

PROFILE

Wicab Engineering Pvt Ltd, an **ISO 9001:2015 accredited** and **CE** safety compliance company, was established in National Capital Region (NCR) of New Delhi India, in year 2005 having specializations in "design, Development, Manufacturing and servicing" of the "Special Electrical and Electronic and Telecommunication Wires and Cables".

Wicab Engineering Pvt Ltd under brand name of 'Wicab', manufactures a vast range of products for varied industrial application covering wide range of parameters and characteristics; **thermal range from -50 °C to +400 °C; operating voltage range from pV 10⁻¹² V up to 90 kV** Power / operating or signal; Mechanically breakage load up to 40 kg/mm²; with chemical inertness either absolutely non-affected by any kind of known chemical or to limited inertness to desired chemicals; as well as UV protected / corona resistant, if so required.

The Technology Company –

It continuously envisages for the products for futuristic industrial applications and requirements. Wicab uses its know-how about various insulating material and their characteristics and multiple / composite insulation process techniques and keep updated the future trends and research about compounds range in Fluoropolymers, Fluorocarbons, Polymers/ Plastics etc.

Conductor –

Wicab manufactures / uses different types of conductor i.e. Copper, Aluminum, Nickel, Tin Plated Copper, Silver Plated Copper, Nickel Plated Copper, Silver Plated Nickel, Copper Clad Aluminum, NiCr, Alloys, Kanthal wire etc. The conductor sizes are solid wire as small as 46 AWG (0.061 mm diameter) and up to 4.0 mm whereas bunched / stranded conductor up to 300 sq mm, Single core or multi cores.

Insulating and Jacketing material –

Wicab uses Thermoset materials, Thermoplastic materials and Polymers & Rubbers and Fluoropolymers materials & Thermoplastic Elastomers materials for Insulation and jacketing. Polypropylene, Polyethylene, PVC, VPE, HDPE / MDPE / LDPE, PTFE / FEP / ETFE, FHF, Kapton, Polyetheretherketone (PEEK), Estane, XLPE, Polyamide, Nylon, Silicon Rubber, Nitrile Butadiene Rubber; Butadiene Acrylonitrile Rubber, Liquid enamel polyester, Polyamide-imides, Polyamide, Polyurethane, high temperature insulation up to 400°C and Composition of multi-insulation.

Insulation processing technique –

Wicab has in-house facilities for

- Fluid / Liquid Insulation Process
- Granules Extrusion Insulation process
- Tape wrapping and Sintering Insulation process
- Combination of above for Composite / Multi Insulation process

Braiding and Armoring and Jacketing –

Wicab has facility for various types of Braiding and Armoring i.e. Thread, wire, foil, sheet / strip; SPC, fiberglass, nylon, copper, SS (306/316), GI, Aluminum; outer jacketing and Flexible armoring on Flat as well as on Round cables;

Wicab has the **manufacturing facility** with highly specialized plant & machinery. The products are **RoHS & REACH** compliant and use only Lead Free (LF) insulating material. Besides, an **ISO 9001: 2015 accredited Company**, Wicab products are manufactured as per either **IS / BIS standard or UL / CSA / IEC** standards. Wicab has **CE** safety compliance for all its products.

Design & Development –

Wicab has well-equipped Technology Development Centre (**TDC**) with Testing equipments & Measuring Instruments. Company has world-class capability for design of wires & cables for wide range of application and varied Industrial requirements and has developed **several unique products** in its facility. Wicab has achieved high reduction in insulation thickness over conductor with the **conductor to insulation ratio of 2:1** (which normally is 1:1). Wicab has developed and manufactures high current density (High Amperage) wires up to 40 amps per sq mm of conductor.

Wicab has unique capability to design and develop the wire / cable to address the industrial requirement or problem for specific applications considering technical specifications, environmental parameters / weather conditions, Electrical and Electronic parameters and specifications, Mechanical ruggedness / Abuses / Abrasions / Mechanical Load & Pressure / Bending Radius & Flexibility etc / Thermal conditions over large temperature range / Chemical inertness / UV or IR or Corona / physical dimension constraints.

Product Testing:

- **Type Test:** Wicab Manufactured products are 100 % tested for Type test for satisfactory performance characteristics for the intended application.
- **Routine Tests** are made on 100% products for the integrity of the manufactured products.
- **Acceptance Tests** are carried out on sample taken from a LOT for the acceptance of the LOT.
- **Destructive Tests** are carried out on some samples for the extreme conditions.

Standards and Certifications:

- All products are **CE** safety compliance and thus **CE** marked.
- WICAB is a **ISO 9001 – 2015** Company and all the processes are strictly followed accordingly.
- The insulation, Jacketing and Sheathing Compounds are **RoHS & REACH** compliant
- Products are manufactured as per the international and/or Geography specific standards as per the product or Industry application requirement i.e. **IS / BIS or IEC or UL / CSA**.

Customer reach / Customer Base:

- Wide range of customers across Global Geography (USA, Mexico, Chile, Peru, Germany, UK, Turkey, Algeria, Australia, Indonesia, Singapore, UAE, Egypt, Nepal, Bhutan etc.)
- Customers spread through varied Industrial Application (Telecom, Oil & Gas, Water, Automotive, Infrastructure etc.)
- Wide range of products for customized applications for industry specific.

Quality Assurance and Quality Policy

WICAB is committed to contribute and helping its customers achieve success by providing the best manufacturing and engineering expertise to supply products and services that meet customer's requirement – ON TIME!

WICAB strive to continually improve the effectiveness of our Business Management Systems in order to fulfill our quality objectives and assist our customers in meeting theirs.

Process Assurance

Wicab Engineering P Ltd, an ISO 9001: 2015 company for design, development, manufacturing and servicing of Special Electrical and Electronic & Telecommunication wires & cables. **ISO 9001 : 2015** is one of the key elements that demonstrate Wicab's commitments to quality in terms of both product and service offerings.

The Route to continual success for Wicab Engineering lies through:

- ↗ Providing products that constantly meet customers' requirements
- ↗ Adhering to delivery schedules / times
- ↗ Cost effective and competitive products in market place.
- ↗ Continual Improvement in product design & development
- ↗ Implementation of technology in manufacturing process

Practice of Wicab Engineering to -

- ↗ Maintain and implement an effective management system
- ↗ Continually improve the effectiveness of the management system
- ↗ Establish and monitor measurable objectives
- ↗ Commitment to comply with applicable statutory and regulatory requirements
- ↗ Ensure that staff are competent to carry out assigned work

The Wicab Products -

- ↗ Designed and Manufactured as per the customer required specifications
- ↗ All products meet safety standards and are **CE** marked
- ↗ **100% Tested and Inspected for technical parameters as per Standards**
- ↗ Routine Breakdown Tests on samples
- ↗ Consistency in product manufacturing and process

Wicab Staff Must -

- ↗ Understand importance of tasks in meeting objectives and customer requirements
- ↗ Be aware of the specification of the product that is a result of their task
- ↗ Achieve the required product specification
- ↗ Contribute to the development and improvement of work processes and the ISO 9001:2015 management system
- ↗ Go through the regular training programs quality and process as well as product specifications.

The Quality Policy and associated quality objectives are established & reviewed, and are communicated and understood by all levels of our organization - for its continuing suitability and effectiveness in achieving the aims of this Quality policy.

PRODUCTS RANGE –

Water Industry / Sewage / Submersible / Open well / Mining & Colliery / Oil Industry:

Wires specifications:

- ✓ Wires for range from 0.25 HP capacity and up to 2000 HP capacity
- ✓ Wires for temp range from - 100°C up to 400°C
- ✓ Wires for operating voltage up to 15 KV and BDV up to 30 KV
- ✓ Submersible motor winding wires for 3 / 4 / 5 / 6 / 7 / 8 / 10 / 12 / 14 / 16 / 20"
- ✓ Copper conductor: Solid from 0.20 mm up to 4.0 mm diameter
: Multi strand from 2.5 sq mm up to 50 sq mm

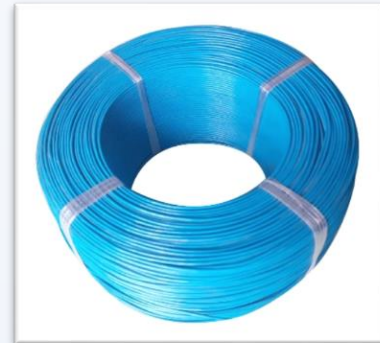


Submersible motor winding wires (Copper conductor)

- ✓ Hybrid PVC insulated (85°C)
- ✓ PE2/PA (up to 105°C)

Submersible Motor Winding wires - High Temp for Water and Oil Industry

- ✓ Polymers insulated PBN/ DIP (up to 140°C)
- ✓ High Temp/ Thermal – EPB, REC, KFP (up to 180°C)
- ✓ Chemical Inert for oil industry TFW (up to 400°C)



High Operating Voltage (24 * 7) Motor winding wires

- ✓ 3.3 KV or 5 KV or 6 KV
- ✓ 10 KV or 15 KV or 20 KV

High Power Motor winding wires – up to 2000 HP motors

- ✓ MSP / High Temperature / High Voltage / High Amperage
- ✓ Solid up to 4.0 mm / Multi Strand motor winding wire up to 50 sq mm

Power Cables for Water and Oil Industry

- ✓ Flat / Round Power cable – 3 cores/ 4 cores up to 70 sq mm
- ✓ High temp / High voltage / Chemical inert power cables (Flat / Round)
- ✓ Rubber insulated power cables

Motor Winding wires (Magnetic-Enamel) – Single / Dual Coating :

- ✓ Temperature Index – 170 °C
- ✓ Temperature Index – 190 °C
- ✓ Temperature Index – 240 °C



Telecommunication and IT Industry:

↪ Data Transmission Cables / Category Cables:

- ✓ CAT5e / CAT6 / CAT6A (U/UTP, F/UTP, S/FTP, SF/UTP etc)
- ✓ CAT7 / CAT7A (U/UTP, F/UTP, S/FTP, SF/UTP), CAT 8.1 & CAT 8.2
- ✓ Frequency Bandwidth (100 MHz upto 1500 MHz),
- ✓ Speed / Application 1 GBase-T; 10 GBase-T, 40 GBase-T)
- ✓ Armored, Weather proof, Dual pair (8), Multi Unit (up to 25 units)
- ✓ Data Center cables (CM, CMR, CMP, CMX etc)

↪ Drop wire 2 core / 3 core / 4 core / 6 core;

↪ Jumper wires; 2 cores / 3 cores

↪ Aerial / switch board Cable – up to 100 pairs; self-supporting and Armored;

↪ PIJF copper cables - Armored and un-armored); Aerial (self-supporting); Indoor; Submarine;
Under Ground (UG) (Direct Burial / Inside Duct) up to 100 pairs;

↪ Coaxial cables - RG 6, RG 11 etc

↪ Telecommunication Signal and control cables, Quad Cables;

↪ Power cable and Earthing cables

↪ Snow Melting / De-icing / De frosting & Heating Solution Industry:

- ✓ Floor Heating cables; Under Tiles Heater, In-Concrete Heaters
- ✓ Heating Pads: Heating Mats & Pads for Kennels, Pets back and Quilt etc.
- ✓ Roof and Gutter De-Icing cables; Swimming pool heating cables
- ✓ Towel Rail, Mirror Demist, Door mats, Foot Warmer, Shoe mats cables
- ✓ Frost Safe/ Water Pipe Tracing cables
- ✓ Industrial application heating solutions

↪ Automotive Industry:

- ✓ Body Wiring cable / harness,
- ✓ Engine wiring cables / harness,
- ✓ Chassis wiring cables / harness
- ✓ Active / Passive Sensor cables /harness, ABS, Crank Sensor etc.
- ✓ Fire Safe Cables (FSC) / high temp power cables
- ✓ Primary Wires TXL, GXL, STX
- ✓ Transmission Wire: Silicone & Non-Silicone Blocked
- ✓ Fuel Tank Wire
- ✓ Hybrid Electric Vehicle Cables
- ✓ Air Bag Wire
- ✓ Battery Cables
- ✓ Shielded and Blocked Wires
- ✓ Data bus / Cable

↻ **Renewable Energy Industry:**

- ✓ Solar power cables
- ✓ Wind mill power cables

↻ **OIL Drilling / Oil Extraction Industry : DOWN HOLE / DEEP WELL / ESP Cable**

- ✓ Flexible Flat Armored Power Cable -Non-Corrosive High Temperature (450 °C), High Pressure up to 30kg/mm²; High Abrasive Resistance, Chemical Inert
- ✓ Specially designed signal & control cable for Oil Exploration & oil Drilling Industrial Segment; High Temperature up to 450 °C, High Pressure up to 30kg/mm²; Non-corrosive and High Abrasive resistance; Chemical Inert;

↻ **FSC (Fire Safe Power Cables) –**

- ✓ Hospitals and Hotels, Real Estate, Commercial & Office complex, Shopping Malls, High Rise building, Chemical plants; Steel / Metal Plants, Oil & GAS Industry etc.

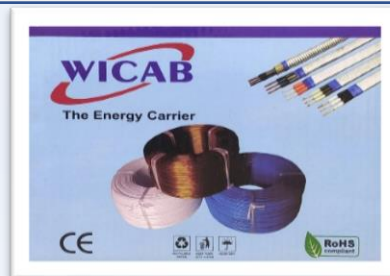
↻ **Elevators & Lifts;**

- ✓ Escalators Industry-Power cables, control and signal wires

↻ **Steel Plants / Cements / Thermal Power Plants-**

- ✓ General Industrial Power cables, High Amperage power cables; Fluoropolymers / Fluorocarbons insulated cables

↻ **Custom designed products for special application for varied / Different Industries**



TECHNICAL SPECIFICATIONS & PARAMETERS

PRODUCT : WICAB PBN-M Insulated Copper Winding Wire

Electrical Properties	1	High current density - 15 to 20 Amp per Sq mm
	2	Leakage current - very very low ; near to Zero Amp at 2000 V
	3	Very High conductance
	4	Insulation Resistance & Volume Resistivity at 100° C - >1.0 x 10¹⁶ ohm- cm
	5	Volume Resistivity ohm-CM at 35° C - >3.0 x 10¹⁷ ohm-cm
	6	Meggar > 4000 M ohm @ 1000 V DC; tends to Infinity
	7	High voltage: PBN wire will withstand of high voltage upto 10 KV
	8	Low Voltage: Motor will be secured and safe even for low voltage upto 60 V
	9	High Voltage Spikes/Transient: PBN will with stand upto 20 KV transient for 8-10 Cycles
	10	Break Down Voltage - >10.0 KV; Typical 10-12 KV
	11	Dielectric Breakdown Strength - >50 KV/mm
	12	On /Off Test - every 15 sec - for 600 times- excellent
	13	Operating Range - Frequency -50 to 60 Hz, Voltage - 600 -1000 V
Thermal Properties	1	Excellent heat transfer from copper conductor to insulation to outer medium (Air/Water/Oil)
	2	Temperature Gradient - > 50° C/mm
	3	Excellent Heat transfer coefficient
	4	Operating temperature from -20 Deg C up to +115 Deg C
	5	Short duration Temperature standing up to +135 Deg C
	6	Copper to insulation surface contact Ratio up 95%
	7	Uniform heat transfer on entire wire length
	8	No hot spots on entire length of wire
	9	Wire insulation thermal failure are near to Zero
	10	Water Absorption during life time - Absolute Zero mg / CC
	11	Heat Dissipation - High Gel point and High Melting point

Mechanical & Chemical Properties	1	Very High Surface Abrasion Resistance
	2	Contraction /Compression at bending Point: Excellent
	3	Bending Radius - Good; < 8.0 x OD
	4	High Tensile Strength
	5	Length per Kg of insulated wire is higher
	6	Weight per meter of insulated wire is Lower
	7	Chemically inert to most of the soil chemicals
	8	Life of Wire against environmental conditions is much higher
	9	Flexibility and Springness and softness of wire much superior
	10	Conductor to insulation ratio is 67%
	11	Insulation Elongation much higher
	12	Coefficient of Friction Kinetic -Excellent; 0.40
Physical dimension and Unique Points	1	Warranty - 5 years
	2	Shelf Life > 10 Years
	3	Lower Thickness of Insulation
	4	Ease of Winding in Motor
	5	Lower Time of motor winding (almost 70%)
	6	For motors 3", 4", 5", 6", 7", 8", 10", 12", 14", 16", 20" & 24 "
	7	From 0.25 HP motors up to 2500 HP motors wire available
	8	Insulation material - Floropolymers and Thermoplastics
	9	Insulation Material is RoHS and REACH Compliance
	10	Copper Purity - 99.99 %
	11	Excellent Resistant to Weather, Water, Oil, Solvents, Saline
	12	Full lot 100% tested for Electrical and Mechanical Parameters
	13	Destructive Test on Samples for BDV and Transients
	14	Endurance Tests on sample Lots for 7 Days for Mechanical & Electrical Tests
	15	Samples test for 6 Months and 12 months for Various Chemical & Soil
	16	Multi Stranded (MSP) from 4.0 sq mm up to 50 sq mm wire
	17	Solid wire from 0.20 mm Conductor Diameter up to 3.50 mm CD
	18	Wicab Products Confers to CE Compliance
	19	Wicab Company adheres to ISO 9001:2015 Standards

TECHNICAL DATA SHEET

PRODUCT: WICAB PBN-M Submersible Motor Winding Wire

Sizes - Solid 0.10 mm to 3.50 mm

Multi stranded 2.50 sq.mm up to 50 sq.mm

Conductor

- Conductor material: Solid Round Annealed Bare Copper Conductor,
- Conductor Sizes: From 0.10 mm to 3.50 mm.
- Conductor Multi strand – 2.5 sq.mm up to 50 sq.mm
- Elongation – Varies for Sizes and minimum 35% for size 1.0mm –2.50 mm
- Tensile Strength – Min 225 N/Sq.mm.
- Resistivity of Copper Conductor at 20° C –0.01758 Ohm-mm² / Meter
- Copper purity – > 99.97%

Insulation

- Insulating Material – Composite Polymers, Fluoropolymers, Mylar,
- Insulation Thickness- Overall RTI 100 Micron to 650 Micron
- Insulation Composition –Different Insulating Material,
- Insulation Process &Technique- Liquid insulation, Coating & Emulsified, TWS.
- Conductor to Insulation surface contact area: 100%
- Conductor to Insulation Ratio- > 50%; UPTO 67%.

Electrical Parameters

- Dielectric strength-7500 to 8500 V/mil
- Operating Range - 50 to 60 Hz, 600 – 1000 V
- Dielectric Breakdown Strength - >50 KV/mm
- Break Down Voltage - >7.5 KV; Typical 8-10 KV
- Leakage current at 2.0 KV for 1000 Meter Length-200mA to500 mA
- Volume Resistivity ohm-CM at 35° C - >3.0 x 10¹⁷ Ohm-cm
- Volume Resistivity ohm-CM at 100° C - >1.0 x 10¹⁶ Ohm- cm
- Insulation Resistance M-Ohm- > 2000 M-Ohm at 1000VDC
- Spark Voltage Test – 5.0 KV For One Sec
- Spikes / Transient Voltage Energy Level- >20 KV for 3-5Cycles
- High Voltage Test-Withstand Voltage Min 10 KV for more than Five minutes
- Conductor current density - >15 amp per sq.mm

Thermal Properties and Parameters

- Working (Operating) Temperature: -20° C to +120° C
- Coefficient of Thermal Expansion (100°C to 200°C): $3.2 \times 10^{-5} \text{cm/cm/}^\circ\text{C}$
- Temperature Gradient - > 50° C/mm
- Heat Dissipation - High Gel Point; High Melting Point
- Loss Factor (Dissipation Factor): High; 0.05 @20 ° C to 0.22@120° C
- Flammability: 94 V-0 (UL94)
- Shrinkage (150±2°c for 15 minutes) - < 1%
- Moisture absorption 50% RH at 25° C - 0 %
- Immersion for 72 Hours at 25° C - 0 %
- Water absorption During Life Cycle: "ZERO" mg /CC
- Heat Shock at 150 ±2°C for one Hour: Visual Inspection (No Scales or Cracks)
- Hot Deformation (@ 115°C for 6 Hours): Depth of Indentation, Max (%): '0'
- Thermal /Heat Conductivity (Surface Area) at 20°C: 0.25 to 0.35W/m* °K.
- Hot Spots / High Temp. Rise Tolerance: Excellent (Uniform Heat Transfer)
- Excellent Heat Transfer (Conductor to Insulation material and Insulation material to outer medium i.e. Air or water or oil)

Metallurgical / Mechanical & Chemical Environment Parameters

- Shelf Life : > 5 Years
- Resistant to: i) Weather, Water, Oil, Solvents, Saline -Excellent
ii) Chemical, Corona, Ozone - Good
iii) Flame, Abrasion - poor
iv) Acids, aromatic Compounds - Poor
- Density -1.30 gms/cc
- Tensile Strength >85 N/sq.mm
- Abrasion resistance / Outer surface Mechanical strength - excellent
- Elongation > 125%
- Contraction /Compression at bending Point: Excellent
- Tensile Modulus : psi -370,000; Gpa -2.2
- Coefficient of Friction Kinetic - Excellent; 0.40
- Bending Radius - Good; < 8.0 x OD

Physical Dimension

- Conductor Solid Diameter (Solid): From 0.10 up to 4.0 mm
- Conductor Multistrand (MSP) - from 2.5 sq.mm up to 50 sq.mm

Summary of Winding Wire Special Test Results

Product: WICAB INSULATED COPPER WINDING WIRE FOR SUBMERSIBLE MOTOR

Size: 1.3 mm

Sr. No.	Standard/ Clause No.	Tests	Requirement as per Specification	Obtained Value	Remarks	Tested by	Report #	Date	Merits/ Demerits
1	IS 3.2 (1)	Conductor Diameter	1.3 ± 0.02	1.3	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	Conductor quality give better electric flow and transfer of heat
	IS 3.2 (2)	Annealing test (Elongation at break)	Min. 28.5 %	33.60%	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	
	IS 3.2 (3)	Conductor Resistance Corrected at 20 °C, Ohm/km	Max. 13.2	12.7	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	
2	(IS) 4.1	Thickness of insulation	Min. 0.20	0.2	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	For better mechanical/ electrical insulation property and heat transfer
	(IS) 4.2	Application of insulation	The insulation shall be so applied that it fits closely on the conductor and it shall be possible to remove it without damage to the conductor	Found satisfactory	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	
	(IS) 4.4	Overall diameter	Max. 1.80	1.74	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	
3	(IS) 3.3	Physical test for insulation							For better mechanical/ electrical insulation property and heat transfer

	(IS) 3.3 (1)	Insulation resistance Volume resistivity Ohm-cm at 27 ± 2 °C At 90 ± 2 °C	Min 1 x 10 ¹⁶ Min 1 x 10 ¹³	6 x 10 ¹⁶ 3 x 10 ¹⁵	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	
	(IS) 3.3 (5)	Shrinkage test % (At 150 ± 2 °C for 15 min.)	Max. 4	<1	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	
	(IS) 3.3 (6)	Water absorption test Gravimetric at 70 ± 2 °C for 24 hrs. water absorb mg/cm ²	Max. 2	Nil	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	
	(IS) 3.3 (9)	Heat shock test At 150 ± 2 °C for 1 hr. Visual examination	No sign of crack or scale shall be observed	No sign of crack or scale was observed	Conforms	ERDA	ICAB/12/4578-2	29-09-2012	
4	CEI EN 60034-1, 8.1_Tab14(5a)	Withstand Voltage Test 440V Max X 10 = 4400V (High Voltage Test)	To withstand 4.4 kV (rms) for 1 minutes after 12 hours of water immersion at room temperature	Withstood	Conforms	ERDA	ICAB/12/4578-3	29-09-2012	Superiority of wire according to International Standards, High Quality Insulation Properties
	CEI EN 60335-2-41, 13	Leakage current and electric strength at operating temp. (95±2°C) - Leakage current - Volume resistivity Ohm-cm	< 30 mA at 440V Min 1 x 10 ¹³	18 mA 2 x 10 ¹⁵	Conforms	ERDA	ICAB/12/4578-3	29-09-2012	
	CEI EN 60335-2-41, 16	Leakage current and electric strength at room temperature - Leakage current - Volume resistivity Ohm-cm	< 30 mA at 440V Min 1 x 10 ¹⁶	15 mA 6 x 10 ¹⁶	Conforms	ERDA	ICAB/12/4578-4	29-09-2012	

5	Special Test	Heat wire to 180 ± 2°C by electric supply to conductor and observe for damages				ERDA	ICAB/12/4578-4	29-09-2012	This test is carried out to prove functional ability of the winding wire to perform at 180 °C
	CEI EN 60034-1, 8.1_Tab14(5a)	Withstand Voltage Test 440V Max X 10 = 4400V	To withstand 4.4 kV (rms) for 1 minutes after 12 hours of water immersion at room temperature	Withstood	Conforms	ERDA	ICAB/12/4578-4	29-09-2012	
	CEI EN 60335-2-41, 16	Leakage current at room temperature	< 30 mA at 440V	16 mA	Conforms	ERDA	ICAB/12/4578-4	29-09-2012	
	CEI EN 60335-2-41, 16	Volume resistivity Ohm-cm at room temperature	Min 1 x 10 ¹⁶	6 x 10 ¹⁶	Conforms	ERDA	ICAB/12/4578-4	29-09-2012	
6	Motor Voltage Spike Test	Withstand Voltage Test 440V Max X 10 = 4400V	To withstand 4.4 kV (rms), 20 Spikes per 1 minutes for 100 spikes after 12 hours of water immersion at room temperature	Withstood	Conforms	Aquafill		17-01-2013	Capability to withstand voltage spikes at field
7	Motor Stall Test	Withstand motor under locked condition	Withstand heat generation under locked condition for 20 minutes	Withstood	Conforms	Aquafill		20-01-2013	Capability of winding wire to withstand heat generated under stall condition
8	Dry run test	Run up of motor with pump under dry condition	Withstand heat generation under Dry condition for 5 minutes	Withstood, Motor was ober heated, steam escaped like pressure cooker	Conforms	Aquafill		21-01-2013	Heat descipation criteria of the winding wire and withstand heat
			Modification done in above test and fill special coolant added to water and test again for 30 min	Withstood	Conforms	Aquafill		21-01-2013	

9	Overload run test	Run up of motor with 200% overload pump	Withstand for 30 minutes	Withstood	Conforms	Aquafill		25-01-2013	Heat despication criteria of the winding wire and withstand heat
10	Forward-reverse test	Run-up of pump set forward-reverse	300 times forward-reverse test of pump set at interval of 15 seconds	Withstood	Conforms	Aquafill		27-01-2013	Withstand mechanical loads on wire
11	Short circuit test	Short circuit between phase	Withstand short circuit over current criteria before fuse failure	Withstood, wire found ok after test	Conforms	Aquafill		15-02-2013	Control panel burnt while performing the test and fuses blown off. Motor was OK

