

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Specifications for particular types of winding wires –  
Part 22: Polyester or polyesterimide enamelled round copper wire overcoated  
with polyamide, class 180**

**Spécifications pour types particuliers de fils de bobinage –  
Partie 22: Fil de section circulaire en cuivre émaillé avec polyester ou  
polyesterimide et avec surcouche polyamide, classe 180**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SPECIFICATIONS FOR PARTICULAR TYPES  
OF WINDING WIRES –****Part 22: Polyester or polyesterimide enamelled  
round copper wire overcoated with polyamide,  
class 180**

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**The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.**

International Standard IEC 60317-22 has been prepared by IEC technical committee 55: Winding wires.

The main changes with respect to the previous edition are listed below:

- new requirements for appearance, Subclause 3.2, added;
- breakdown voltage values, former Table 3, replaced with a reference to IEC 60317-0-1;
- new pin hole test, Clause 23, added.

This International Standard is to be read in conjunction with IEC 60317-0-1.

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

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## INTRODUCTION

This part of IEC 60317 is one of a series which deals with insulated wires used for windings in electrical equipment. The series has three groups describing

- 1) winding wires – Test methods (IEC 60851);
- 2) specifications for particular types of winding wires (IEC 60317);
- 3) packaging of winding wires (IEC 60264).

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## SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

### Part 22: Polyester or polyesterimide enamelled round copper wire overcoated with polyamide, class 180

#### 1 Scope

This part of IEC 60317 specifies the requirements of enamelled round copper winding wire of class 180 with a dual coating. The underlying coating is based on polyester or polyesterimide resin, which may be modified providing it retains the chemical identity of the original resin and meets all specified wire requirements. The superimposed coating is based on polyamide resin.

NOTE A modified resin is a resin that has undergone a chemical change, or contains one or more additives to enhance certain performance or application characteristics.

Class 180 is a thermal class that requires a minimum temperature index of 180 and a heat shock temperature of at least 200 °C.

The temperature in degrees Celsius corresponding to the temperature index is not necessarily that at which it is recommended that the wire be operated and this will depend on many factors, including the type of equipment involved.

The range of nominal conductor diameters covered by this standard is as follows:

- grade 1: 0,050 mm up to and including 3,150 mm;
- grade 2: 0,050 mm up to and including 5,000 mm;
- grade 3: 0,250 mm up to and including 1,600 mm.

The nominal conductor diameters are specified in Clause 4 of IEC 60317-0-1.

#### 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 60317-0-1, *Specifications for particular types of winding wires – Part 0: General requirements – Section 1: Enamelled round copper wire*

#### 3 Definitions and general notes on methods of test and appearance

##### 3.1 Definitions and general notes on methods of test

For definitions and general notes on methods of test, see Clause 3 of IEC 60317-0-1.

In case of inconsistencies between IEC 60317-0-1 and this standard, IEC 60317-22 shall prevail.



### **3.2 Appearance**

See Clause 3 of IEC 60317-0-1.

### **4 Dimensions**

See Clause 4 of IEC 60317-0-1.

### **5 Electrical resistance**

See Clause 5 of IEC 60317-0-1.

### **6 Elongation**

See Clause 6 of IEC 60317-0-1.

### **7 Springiness**

See Clause 7 of IEC 60317-0-1.

### **8 Flexibility and adherence**

See Clause 8 of IEC 60317-0-1, where the constant  $K$  used for the calculation of the number of revolutions for the peel test shall be 110 mm.

### **9 Heat shock**

See Clause 9 of IEC 60317-0-1, where the minimum heat shock temperature shall be 200 °C.

### **10 Cut-through**

No failure shall occur within 2 min at 265 °C.

### **11 Resistance to abrasion**

(nominal conductor diameters from 0,250 mm up to and including 2,500 mm)

The wire shall meet the requirements given in Table 1.

**Table 1 – Resistance to abrasion**

Nominal conductor diameter mm	Grade 1		Grade 2		Grade 3	
	Minimum average force to failure	Minimum force to failure of each measurement	Minimum average force to failure	Minimum force to failure of each measurement	Minimum average force to failure	Minimum force to failure of each measurement
	N	N	N	N	N	N
0,250	2,85	2,45	4,70	4,00	5,80	4,90
0,280	3,10	2,60	5,05	4,30	6,25	5,30
0,315	3,35	2,80	5,45	4,60	6,70	5,70
0,355	3,60	3,05	5,85	4,95	7,20	6,10
0,400	3,85	3,25	6,25	5,30	7,70	6,50
0,450	4,15	3,50	6,75	5,70	8,25	7,00
0,500	4,45	3,75	7,20	6,10	8,85	7,50
0,560	4,75	4,05	7,70	6,50	9,50	8,05
0,630	5,10	4,35	8,25	7,00	10,20	8,65
0,710	5,45	4,65	8,85	7,50	10,90	9,25
0,800	5,85	4,95	9,50	8,05	11,70	9,90
0,900	6,30	5,35	10,20	8,60	12,50	10,60
1,000	6,75	5,75	10,90	9,20	13,30	11,30
1,120	7,35	6,20	11,60	9,80	14,20	12,00
1,250	7,90	6,70	12,50	10,50	15,20	12,90
1,400	8,50	7,20	13,30	11,30	16,40	13,90
1,600	9,20	7,80	14,30	12,10	17,60	14,90
1,800	9,95	8,40	15,40	13,00	–	–
2,000	10,60	9,00	16,40	13,90	–	–
2,240	11,70	9,90	17,50	14,80	–	–
2,500	12,80	10,80	18,60	15,80	–	–

For intermediate nominal conductor diameters, the value of the next larger nominal conductor diameter shall be taken.

**12 Resistance to solvents**

See Clause 12 of IEC 60317-0-1.

**13 Breakdown voltage**

See Clause 13 of IEC 60317-0-1, where the elevated temperature shall be 180 °C.

**14 Continuity of insulation**

See Clause 14 of IEC 60317-0-1.