirements to be met for the mechanical tests shall be as given in Annex F.

4.2 Ordinary duty cables – H05VVH8-F and H05VVH2H8-F

4.2.1 Construction – Pre-coiling

4.2.1.1 Conductor

The conductor shall be class 5, according to EN 60228.

4.2.1.2 Sizes of cable

The sizes of cable shall be:

– circular cables – 0,75 mm^2 to 1,5 mm^2 – 2 and 3 core;

– flat cables – 0,75 mm^2 – 2 core only.

4.2.1.3 Insulation

The insulation shall be polyvinyl chloride compound of Type TI 2 to EN 50363-3.

4.2.1.4 Assembly

The cables shall be assembled as follows:

– circular cable: the cores shall be twisted together;

– flat cable: the cores shall be laid parallel.

For circular cable having two cores, the space between the cores shall be filled either by separate fillers or by the sheath filling the interstices.

NOTE A tape may be applied around the core assembly before application of the sheath.

4.2.1.5 Sheath

The sheath shall be polyvinyl chloride compound of Type TM 2 to EN 50363-4-1.

The sheath shall fill the spaces between the cores, thus forming a filling.

4.2.1.6 Marking

The cable shall be marked with the CENELEC code H05VVH8-F for circular cables, or H05VVH2H8-F for flat cables. The marking shall comply with Clause 6 of EN 50525-1.

4.2.2 Construction – Post-coiling

The cables shall be coiled in the form of a helical lead and caused substantially to maintain this form during use.

Slight deformation of the cables, created by the coil forming process, is acceptable provided that the thickness of the insulation and sheath meets the requirements.

The original marking, if any, on the pre-coiled cables may be affected by the coiling process but this is acceptable provided that traceability is not impaired.

The producer of the extensible lead, if different from the producer of the pre-coiled cable, shall apply an additional mark, as indication of origin, as required by Annex A.

4.2.3 Requirements

Each cable shall comply with the appropriate requirements given in EN 50525-1, and the particular requirements of this Part.

Testing at the pre-coiling stage shall be in accordance with Annex B, and the relevant tests indicated in column 7. Testing at the post-coiling stage shall be in accordance with Annex C, and the relevant tests indicated in column 7.

The dimensions of the cables (pre-coiling) and the thickness of insulation and sheath (post-coiling) shall conform to Table D.2 for the relevant size. The requirements of 5.3.3 of EN 50525-1 shall apply for the insulation thickness and of 5.7.3 of EN 50525-1 for the sheath thickness.

The requirements to be met for the compatibility test shall be as given in Annex E.

The requirements to be met for the mechanical tests shall be as given in Annex F.

Annex A
(normative)

Post-coiling requirements for marking

For extensible leads an additional mark of indication of origin shall be applied to identify the coiler. It shall consist of one of the following:

1) an additional embossed mark clearly discernible on the extensible part regardless of any additional processing such as the moulding on of a plug;

2) an additional moulded mark subject to the conditions as in 1) above;

3) the addition of a sleeve bearing a clear and indelible marking which shall remain identifiable during normal use and which shall not be removed during any further processing;

4) additional printing on the ends of the extensible lead, provided such marking shall not be obliterated during any subsequent processing and remains identifiable during normal use.

Annex B
(normative)

Pre-coiling tests for cables to EN 50525-2-12

Table B.1

1	2	3	4	5	6	7
Ref No.	**Tests** [a]	**Category of test**	**Test method described in**		**Applicability of test – Subclause**	
			EN	**Clause**	**4.1**	**4.2**
					H03VV	**H05VV**
1	**Electrical tests** [b]					
1.1	Resistance of conductors	T, S	50395	5	X	X
1.2	Voltage test on cores according to specified insulation thickness:					
1.2.1	- at 1 500 V up to and including 0,6 mm	T	50395	7	X	X
1.2.2	- at 2 000 V above 0,6 mm	T	50395	7	-	X
1.3	Insulation resistance at 70 °C	T, S	50395	8.1	X	X
1.4	Long term resistance of insulation to d.c.	T	50395	9	X	X
1.5	Absence of faults in insulation	R	50395	10		
2	**Constructional and dimensional tests**				X	X
2.1	Checking of compliance with constructional provisions	T, S	50525-1	Inspection and manual tests		
2.2	Measurement of overall dimensions				X	X
2.2.1	- Mean value	T, S	50396	4.4.1	X	X
2.2.2	- Ovality	T, S	50396	4.4.2		
3	**Insulation material tests**	T	50363-3 [c]	-	X	X
4	**Sheath material tests**	T	50363-4-1	-	X	X
5	**Compatibility test**	T	60811-1-2	8.1.4	X	X
6	**Impact test** at - 5 °C	T	60811-1-4	8.5	X	X

[a] The order given does not imply a sequence of testing.

[b] Particular test conditions and requirements are given in Table 1 of EN 50525-1.

[c] This EN includes all the test methods and requirements for the material. Material to be tested is taken from the finished cable.

Annex C
(normative)

Post-coiling tests for cables to EN 50525-2-12

Table C.1

1	2	3	4	5	6	7
Ref No.	**Tests** [a]	**Category of test**	**Test method described in**		**Applicability of test – Subclause**	
			EN	**Clause**	**4.1**	**4.2**
					H03VV	**H05VV**
1	**Electrical tests** [b]					
1.1	Voltage test on complete cable at 2 000 V	T, S	50395	6	X	X
2	**Constructional and dimensional tests**					
2.1	Checking of compliance with constructional provisions	T, S	50525-1	Inspection and manual tests	X	X
2.2	Measurement of thickness of insulation	T, S	50396	4.1	X	X
2.3	Measurement of thickness of sheath	T, S	50396	4.2 or 4.3	X	X
3	**Mechanical tests on completed cable**					
3.1	Extension test	T	50396	9.1	X	X
3.2	Endurance test	T	50396	9.2	X	X
4	**Test under fire conditions** [c]	T	50396	9.3	X	X

[a] The order given does not imply a sequence of testing.

[b] Particular test conditions and requirements are given in Table 1 of EN 50525-1.

[c] After removal of the gas burner the flame shall extinguish within 30 s.

Annex D
(normative)

General data

NOTE The overall dimensions of pre-coiled cables have been calculated in accordance with EN 60719.

Table D.1 – Cables rated at 300/300 V

1	2	3	4	5	6
Pre-coiling				**Post-coiling**	
Number and nominal cross sectional area of conductors	**Mean overall dimensions**		**Minimum insulation resistance at 70 °C**	**Thickness of insulation**	**Thickness of sheath**
	Lower limit	**Upper limit**		**Specified value**	**Specified value**
mm^2	mm	mm	MΩ.km	mm	mm
2 x 0,5	4,6 or 3,0 x 4,9	5,9 or 3,7 x 5,9	0,011	0,5	0,6
2 x 0,75	4,9 or 3,2 x 5,2	6,3 or 3,8 x 6,3	0,010	0,5	0,6
3 x 0,5	4,9	6,3	0,011	0,5	0,6
3 x 0,75	5,2	6,7	0,010	0,5	0,6

Table D.2 – Cables rated at 300/500 V

1	2	3	4	5	6
Pre-coiling				**Post-coiling**	
Number and nominal cross sectional area of conductors	**Mean overall dimensions**		**Minimum insulation resistance at 70 °C**	**Thickness of insulation**	**Thickness of sheath**
	Lower limit	**Upper limit**		**Specified value**	**Specified value**
mm^2	mm	mm	MΩ.km	mm	mm
2 x 0,75	5,7 or 3,7 x 6,0	7,2 or 4,5 x 7,2	0,011	0,6	0,8
2 x 1	5,9	7,5	0,010	0,6	0,8
2 x 1,5	6,8	8,6	0,010	0,7	0,8
3 x 0,75	6,0	7,6	0,011	0,6	0,8
3 x 1	6,3	8,0	0,010	0,6	0,8
3 x 1,5	7,4	9,4	0,010	0,7	0,9

Annex E
(normative)

Requirements for compatibility test

E.1 Test conditions

The sample shall be aged for seven days at (80 ± 2) °C in accordance with the designated test method.

E.2 Requirements

At the conclusion of the ageing period the insulation and sheath shall meet the requirements given in Table E.1 below.

Table E.1

Parameter		Units	Insulation TI 2	Sheath TM 2
Tensile strength	- median, min.	N/mm^2	10,0	10,0
	- variation [a], max.	%	± 20	± 20
Elongation at break	- median, min.	%	150	150
	- variation [a], max.	%	± 20	± 20

[a] The variation is the difference between the respective values obtained prior to and after heat treatment, expressed as a percentage of the former.

Annex F
(normative)

Requirements for mechanical tests

F.1 Extension tests for extensible leads

The test shall be carried out in accordance with 9.1 of EN 50396. After the test, and within 30 s following the fifth extension, the sample shall return to 150 % of its original closed length for a sample tested before ageing (9.1.2 of EN 50396) and 180 % of its original closed length for a sample tested after ageing (9.1.3 of EN 50396).

F.2 Endurance test for extensible leads

The test shall be carried out in accordance with 9.2 of EN 50396. During the test with 30 000 backward and forward movements, i.e. 60 000 single strokes, neither interruption of the current nor short circuit between the conductors shall occur.

After the test, the sample shall withstand the voltage test carried out in accordance with Clause 6 of EN 50395.

Bibliography

EN 60719	Calculation of the lower and upper limits for the average outer dimensions of cables with circular copper conductors and of rated voltages up to and including 450/750 V
HD 516	Guide to use of low voltage harmonized cables

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National Annex (informative) **Origins and identification of the particular cable types**

As an aid to users, the table below shows, in respect of BS EN 50525-2-12:

— the identification of the particular cable types from BS 6500 that are now included in BS EN 50525-2-12;

— the location of the cables within BS EN 50525-2-12;

— any applicable United Kingdom and CENELEC cable codings (see also National Informative Annex B to BS EN 50525-1).

Pre-existing BS		**Clause in BS EN 50525-2-12**	**Cable type – Coding**	
Number	**Clause**		**United Kingdom (if applicable)**	**CENELEC**
BS 6500	8	4.1	–	H03VVH8-F
			–	H03VVH2H8-F
BS 6500	8	4.2	–	H05VVH8-F
			–	H05VVH2H8-F

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