



PVC Insulated Winding Wire for Submersible Motor-Pumps

Introduction

“Emgee” a unit of Mangal Chand Group produces high performance copper Winding Wires, Rubber/PVC/PE insulated wire and cables.

Emgee Cables is also India’s leading manufacturer of Submersible Winding Wires & Cables and enjoys an enviable reputation as a quality manufacturer.

The company has most modern computerized fully automatic lines supported by an excellent forward & backward integrations including Wire Drawing with online annealing, High Speed Bunchers, Automatic packing machines and very sophisticated online & offline testing systems.

Emgee Cables & Communication limited is a public company, with shares listed on stock exchange. The company is ISO certified and has all the relevant quality certifications.

Company’s Submersible Winding Wires / Cables are approved by major pump manufacturers viz Caprari, Ustunel, Impo, KSB, Texmo, Duke, Pluga etc.

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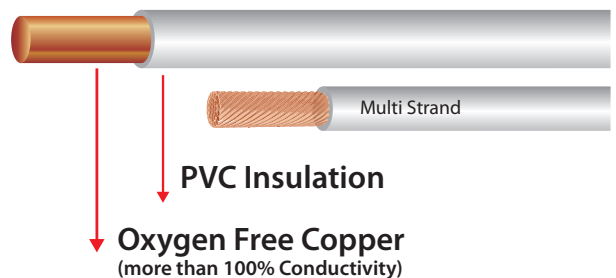
Disclaimer

All information given here is in good faith. Emgee shall not be liable for any damage arising out of incorrect use or interpretation. The company reserves the right to change any of the above specifications without any prior notice.

Winding Wire for Submersible Motor-Pumps

Characteristics

Designation •	• PVC Insulated Winding Wire
Construction Characteristics	
Insulation Colour •	• White PVC
Conductor Material •	• Annealed Bare copper E.C. Grade Single / Stranded wire as per IS:8783 (Part I) 1995
Dimensional Characteristics	
Dimensional Standards •	• See table
Electrical Characteristics	
Rated Voltage U_0/U (U_m) •	• 450/750 V
Test voltage •	• 3.0 KV for one minute (after 48 hrs of water immersion @ 20°C)
Short Circuit Temp. •	• 150°C
Insulation Resistance ($M\Omega$ -km) •	• 600
Mechanical Characteristics	
Wire flexibility •	• Flexible
Tensile Strength (P.S.I.) •	• 2000
Tensile strength change after ageing at 135°C after 7 days •	• Less than 15%
Elongation •	• More than 150%
Elongation after ageing at 135°C after 7 days •	• Less than 15%
Wall thickness decrease by Heat Deformation at 95°C after 6 hrs •	• Less than 20%
Usage Characteristics	
Chemical resistance •	• Accidental
Oil resistance •	• Yes
Operating temperature, range •	• (-) 25 (+) 85°C
Weather resistance •	• Very good
Min. ambient temp. •	• -40°C ~ -15°C
Max operation temp. •	• +85°C in Fixed Protected installation.
Dielectric strength (V/mm) •	• 250 @ 20°C and 240 @ 80°C
Water Absorption •	• 0.70



Certification •	
Norms •	• IS:8783 (Part IV/ Section I), DIN 53483, VDE 0472

Description: PVC Insulated submersible winding wire with annealed bare copper.

Features: The Winding Wires of 'Wet Type Motors' are continually in contact with liquids that are more or less aggressive. For this reason the extruded insulation of the Winding Wires has to be absolutely water tight and resistant to a number of different substances. The dielectric properties of the insulation (dielectric strength, insulation resistance, dielectric losses), have to meet the high standards that, of course, have to be fulfilled under the influence of moisture for long periods of time.

Due to our long standing experience and tests, EMGEE has developed its own suitable PVC compound for this special application. Our insulating materials have excellent properties to assure long-life. Here are some of the main characteristics:

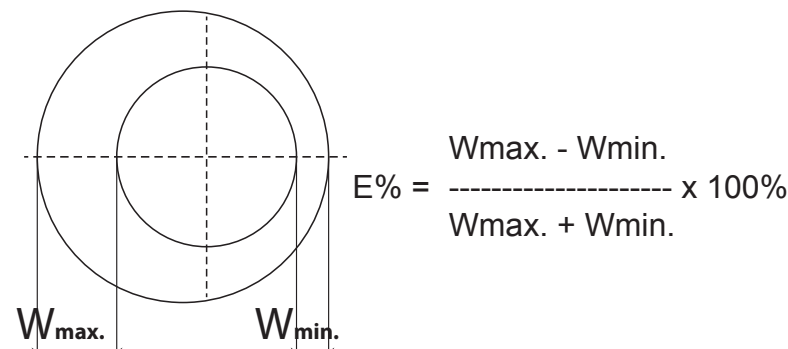
- High dielectric strength
- High insulation resistance
- Low dielectric losses
- Good thermal and chemical resistance.

Tests

The following tests are carried out on 100% of every production lot:

1. Mechanical tests :

- a) Dimension of the bare copper conductor
- b) Dimension of the insulated wire
- c) Surface
- d) Eccentricity



Tolerances

Outer diameter of the insulated wire	<2.20 mm	2.21 - 3.00 mm	3.01-4.30mm	4.31-6.00mm
Tolerances on outer diameter of the insulated wire	(-) 0.05mm	(-) 0.097 mm	(-) 0.10 mm	(-) 0.15mm
Eccentricity	≤ 10%	≤ 12%	≤15%	≤ 15%

Mechanical characteristics

Tensile strength on delivery		σ B	≥ 20N/mm ²
Tensile strength after ageing	28 d/80°C	σ B	≤ + 10%
Elongation at break on delivery		ε B	≥ 150%
Elongation at break after ageing (VDE 0472/602)	28 d/80°C	ε B	≥ + 15%
Hot deformation (reduction of wall thickness) (VDE 0472/609)		80°C / 4h	≤ 40%
		95°C / 6h	≤ 25%

2. Test voltage and duration of test:

Electrical Characteristics

Working voltage		50 Hz	380 V	600 V
Test voltage after 24 h in water at 20°C		15 min.	5000 V DC*	5000 V DC*
Operating temperature			70°C	70°C
Loss factor	(acc. to DIN 53483)	20°C/800 Hz	6x10 ⁻²	6x10 ⁻²
		70°C/800 Hz	7x10 ⁻²	7x10 ⁻²
Relative dielectric constant	(acc. to DIN 53483)	20°C/800 Hz	4	4
		70°C/800 Hz	7.5	7.5
Volume resistivity	(acc. to VDE 0472, Teil 502)	20°C/500 V DC	1015Ωxcm	1015Ωxcm
		85°C/500 V DC	3x10 ¹² Ω x cm	3x10 ¹² Ω x cm
Breakdown voltage measured on wire	1.6/2.4 mm-Ø	20°C	≥ 55 kV/mm	≥ 55 kV/mm
		70°C	≥ 45 kV/mm	≥ 45 kV/mm

*Test voltage 2000 V DC for wire with wall thickness under 0.4mm

Technical Specifications:

Copper Dia ±1% (mm)	Cond. Resistance @20°C Ohm/Km (Nom.)	Average Conductor Elongation % (±2%)	Insulation Thickness Min. (mm)	Overall Dia Max. (mm)	Weight per Km. (Kg.)	Standard Length
0.90	27.10	35.00	0.30	1.50	7.55	1000
1.00	21.96	36.00	0.30	1.60	8.88	1000
1.10	18.15	37.00	0.30	1.70	10.55	1000
1.20	15.26	38.00	0.30	1.80	12.35	1000
1.30	12.96	38.00	0.30	1.90	14.25	1000
1.40	11.20	38.00	0.35	2.10	16.82	1000
1.50	9.74	40.00	0.35	2.20	18.95	750
1.60	8.58	40.00	0.35	2.30	21.22	750
1.70	7.60	40.00	0.35	2.40	23.70	750
1.80	6.79	40.00	0.35	2.50	26.38	750
1.90	6.07	40.00	0.35	2.60	29.17	500
2.00	5.49	40.00	0.45	2.90	33.18	500
2.10	4.98	42.00	0.45	3.00	36.37	500
2.20	4.54	42.00	0.45	3.10	39.58	350
2.30	4.15	42.00	0.45	3.20	42.83	350
2.40	3.81	42.00	0.50	3.40	47.22	350
2.50	3.51	42.00	0.50	3.50	50.75	350
2.60	3.25	43.00	0.50	3.60	54.78	350
2.70	3.01	43.00	0.50	3.70	58.78	350
2.80	2.80	43.00	0.55	3.90	63.12	350
2.90	2.61	43.00	0.55	4.00	67.80	350
3.00	2.44	43.00	0.55	4.10	72.40	350

- Note:
1. Specific length can be supplied as per customer requirement.
 2. Over all diameter can also be increased as per customer requirement.
 3. Tolerance of outer diameter is (-) 0.05mm.
 4. Eccentricity : ≤ 10%.