

# INTERNATIONAL STANDARD

# IEC 60227-5

Edition 2.2  
2003-07

Edition 2:1997 consolidated with amendments 1:1997 and 2:2003

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## Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V –

### Part 5: Flexible cables (cords)

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Reference number  
IEC 60227-5:1997+A1:1997+A2:2003(E)

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<https://standards.iteh.ai/catalog/standards/iec/3bc8c8ae-88a8-4db5-bee4-a541b33a2cfe/iec-60227-5-1997>

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE

CJ

For price, see current catalogue

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**POLYVINYL CHLORIDE INSULATED CABLES  
OF RATED VOLTAGES UP TO AND INCLUDING 450/750 V –****Part 5: Flexible cables (cords)**

## FOREWORD

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International Standard IEC 60227-5 has been prepared by subcommittee 20B: Low-voltage cables, of IEC technical committee 20: Electric cables.

This consolidated version of IEC 60227-5 consists of the second edition (1997) [documents 20B/228/FDIS and 20B/243/RVD], its amendment 1 (1997) [documents 20B/255/FDIS and 20B/263/RVD] and its amendment 2 (2003) [documents 20/626/FDIS and 20/641/RVD].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 2.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

The committee has decided that the contents of the base publication and its amendments 1 and 2 will remain unchanged until 2008. At this date, the publication will be

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- withdrawn;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

Withdrawn

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# POLYVINYL CHLORIDE INSULATED CABLES OF RATED VOLTAGES UP TO AND INCLUDING 450/750 V –

## Part 5: Flexible cables (cords)

### 1 General

#### 1.1 Scope

This part of IEC 60227 details the particular specifications for polyvinyl chloride insulated flexible cables (cords), of rated voltages up to and including 300/500 V.

All cables comply with the appropriate requirements given in IEC 60227-1 and each individual type of cable complies with the particular requirements of this part.

#### 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 60227-1:1993, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60227-2:1979, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 2: Test methods*

IEC 60228:1978, *Conductors of insulated cables. Guide to the dimensional limits of circular conductors*

IEC 60332-1:1993 *Tests on electric cables under fire conditions – Part 1: Test on a single vertical insulated wire or cable*

IEC 60811-1-1:1993, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general applications – Section 1: Measurement of thickness and overall dimensions – Tests for determining the mechanical properties*

IEC 60811-1-2:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general applications – Section 2: Thermal ageing methods*

IEC 60811-1-4:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general applications – Section 4: Tests at low temperature*

IEC 60811-3-1:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 3: Methods specific to PVC compounds – Section 1: Pressure test at high temperature – Tests for resistance to cracking*

IEC 60811-3-2:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 3: Methods specific to PVC compounds – Section 2: Loss of mass test – Thermal stability test*

## 2 Flat tinsel cord

### 2.1 Code designation

60227 IEC 41.

### 2.2 Rated voltage

300/300 V.

### 2.3 Construction

#### 2.3.1 Conductor

Number of conductors: 2.

Each conductor shall comprise a number of strands or groups of strands, twisted together, each strand being composed of one or more flattened wires of copper or copper alloy, helically wound on a thread of cotton, polyamide or similar material.

The conductor resistance shall not exceed the value given in table 1, column 5.

#### 2.3.2 Insulation

The insulation shall be polyvinyl chloride compound of type PVC/D applied around each conductor.

The insulation thickness shall comply with the specified value given in table 1, column 1.

The insulation resistance shall be not less than the value given in table 1, column 4.

#### 2.3.3 Assembly of cores

The conductors shall be laid parallel and covered with the insulation.

The insulation shall be provided with a groove on both sides, between the conductors, to facilitate separation of the cores.

#### 2.3.4 Overall dimensions

The mean overall dimensions shall be within the limits given in table 1, columns 2 and 3.

### 2.4 Tests

Compliance with the requirements of 2.3 shall be checked by inspection and by the tests given in table 2.

### 2.5 Guide to use

Maximum conductor temperature in normal use: 70 °C.

NOTE Other guidelines are under consideration.

**Table 1 – General data for type 60227 IEC 41**

1	2	3	4	5
<b>Insulation thickness</b>	<b>Mean overall dimensions</b>		<b>Minimum insulation resistance at 70 °C</b>	<b>Maximum conductor resistance at 20 °C</b>
<b>Specified value</b> mm	<b>Lower limits</b> mm	<b>Upper limits</b> mm	MΩ·km	Ω/km
0,8	2,2 × 4,4	3,5 × 7,0	0,019	270

NOTE The mean overall dimensions have been calculated in accordance with IEC 60719.

**Table 2 – Tests for type 60227 IEC 41**

1	2	3	4	
Ref. No.	Test	Category of test	Test method described in:	
			IEC Standard	Subclause
1	<i>Electrical tests</i>			
1.1	Resistance of conductors	T, S	IEC 60227-2	2.1
1.2	Voltage test on completed cable at 2 000 V	T, S	IEC 60227-2	2.2
1.3	Insulation resistance at 70 °C	T	IEC 60227-2	2.4
2	<i>Provisions covering constructional and dimensional characteristics</i>		IEC 60227-1 IEC 60227-2	
2.1	Checking of compliance with constructional provisions	T, S	IEC 60227-1	Inspection and manual test
2.2	Measurement of insulation thickness	T, S	IEC 60227-2	1.9
2.3	Measurement of overall dimensions	T, S	IEC 60227-2	1.11
3	<i>Mechanical properties of insulation</i>			
3.1	Tensile test before and after ageing	T	IEC 60811-1-1 IEC 60811-1-2	9.1 8.1
3.2	Loss of mass test	T	IEC 60811-3-2	8.1
4	<i>Pressure test at high temperature</i>	T	IEC 60811-3-1	8.1
5	<i>Elasticity at low temperature</i>			
5.1	Bending test for insulation at low temperature	T	IEC 60811-1-4	8.1
6	<i>Heat shock test</i>	T	IEC 60811-3-1	9.1
7	<i>Mechanical strength of completed cable</i>			
7.1	Bending test	T	IEC 60227-2	3.2
7.2	Snatch test	T	IEC 60227-2	3.3
8	<i>Test of flame retardance</i>	T	IEC 60332-1	

### 3 Not used

## 4 Cord for indoor decorative lighting chains

### 4.1 Code designation

60227 IEC 43.

### 4.2 Rated voltage

300/300 V.

### 4.3 Construction

#### 4.3.1 Conductor

Number of conductors: 1.

The conductor shall comply with the requirements given in IEC 60228 for class 5 conductors.

#### 4.3.2 Insulation

The insulation shall be polyvinyl chloride of the type PVC/D, it shall consist of two layers and applied by dual extrusion around the conductor.

The outer layer of insulation shall be of a colour contrasting with that of the inner layer, but shall adhere to the inner layer.

The combined thickness of the inner and outer layer of insulation shall comply with the overall thickness specified in table 5, columns 3 and 4, but at no point the thickness of either layer shall be less than the value specified in column 2.

The insulation resistance at 70 °C shall be not less than the values given in table 5, column 7.

#### 4.3.3 Cord identification

Preferred colour of outer layer: green.

#### 4.3.4 Overall diameter

The mean overall diameter shall be within the limits given in table 5, columns 5 and 6.

### 4.4 Tests

Compliance with the requirements of 4.3 shall be checked by inspection and by the tests given in table 6.

### 4.5 Guide to use

Maximum conductor temperature in normal use: 70 °C.