PAPER COVERED COPPER STRIP

FRHC, ETP & OFC Copper / Kraft & TUK Paper

About Our Paper Covered Copper Strip

Universal Metals (Pvt.) Ltd manufactures paper covered copper strips (PCCS) for transformer windings and high-voltage electrical equipment. Our strips are produced from FRHC, ETP, and OFC copper conductors, each achieving a minimum conductivity of 101% IACS, insulated with precision-wound Kraft or thermally upgraded Kraft (TUK) paper.

The copper strip is drawn and rolled from rod manufactured in-house, ensuring full traceability from melt to finished product. Paper insulation is applied using automated wrapping machines that maintain consistent overlap, tension, and radial buildup per IEC 60317 and IS 13730-27 requirements.

Applications

Paper covered copper strips are used across a wide range of transformer and high-voltage applications:

- Power transformers
- Distribution transformers
- Current transformers
- Instrument transformers
- Reactors
- Welding transformers
- HT motors
- Lead connections

Conductor Configurations

Paper covered copper strip is available in three conductor configurations.

Configuration	Description	Application
Single	One copper 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

Two grades of electrical insulation paper are offered. Reference: IEC 60554, IS 13730-27.

Property	Kraft Paper	TUK Paper	Notes
Thermal Class	Class A (105 °C)	Class B (130 °C)	Continuous rating
Material	Standard Kraft	Thermally Upgraded Kraft	Chemically stabilised
Oil Compatibility	Mineral oil	Mineral oil	Both suited for oil-filled transformers
Typical Use	Distribution transformers	Power transformers	TUK for higher thermal demand

TUK (Thermally Upgraded Kraft) paper offers a 25 °C higher continuous operating temperature than standard Kraft, extending transformer life in high-load conditions. Both paper types are compatible with standard transformer mineral oils.

Conductor Dimensions

Bare copper strip dimensions before paper wrapping. Tolerances per IS 1897 / IEC 60317.

Parameter	Range	Tolerance
Width	3.0 - 20.0 mm	±0.05 mm
Thickness	1.0 - 5.6 mm	±0.03 mm
Edge Radius	0.5 - 1.0 mm	Per drawing
Conductivity	≥101% IACS	-

Wrapping Methods

Method	Description	Application
Butt-wound	Paper edges meet without overlap	Minimum insulation buildup
Overlap wound	Paper edges overlap by 2 - 4 mm	Standard insulation, improved moisture barrier
Half-lap	50% overlap per layer	Maximum dielectric strength

Insulation Buildup

Standard paper thicknesses available for PCCS wrapping. Other thicknesses available per customer specification.

Paper Thickness	Microns	Mil	Grammage	Typical Use
0.040 mm	40	1.5	28 - 32 g/m^2	Fine turn insulation
0.050 mm	50	2.0	35 - 40 g/m^2	Light-duty wrapping
0.060 mm	60	2.4	42 - 48 g/m^2	Standard PCCS wrapping
0.063 mm	63	2.5	44 - 50 g/m^2	Standard PCCS wrapping
0.065 mm	65	2.6	45 - 52 g/m^2	Standard PCCS wrapping
0.075 mm	75	3.0	52 - 60 g/m^2	General-purpose
0.080 mm	80	3.1	56 - 64 g/m^2	General-purpose
0.085 mm	85	3.3	60 - 68 g/m^2	Medium-duty
0.090 mm	90	3.5	63 - 72 g/m^2	Medium-duty
0.100 mm	100	4.0	70 - 80 g/m^2	Heavy-duty wrapping
0.125 mm	125	5.0	88 - 100 g/m^2	Heavy-duty wrapping
0.150 mm	150	6.0	105 - 120 g/m^2	Extra heavy-duty

Thickness tolerance: ±10% per IEC 60554. Both Kraft and TUK paper are available in all listed thicknesses. 60 and 63 micron are the most commonly specified for standard PCCS applications. Custom thicknesses can be manufactured to order.

Kraft Insulation Paper

Class A (105 °C). Reference: IEC 60554, IS 13730-27.

Property	Value	Unit
Thickness Range	0.040 - 0.150	mm
Dielectric Breakdown (in air)	≥7.0	kV/mm
Dielectric Breakdown (in oil)	≥55	kV/mm
Tensile Strength (MD)	≥80	N/mm^2
Moisture Content	≤8.0	%
Density	0.70 - 1.05	g/cm^3
Porosity (Gurley)	15 - 30	sec/100 ml

TUK Insulation Paper (Thermally Upgraded Kraft)

Class B (130 °C). Reference: IEC 60554, IS 13730-27.

Property	Value	Unit
Thickness Range	0.040 - 0.150	mm
Dielectric Breakdown (in air)	≥10.0	kV/mm
Dielectric Breakdown (in oil)	≥60	kV/mm
Tensile Strength (MD)	≥85	N/mm^2
Moisture Content	≤6.0	%
Density	0.80 - 1.10	g/cm^3
Porosity (Gurley)	20 - 40	sec/100 ml
Thermal Ageing	≤50% loss at 130 °C / 500 h	tensile retention

TUK paper is chemically stabilised through nitrogen-based additives, reducing cellulose degradation at elevated temperatures. This results in higher dielectric breakdown strength, lower moisture absorption, and significantly extended insulation life compared to standard Kraft paper. Both paper types are sourced from qualified suppliers and tested per IEC 60554 before use.

Packaging

Paper covered copper strip is supplied as continuous wound lengths on wooden drums or rigid spools, depending on strip dimensions and customer requirements.

Metric	Value	Notes
Packaging Type	Wooden drums / spools	Based on strip size
Coil Weight	50 - 500 kg	Per customer specification
Inner Wrapping	Kraft paper	Moisture protection
Outer Protection	HDPE film + strapping	Transit protection

Storage & Handling

- Store in a cool, dry environment (15 - 30 °C, <50% RH)
- Keep away from direct sunlight, moisture, and chemical exposure
- Do not remove protective wrapping until ready for use
- Handle with clean, dry gloves to prevent contamination of paper insulation
- Certificates of conformance provided with each shipment

Labelling

Each coil is labelled with product type, conductor grade, strip dimensions, paper type, number of layers, wrapping method, lot number, manufacture date, and net weight.

Paper covered copper strip must be stored in low-humidity conditions to preserve the dielectric properties of the paper insulation. Exposure to moisture will degrade insulation performance. Customers requiring vacuum-dried strip should specify this at the time of order.