

Fibre-insulated wires

VS 220 VF flat

- **Fibre-insulated winding wire especially designed for tractions motors**
- **Wire with reduced insulation thickness and very good mechanical/thermal properties**

General description

VS 220 VS is an enameled flat copper wire insulated with a very fine polyamide-imide impregnated glass and polyester fibre blend covering.

Application

Traction motor and rotor windings.

Conventional types

VS 220 VF has been developed with a very thin insulation thickness, in order to allow the use of fibre-insulated wires in windings of traction motors in place of polyimide-tape insulation.

Cross section: 2 to 80 mm²
 Width: 2 to 12 mm
 Thickness: 1 to 5 mm

The standard dimensions of the conductors (nominal dimensions), the tolerance and the overall dimension of the enameled wire, complies with the IEC standard 60317-0-2.

Standards

There are no existing IEC standards for VS 220 wires today.
 The test methods are based on IEC Publication 60851:

- 60851-1 General
- 60851-2 Definition of dimensions
- 60851-3 Mechanical properties
- 60851-4 Chemical properties
- 60851-5 Electrical properties
- 60851-6 Thermal properties

Advantages

- Very high thermal resistance
- Very good dielectric properties
- Covering with high mechanical strength

Order data

The designation shall comprise:
 For rectangular shape: FL
 Description of the insulation: VS 220 RENF
 Reel type: e.g.: DIN 500

Complete order:

2000 kg FL VS220 VF 2.24x5.00mm D500

	unit	value	Test standard
Increase due the insulation			
For width above 2.00 mm	mm	0.15 to 0.19	
Mechanical properties			
Elongation at break thickness up to 2.5 mm	%	≥ 30	IEC60851-3 test 6
Elongation at break thickness above 2.5 mm	%	≥ 32	IEC60851-3 test 6
Springiness	°	≤ 5.5	IEC60851-3 test 7
Adherence after elongation	20 %	No loss of adhesion	IEC60851-3 test 8
Flexibility - if width up to 10 mm - edgewise bent on mandrel Ø 3 x width	visual	no cracks	IEC60851-3 test 8
Flexibility - if width above 10 mm - edgewise bent on mandrel Ø 4 x width	visual	no cracks	IEC60851-3 test 8
Flexibility - flatwise bent on mandrel Ø 3 x thickness	visual	no cracks	IEC60851-3 test 8
Electrical properties			
Break down voltage after bending	V	≥ 2400	IEC60851-5 test 13
Thermal properties			
Heat shock 30 min / 240 °C if width up to 10 mm - edgewise mandrel Ø 5 x width	visual	no cracks	IEC60851-6 test 9
Heat shock 30 min / 240 °C if width above 10 mm - edgewise mandrel Ø 6 x width	visual	no cracks	IEC60851-6 test 9
Thermal endurance	TI	220	IEC60172

Appearance

Slight color variations are raw material or process-related and have no influence on the technical properties of the wire

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