

Fiber-insulated wires

VTV FL

- Flat bare copper wire insulated with a combination of mixed glass/polyester fibers and glass yarn
- Winding wire with excellent mechanical, thermal properties
- Temperature Index 180

General description

VTV-covered flat bare wires are insulated with a varnish impregnated covering of mixed glass/polyester yarn (inner layer) and glass yarn (outer layer). They can be supplied in an un-cured thermal adhesive version (V 180 K), or cured version (V 180).

Application

- Stator and rotor windings for motors.
- Production of Roebel bars for generator stators.

Conventional Types

Covered bare copper wires, insulated with:

- 2 fine or reinforced impregnated covering layers

Cross section: 2 to 80 mm²
 Width: 2 to 22 mm
 Thickness: 1 to 6 mm.

The standard dimensions of the conductors (nominal dimension), the overall dimensions and the tolerances comply with the IEC standard 60317-0-2. Other standards or specifications are available upon request.

Standards

There are no particular existing IEC standards for VTV-covered flat wires at 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

Build Criteria Rectangular Wire

Bare conductor Width w	Max. increase in dimension (mm)	
	Fiber covering over bare conductor	
	VTV (cured version)	
	Fine	Reinforced
w ≥ 2 mm	0.20 to 0.24	0.25 to 0.29

Bare conductor Width w	Max. increase in dimension (mm)			
	Fiber covering over bare conductor			
	VTV K (thermal adhesive version)			
	Fine		Reinforced	
	Supply state	After pressing	Supply state	After pressing
w ≥ 2 mm	0.20 to 0.24	0.16 to 0.20	0.25 to 0.29	0.20 to 0.25

Advantages

- Excellent thermal bonding properties
- Excellent mechanical properties (adhesion, flexibility)

Processing Instructions

No special precautions. For the items with a thermal-adhesive bond coat (K), the storage time is limited to 1 year at room temperature and 60 % relative humidity.

Order Data

Quantity, Designation, Supply Form e.g.:

The designation shall comprise:

Shape of the wires: FL for flat
 Description of the insulation: VTV V180 Fine
 Nominal dimension in mm: 2.24 x 5.00 mm
 Reel type: e.g.: DIN 500

Example of complete order:

2000 Kg FL VTV V180 F 2.24 x 5.00mm D500

		VTV V180 (K) Fine or Reinforced	Test standard
Mechanical properties			
Elongation at break / thickness up to 2.5 mm	%	≥ 30	IEC 60851-3 test 6
Elongation at break / thickness above 2.5 mm	%	≥ 32	IEC 60851-3 test 6
Springiness /diameter above 1.60 mm	°	≤ 5	IEC60851-3 test 7
Flexibility Flatwise bent on mandrel Ø 9 x thickness		no cracks	IEC60851-3 test 8
Flexibility if width up to 10 mm Edgewise bent on mandrel Ø 6 x width		no cracks	IEC60851-3 test 8
Flexibility if width above 10 mm Edgewise bent on mandrel Ø 7 x width		no cracks	IEC60851-3 test 8
Adherence after elongation	20 %	no loss of adhesion	IEC60851-3 test 8
Shear strength (for V180K only)	N/mm ²	≥ 4	Delle test 1.47.14
Electrical properties			
Breakdown voltage after bending	V/mm	≥ 2200	IEC60851-5 test 13
Thermal properties			
Heat shock 30 min / 200 °C if width up to 10 mm Edgewise mandrel Ø 8 x width		no cracks	IEC60851-6 test 9
Heat shock 30 min / 200 °C if width above 10 mm Edgewise mandrel Ø 9 x width		no cracks	IEC60851-6 test 9
Thermal endurance	TI	180	NEMA MW 1000

Appearance

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

The product properties set forth in this data sheet are based on the results of testing of typical material produced by the company Torns Fil De Bobinage SAS. Some variation in product properties is typical. Comments or suggestions relating to any subject other than product properties are offered only to call the end-user's or other person's attention to considerations which may be relevant in the independent determination of the use and/or manner of use of product. Torns Fil De Bobinage SAS does not claim or warrant that the use of its product will have the results described in this data sheet or that the information provided is complete, accurate or useful. The user should test the product to determine its properties and its suitability for the intended use. Torns Fil De Bobinage SAS expressly disclaims any liability for any damage, harm, injury, cost or expense to any person resulting directly or indirectly from that person's reliance on any information contained in this data sheet. Nothing contained in this data sheet constitutes representation or warranty as to any matter whatsoever. Torns Fil De Bobinage SAS makes no warranties whatsoever in this data sheet, expressed or implied, including any implied warranty or fitness for a particular use or purpose. Torns Fil De Bobinage SAS shall in no event be liable for incidental, exemplary, punitive or consequential damages.