



Rod | Wire | Cable | Insulation

Enamelled Wire & Paper Covered Strip



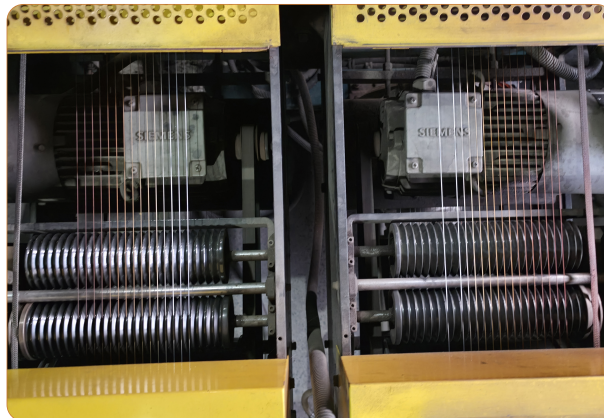


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About Universal Metals

Universal Metals (Pvt.) Ltd, founded in 1996, is a Pakistani manufacturer of copper and aluminium rods, winding wires, overhead conductors, low voltage cables, and insulating materials. Our winding conductor range covers two product families used in motor and transformer windings: enamelled round wire and paper covered rectangular strip. Both start from high-purity copper or aluminium rod that we cast and roll in our own facility, so every coil and drum can be traced back to the raw materials it came from.



Manufacturing Capability

Enamelled winding wire is round copper or aluminium wire drawn down to the customer's required diameter and then coated with several thin layers of enamel insulation. We run both horizontal and vertical enamelling lines, building the insulation up layer by layer to the requested thermal class.

Paper covered strip is rectangular copper or aluminium conductor wrapped layer by layer with electrical-grade paper. We use both standard Kraft paper and Thermally Upgraded Kraft (TUK) paper, choosing the paper grade based on the operating temperature of the transformer it is wound into.

Applications

Enamelled Wire

- Electric motors (AC/DC)
- Power and distribution transformers
- Generators and alternators
- Relays and solenoids
- Ballasts, chokes, inductors
- Small appliance motors

Paper Covered Strip

- Power and distribution transformers
- Current and instrument transformers
- Reactors and welding transformers
- HT motors
- Lead connections

Enamelled Wire

Copper

Property	Single-Coat PE	Single-Coat PEI	Dual-Coat PE / PAI	Dual-Coat PEI / PAI
Conductor	Copper	Copper	Copper	Copper
Enamel Base Coat	Polyester	Polyesterimide	Polyester	Polyesterimide
Enamel Top Coat	N/A	N/A	Polyamide-imide	Polyamide-imide
Thermal Class	155°C	180°C	200°C	200°C
Size Range (mm)	0.45 - 2.25	0.45 - 2.25	0.45 - 2.25	0.45 - 2.25
Grade Availability	G1, G2: 0.45-2.25 G3: 0.50-2.25	G1, G2: 0.45-2.25 G3: 0.50-2.25	G1, G2: 0.45-2.25 G3: 0.50-2.25	G1, G2: 0.45-2.25 G3: 0.50-2.25

Aluminium

Property	Single-Coat PEI	Dual-Coat PEI / PAI
Conductor	Aluminium	Aluminium
Enamel Base Coat	Polyesterimide	Polyesterimide
Enamel Top Coat	N/A	Polyamide-imide
Thermal Class	180°C	200°C
Size Range (mm)	0.35 - 1.00	0.35 - 1.00
Grade Availability	G1, G2: 0.35 - 1.00	G1, G2: 0.35 - 1.00

Paper Covered Strip: Conductor Options

Conductor Materials

Material	Min. Conductivity	Typical Use
Copper	≥101% IACS	Power and distribution transformers, high-current windings, demanding service duty
Aluminium	≥61.5% IACS	Distribution transformers and reactors where weight or material-cost savings are prioritised

Conductor Configurations

Configuration	Description	Application
Single	One strip, paper wrapped	Standard transformer windings
Double (Twin)	Two strips wrapped together	Parallel conductors for higher current capacity
Triple	Three strips wrapped together	Heavy-duty windings requiring maximum current

Insulation Paper Types

Property	Kraft Paper	TUK Paper	Notes
Thermal Class	Class A (105 °C)	Class E (120 °C)	Continuous rating
Material	Standard Kraft	Thermally Upgraded Kraft	Chemically stabilised
Oil Compatibility	Mineral oil	Mineral oil	Both suit oil-filled transformers
Typical Use	Distribution transformers	Power transformers	TUK for higher thermal demand

Paper Covered Strip: Technical Specifications

Conductor Dimensions

Parameter	Range	Tolerance
Width	5.0 - 30.0 mm	±0.05 mm
Thickness	1.0 - 5.0 mm	±0.03 mm
Cross-Section Area	5 - 150 mm ²	-
Edge Radius	0.5 - 1.0 mm	Per drawing

Insulation Paper: Standard Kraft

Property	60 μm	63 μm
Density (g/cm ³)	0.80	0.80
Grammage (g/m ²)	48	50
Tensile Index MD (N·m/g)	≥89	≥93
El. Strength, dry (kV/mm)	≥7.5	≥7.0
Moisture (% , max)	8.0	8.0
DP (min.)	1200	1200

Standard stock: 60 μm (0.80 g/cm³) and 63 μm (0.80 g/cm³). All other grades on request.

Insulation Paper: Thermally Upgraded Kraft (TUK)

Property	60 μm	65 μm
Density (g/cm ³)	0.75	1.00
Grammage (g/m ²)	45	65
El. Strength, dry (kV/mm)	≥8.0	≥9.0
Nitrogen (% , min)	1.3	1.3
Moisture (% , max)	8.0	8.0
DP (min.)	1200	1200

Standard stock: 60 μm (0.75 g/cm³) and 65 μm (1.00 g/cm³). All other grades on request.

Enamelled Wire: Packaging

Enamelled winding wire is supplied on standard plastic bobbins, sized to the conductor diameter so that coil weight stays manageable on the winding floor without making the bobbin awkward to handle. Each bobbin is wound with an even, gap-free traverse so the wire pays off cleanly under tension, and the outer layer is protected with kraft paper before transit packing. Custom drum or returnable spool packing is available where a customer's winding machine calls for it.



Spool Type	Net Weight (kg)
PT-4	4
PT-10	10
PT-15	15
PT-25	25
PT-45	45
PT-90	90

Paper Covered Strip: Packaging

Paper covered strip is supplied as continuous wound lengths on wooden drums or rigid spools, sized to the strip cross-section and the customer's shipping mode. Drum diameter is chosen large enough to keep the bend radius within the limits set out in IEC 60554 so the paper covering is not stressed during winding or pay-off. Each drum is wrapped with kraft paper for moisture protection before the outer HDPE film and strapping are applied for transit.



Metric	Value	Notes
Packaging Type	Wooden drums / spools	Based on strip size
Coil Weight	50 - 1000 kg	Per customer specification
Inner Wrapping	Kraft paper	Moisture protection
Outer Protection	HDPE film + strapping	Transit protection

Identification, Storage and Handling

Bobbins and coils are labelled with material, dimensions, grade, lot number, and net weight; IEC 60317 / 60554 certificates ship with every order. Store cool, dry (<50% RH), out of sunlight.



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CONTACT

ADDRESS 47 B-1, Gulberg-III, Lahore, Pakistan
PHONE +92 333 059 6633
EMAIL info@universalmetals.com.pk
WEBSITE universalmetals.com.pk

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WEBSITE



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