SUBMERSIBLE WINDING WIRE

FRHC, OFC & ETP Copper / Class F & Class H

About Our Submersible Winding Wire

Universal Metals (Pvt.) Ltd manufactures submersible winding wires engineered for Electric Water Submersible Motors (EWSM) and Electric Oil Submersible Pumps (EOSP). Our wires deliver Class F (155 °C) and Class H (180 °C) thermal performance for continuous operation in deep well and submerged environments.

The insulation system uses high-performance polyurethane-based resin from Altana Chemie (Germany), providing IPX8-rated waterproof performance under continuous submersion. All conductors are drawn from our own FRHC, OFC, and ETP copper rods, each achieving a minimum conductivity of 101% IACS, ensuring complete traceability from rod to finished wire.

Applications

Our submersible winding wires are designed for demanding submerged and sealed motor environments:

- Electric Water Submersible Motors (EWSM)
- Electric Oil Submersible Pumps (EOSP)
- Deep well pump motors
- Agricultural borehole pumps

- Industrial submersible pump motors
- Mine dewatering motors
- Municipal water supply pumps
- Geothermal well pumps

Low Voltage Winding Wire (EWSM)

For Electric Water Submersible Motors. Reference: IEC 60317, IEC 60851.

Parameter	Specification
Conductor	FRHC, OFC, or ETP copper; solid or stranded; bare or tin-plated
Size Range	SWG 7 – 25 / 0.5 – 4.5 mm diameter
Thermal Class	Class F (155 °C continuous operation)
Voltage Rating	450/750V AC per IEC 60851-5
Insulation	Modified polyurethane with self-bonding overcoat (where applicable)
Film Build	Uniform Grade 1/2 coating per IEC 60317
Chemical Resistance	Mineral oils, transformer oils, refrigerants, acids (pH 3 – 11), alkalis, moisture, fungal growth
Operating Environment	Water pH 6.5 – 8.5; pressure rating 10 kgf/cm^2

High Voltage Winding Wire (EOSP)

For Electric Oil Submersible Pumps. Reference: IEC 60317, IEC 60851.

Parameter	Specification
Insulation	Polyimide film composite insulation
Voltage Rating	3.6/6 kV AC per IEC 60851-5
Thermal Class	Class H (180 °C continuous operation)
Dielectric Strength	≥8 kV breakdown voltage
Application	Oil submersible pump motors, deep well applications requiring superior corona resistance and thermal endurance

A Cross Linked 90 °C variant is also available for applications requiring enhanced thermal stability in oil field and industrial installations.

Reference Standard: IEC 60317-0-1. Values at 20 °C.

DC Resistance Values

Conductor Dia. (mm)	DC Resistance Min (Ω/m)	DC Resistance Max (Ω/m)
1.00	0.02116	0.02240
1.12	0.01687	0.01785
1.18	0.01519	0.01609
1.25	0.01353	0.01435
1.40	0.01079	0.01143
1.50	0.009402	0.009955
1.60	0.008237	0.008749
1.70	0.007320	0.007750
1.80	0.006529	0.006913
1.90	0.005860	0.006204
2.00	0.005289	0.005600
2.12	0.004708	0.004983
2.24	0.004218	0.004462
2.36	0.003797	0.004023
2.40	0.003564	0.003810
2.50	0.003385	0.003584
2.60	0.003130	0.003314
2.70	0.002902	0.003073
2.80	0.002699	0.002857
2.90	0.002516	0.002663
3.00	0.002351	0.002489
3.10	0.002201	0.002331
3.20	0.002066	0.002188
3.30	0.001943	0.002057
3.40	0.001830	0.001938
3.55	0.001679	0.001777
3.60	0.001632	0.001728
3.80	0.001465	0.001551

Values shown are for OFC / FRHC conductor ($\geq$101% IACS). ETP conductor values are comparable, as all three grades achieve the same minimum conductivity of 101% IACS.

Packaging & Supply

Wire is supplied as continuous wound lengths on rigid plastic spools conforming to GB/T 4004, JIS C3002, and DIN 46397.

Metric	Value	Tolerance
Spool Weight	200 kg	±2%
Spool Type	Rigid plastic spool	–

Storage & Handling

- Store in a cool, dry environment (15 – 30 °C, <65% RH)
- Keep away from direct sunlight and heat sources
- Spools are compatible with automated winding systems
- Custom packaging and coil packing available on request
- Certificates of conformance provided with each shipment

Individual reel catch weights are maintained within ±2% tolerance for compatibility with automated winding systems. Each spool is labelled with product grade, conductor type, diameter, lot number, manufacture date, and net weight.