

# Fibre-insulated wires

## VS 240 VF

- **Winding wire especially designed for traction motors with reduced insulation thickness and outstanding mechanical and thermal properties**
- **Temperature Index 240**

### General description

VS 240 VF is a polyimide enameled flat copper wire insulated with a reinforced, polyimide impregnated, fibre blend covering.

### Application

- Traction motors: stator and rotor windings
- High temperature rotating HV-machines

### Conventional types

VS 240 VF covered enameled wires are available in the following standard grades:  
VS 240 VF V and VS 240 VF P covered with a different type of mixed fibres.

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 240 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 240 VF V or P  
Reel type: e.g.: DIN 500

### Complete order:

2000 kg FL VS240 VF V 2.24x5.00mm D500

	unit	value	Test standard
<b>Increase due the insulation</b>			
For width above 2.00 mm	mm	0.15 to 0.19	
<b>Mechanical properties</b>			
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
<b>Electrical properties</b>			
Break down voltage after bending	V	≥ 2400	IEC60851-5 test 13
<b>Thermal properties</b>			
Heat shock 30 min / 260 °C if width up to 10 mm - edgewise mandrel Ø 5 x width	visual	no cracks	IEC60851-6 test 9
Heat shock 30 min / 260 °C if width above 10 mm - edgewise mandrel Ø 6 x width	visual	no cracks	IEC60851-6 test 9
Thermal endurance	TI	240	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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