

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Specifications for particular types of winding wires –  
Part 3: Polyester enamelled round copper wire, class 155**

**Spécifications pour types particuliers de fils de bobinage –  
Partie 3: Fil de section circulaire en cuivre emailé avec polyester, classe 155**



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# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



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**Specifications for particular types of winding wires –  
Part 3: Polyester enamelled round copper wire, class 155**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SPECIFICATIONS FOR PARTICULAR TYPES  
OF WINDING WIRES –****Part 3: Polyester enamelled round copper wire,  
class 155**

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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 60317-3 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;
- the constant K, applied in calculating the number of revolutions for the peel test, Clause 8, increased from 130 mm to 150 mm;
- the test temperature for the cut-through test, Clause 10, increased from 240 °C to 270 °C;
- 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.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability 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

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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 3: Polyester enamelled round copper wire, class 155

#### 1 Scope

This part of IEC 60317 specifies the requirements of enamelled round copper winding wire of class 155 with a sole coating based on polyester resin, which may be modified provided it retains the chemical identity of the original resin and meets all specified wire requirements.

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 155 is a thermal class that requires a minimum temperature index of 155 and a heat shock temperature of at least 175 °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: 0,020 mm up to and including 3,150 mm;
- grade 2: 0,020 mm up to and including 5,000 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 60317-0-1:2008, *Specifications for particular types of winding wires – Part 0-1: General requirements – 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~~ Subclauses 3.1 and 3.2 of IEC 60317-0-1.

In case of inconsistencies between IEC 60317-0-1 and this standard, IEC 60317-3 shall prevail.



### 3.2 Appearance

See ~~Clause 3~~ Subclause 3.3 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 150 mm.

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### 9 Heat shock

See Clause 9 of IEC 60317-0-1, where the minimum heat shock temperature shall be 175 °C.

### 10 Cut-through

No failure shall occur within 2 min at a temperature of 270 °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	Grade 1		Grade 2	
	Minimum average force to failure	Minimum force to failure of each measurement	Minimum average force to failure	Minimum force to failure of each measurement
mm	N	N	N	N
0,250	2,70	2,30	4,50	3,80
0,280	2,90	2,45	4,80	4,10
0,315	3,15	2,65	5,20	4,40
0,355	3,40	2,85	5,60	4,75
0,400	3,65	3,05	6,00	5,10
0,450	3,90	3,30	6,45	5,45
0,500	4,20	3,55	6,90	5,85
0,560	4,50	3,80	7,40	6,25
0,630	4,85	4,10	7,90	6,70
0,710	5,20	4,40	8,50	7,20
0,800	5,60	4,70	9,10	7,70
0,900	6,05	5,10	9,70	8,20
1,000	6,55	5,50	10,40	8,80
1,120	7,05	5,95	11,10	9,40
1,250	7,60	6,45	11,90	10,00
1,400	8,20	6,95	12,70	10,80
1,600	8,90	7,55	13,70	11,60
1,800	9,60	8,15	14,70	12,40
2,000	10,30	8,75	15,70	13,30
2,240	11,10	9,40	16,70	14,20
2,500	11,90	10,10	17,80	15,10

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 155 °C.

**14 Continuity of insulation**

See Clause 14 of IEC 60317-0-1.

**15 Temperature index**

See Clause 15 of IEC 60317-0-1, where the minimum temperature index shall be 155.

## **16 Resistance to refrigerants**

Test inappropriate.

## **17 Solderability**

Test inappropriate.

## **18 Heat or solvent bonding**

Test inappropriate.

## **19 Dielectric dissipation factor**

Test inappropriate.

## **20 Resistance to transformer oil**

Test inappropriate.

## **23 Pin hole test**

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~~Requirements under consideration.~~ See Clause 23 of IEC 60317-0-1.

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## **30 Packaging**

See Clause 30 of IEC 60317-0-1.

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