



COPPER ENAMELLED WIRE

Enamelled Round Winding Wires / IEC 60317 Series



About Universal Metals

Universal Metals (Pvt.) Ltd manufactures a comprehensive range of copper enamelled round winding wires conforming to the IEC 60317 series and NEMA MW standards. Our enamelled wire facility employs precision coating technology to deliver uniform insulation thickness, excellent thermal endurance, and consistent electrical properties across the full product range.

With thermal classes spanning from 105°C to 240°C, our copper enamelled wires are available in multiple enamel chemistries including polyvinyl acetal, polyester, polyurethane, polyesterimide, polyamide-imide, and polyimide. Size ranges cover 0.24 mm to 5.0 mm nominal conductor diameter, with insulation grades from IEC Grade 1 through Grade 3 and NEMA Single through Quad build.

Applications

Copper enamelled winding wires are used across a broad range of electrical and electromechanical applications:

- Electric Motors
- Power Transformers
- Distribution Transformers
- Generators & Alternators
- Relays & Solenoids
- Hermetic Compressors
- Ignition Coils
- Inductors & Chokes

Applicable Standards

- IEC 60317 series — Specifications for particular types of winding wires
- NEMA MW 1000 — Magnet wire standards
- IEC 60264 — Packaging of winding wires (spool dimensions)

Single-Coat Enamelled Wires — IEC 60317 Series

	IEC 60317-1 MW15C	IEC 60317-3 MW5C	IEC 60317-4 MW75C	IEC 60317-8 MW30C
Enamel Base Coat	Polyvinyl Acetal	Modified Polyester	Polyurethane	Polyesterimide
Enamel Top Coat	N/A	N/A	N/A	N/A
Thermal Class	105°C	155°C	130°C	180°C
Size Range (mm)	0.50 – 5.00	0.50 – 5.00	0.24 – 2.00	0.24 – 5.00
Insulation Thickness	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple
UL Designation	N/A	N/A	N/A	N/A
Characteristics	Good solderability and moisture resistance. Widely used in oil-filled transformers.	Good thermal stability and flexibility. Suitable for dry-type transformers.	Excellent solderability without stripping. Ideal for relay coils and small motors.	High thermal endurance with good chemical resistance. Standard motor winding wire.

Single-Coat & Dual-Coat Enamelled Wires — IEC 60317 Series

	IEC 60317-12	IEC 60317-13 MW35C/73C	NEMA MW37C	IEC 60317-20 MW79C
Enamel Base Coat	Polyvinyl Acetal	Polyesterimide	Polyesterimide	Polyurethane
Enamel Top Coat	N/A	Polyamide-imide	Polyamide-imide	N/A
Thermal Class	120°C	200°C	220°C	155°C
Size Range (mm)	0.50 – 5.00	0.24 – 5.00	Single 14–44 AWG Heavy 2–44 AWG Triple 14–44 AWG Quad 10–30 AWG	0.24 – 2.00
Insulation Thickness	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple	NEMA Single/ Heavy/Triple/ Quad	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple
UL Designation	N/A	Preci-7	Preci-12	Preci-9
Characteristics	Moderate thermal class with good winding properties. Used in oil-immersed transformers.	Hermetic grade. Excellent resistance to refrigerants and lubricants. For compressor motors.	High thermal class hermetic wire. Superior chemical resistance for demanding compressor applications.	Self-solderable polyurethane. Good for automated winding. Small motors and relays.

Dual-Coat Enamelled Wires — IEC 60317 Series

	IEC 60317-21 MW80C	IEC 60317-22 MW76C	IEC 60317-23 MW77C	IEC 60317-26 MW81C
Enamel Base Coat	Polyurethane	Polyester/ Polyesterimide	Polyesterimide	Polyamide-imide
Enamel Top Coat	Polyamide	Polyamide	N/A	N/A
Thermal Class	155°C	180°C	180°C	200°C
Size Range (mm)	0.24 – 1.60	0.24 – 5.00	0.24 – 1.60	0.24 – 5.00
Insulation Thickness	IEC Grade 1B/2B NEMA Type 1/ Type 2	IEC Grade 1B/2B NEMA Type 1/ Type 2	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple
UL Designation	Preci-10	Preci-2	N/A	N/A
Characteristics	Self-solderable with good adhesion. Polyamide topcoat improves abrasion resistance.	Versatile dual-coat wire with excellent mechanical and thermal properties. Wide application range.	Single-coat polyesterimide with high thermal endurance. Good for traction motors.	Premium single-coat wire. Outstanding thermal and chemical resistance for severe duty applications.

Self-Bonding Enamelled Wires — IEC 60317 Series

	IEC 60317-34	IEC 60317-35 MW135C	IEC 60317-36	IEC 60317-37
Enamel Base Coat	Polyester	Polyurethane	Polyesterimide	Polyesterimide
Enamel Top Coat	N/A	Polyamide	Polyamide	Polyamide
Thermal Class	130°C	130°C	180°C	180°C
Size Range (mm)	0.24 – 5.00	0.24 – 0.80	0.24 – 1.60	0.24 – 1.60
Insulation Thickness	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple	IEC Grade 1B/2B NEMA Type 1/ Type 2	IEC Grade 1B/2B NEMA Type 1/ Type 2	IEC Grade 1B/2B NEMA Type 1/ Type 2
UL Designation	N/A	N/A	N/A	N/A
Characteristics	Standard polyester wire. Good balance of cost and performance for general-purpose applications.	Self-solderable dual-coat. Good for fine wire applications in small transformers and coils.	High thermal class with polyamide topcoat. Good mechanical strength for demanding windings.	Similar to IEC 60317-36 with enhanced bonding properties. Suitable for form-wound coils.

Specialty Enamelled Wires — IEC 60317 Series

	IEC 60317-38 MW102C	IEC 60317-46 MW20C	IEC 60317-51 MW82C	IEC 60317-57 MW81C
Enamel Base Coat	Polyesterimide	Polyimide	Polyurethane	Polyamide-imide
Enamel Top Coat	Polyamide-imide + Self bonding	N/A	N/A	N/A
Thermal Class	180°C	240°C	180°C	220°C
Size Range (mm)	0.24 – 1.628	0.24 – 5.00	0.24 – 1.00	0.24 – 5.00
Insulation Thickness	IEC Grade 1B/2B NEMA Type 1/ Type 2	IEC Grade 1/2 NEMA Single/ Heavy	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple	IEC Grade 1/2/3 NEMA Single/ Heavy/Triple
UL Designation	N/A	N/A	N/A	N/A
Characteristics	Self-bonding dual-coat wire. Eliminates need for varnish impregnation in coil manufacturing.	Highest thermal class (240°C). Outstanding performance in extreme temperature environments.	Polyurethane single-coat wire for fine wire applications requiring good solderability.	High-performance polyamide-imide wire. Excellent for inverter-fed motors and high-frequency applications.

Customised solutions can also be offered. Please contact our technical team to discuss specific requirements for enamel chemistry, thermal class, or conductor size outside the standard ranges listed above.

Spool standards per IEC 60264 series

Cylindrical Barrelled Spools (IEC 60264-2-2)

Size Range (mm)	IEC 60264-2-2 Spools	Indian Equivalent
2.37 – 5.00	—	500W & 410W
0.30 – 2.36	355, 200, 250 & 200	500W, 410, 265 & 250
0.400 – 2.36	160	160 PT-4/PT-5
0.349 – 0.200	160 & 125 PT-4/5	110
0.190 – 0.100	125 & 100 PT-4/5	125 PT-4/PT-5
0.090 – 0.050	100 PT-4/5	63 & 125 PT-4/PT-5

Taper Barrelled Spools (IEC 60264-3-2)

Size Range (mm)	IEC 60264-3-2 Spools	As per JIS Spools
2.37 – 5.00	315/500, 500/630 & 630/800	—
0.500 – 2.36	160/315, 250/400, 315/500, 400/630 & 500/800	—
0.200 – 0.500	160/315, 250/400, 315/500, 400/630 & 500/800	—
0.200 – 5.00	PT4 & PT10	PT-10

Spool dimensions conform to IEC 60264-2-2 (cylindrical barrelled) and IEC 60264-3-2 (taper barrelled) standards. Detailed spool dimension drawings are available on request. Custom spool sizes and packaging can be accommodated for bulk orders.