



CONTINUOUSLY TRANSPOSED CABLE

Shree Cables & Conductors Pvt. Ltd. increases its production range manufacturing CTC up to 96 conductors and different types of insulation



**CUSTOMISED SOLUTION PROVIDER
FOR BARE & INSULATED FLAT WIRE,
COPPER/COPPER ALLOY COMPONENTS,
COPPER/COPPER ALLOY PROFILES
SECTIONS AND ROUNDS
FOR ELECTRICAL AND INDUSTRIAL APPLICATIONS**



SHREE CABLES & CONDUCTORS PVT. LTD.

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We understand that the Power Sector and Transformer market is passing through an interesting phase. The use of latest technology in design and materials is now very apparent in transformer manufacturing.

Keeping in line with the latest manufacturing trend in transformer manufacturing technology. **Shree Cables & Conductors Pvt. Ltd., Bhopal, INDIA** has installed State of art production facility with the largest Continuous Transposed Conductors machine in the world with capability of manufacturing up to 96 conductors. We have multiple lines for manufacturing of CTC conductors and meeting international and national specification.

CONDUCTORS		ELECTRICAL SPECIFICATIONS	MECHANICAL SPECIFICATIONS OF ANNEALED CONDUCTOR		CONTROLLED PROOF STRESS COPPER BS1432		
Material	Content	Resistivity at 20°C	Tensile strength	Elongation	CPR1	CPR2	CPR3 *
CU-ETP IEC 60317-0-2	Cu + Ag > 99.9 %	≤ 0.01724 Ω mm²/m	≥ 23 N/mm²	≥ 12 - 44 %	140-200 N/mm²	170-230 N/mm²	220-260 N/mm²

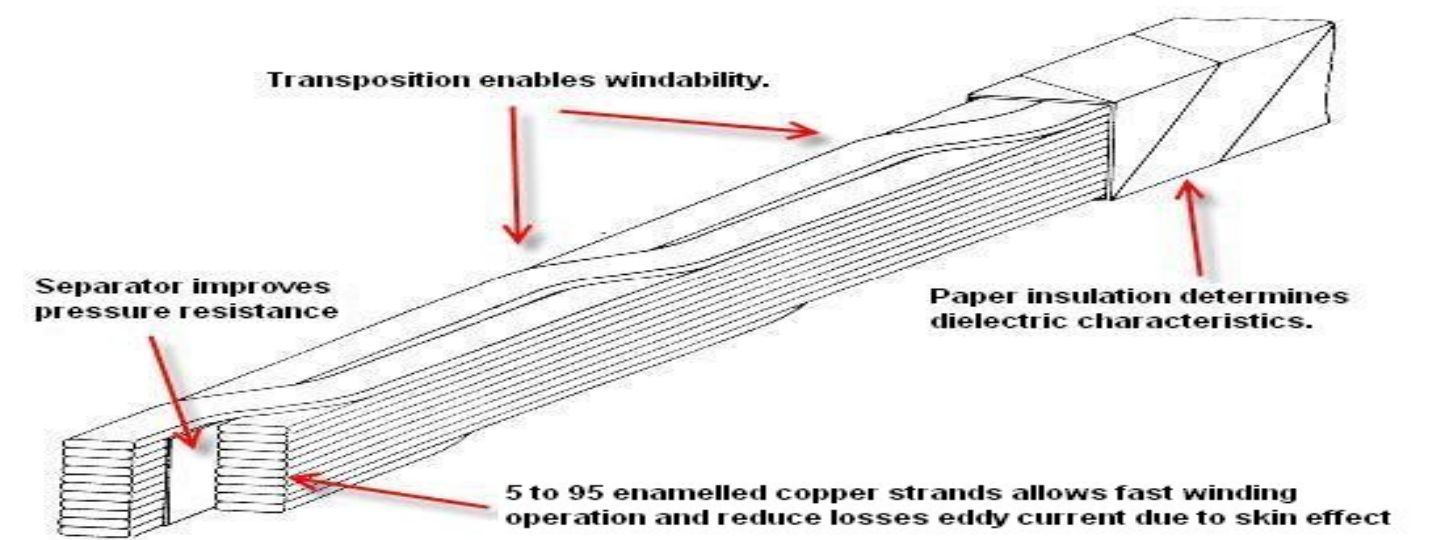
*For Proof stress more than 230 N/mm2 we recommend CuAg0.1 alloy due to re softening during transformer service.

DIMENSIONAL SPECIFICATION OF CTC CONDUCTORS DESIGN LIMITS

Individual Strands	Soft ETP Copper	Transposed Cable	Soft ETP Copper
Minimum Number	5	Minimum Height	5.00 mm
Maximum Number	95	Maximum Height	100.00 mm
Minimum Thickness	1.00 mm	Minimum Width	6.00 mm
Maximum Thickness	5.00 mm	Maximum Width	30.00 mm
Minimum Width	2.80 mm		
Maximum Width	13.00 mm		
Min Width/Thickness	1.5 to 1		
Max Width/Thickness	6.5 to 1		

SPECIFICATIONS OF ENAMELLED RECTANGULAR WIRE

Type of enamel	Grade	Increase in dimensions (mm)
Polyvinyl formal resins	1	0.10 ± 0.02
	2	0.14 ± 0.03
Polyvinyl formal + B-stage epoxy resins	1	0.17 ± 0.03
	2	0.19 ± 0.03
Polystermide + Polyamide resins	1	0.11 ± 0.02
	2	0.14 ± 0.03



B-stage epoxy coating 0.02-0.05 mm allow good adhesion of the strands for treatment at 120 °C 24 h for storage at temperature not greater than 32 °C up to 8 months (or up to 6 months for treatment at 100 °C 48 h). Good bonding is achieved in Lab specimens after treatment at 130 °C for 16 h or 120 °C for 24 h.

TEST METHODS: IEC 60851, IEC 60317-0-2 General Requirements, IEC 60317-18, IEC 60317-28 and IEC 60317-29, if not otherwise specified in the order.

Standard Construction

Individual strands are CDA11000 ETP copper magnet wire conforming to customers’ specifications / IEC standards. Each strand is insulated with Polyvinyl Formal Enamel/Epoxy insulation conforming to customers’ requirements /IEC standards.

Radial tolerances

Transposing factor $F_T \geq 7$ thickness of strand 2.00 mm or yield point $R_{p0.2} \leq 170$ MPa	
No. Of strands	Tolerance
≤ 21	-0.10 / +0.20 mm
≤ 35	-0.15 / +0.30 mm
≤ 55	-0.20 / +0.80 mm
> 55	-0.50 / +1.10 mm

Transposing factor $F_T \geq 5$ thickness of strand > 2.00 mm or yield point 170 MPa $< R_{p0.2} \leq 220$ MPa	
No. Of strands	Tolerance
≤ 21	-0.10 / +0.30 mm
≤ 35	-0.15 / +0.50 mm
≤ 55	-0.20 / +1.30 mm
> 55	-0.50 / +1.40 mm

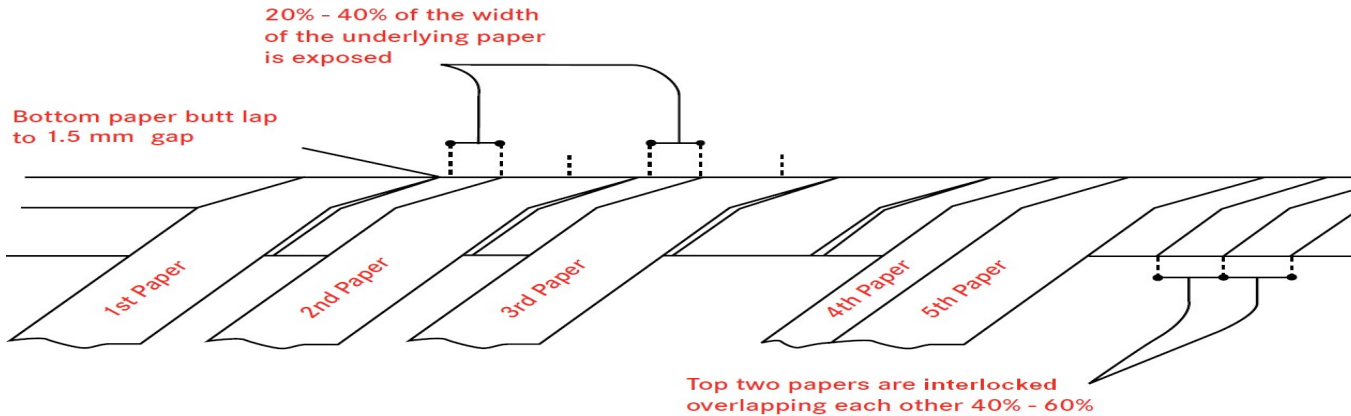
Axial tolerances

Size	Tolerance
All size	-0.10 / +0.05 mm

SPECIFICATIONS OF INSULATION* - SPECIAL PAPERS INSULATION

Type of paper	Recomm. Thickness (mm)	Applications	Main properties
Kraft natural paper	0.065-0.080	General purpose	High purity 5A2-1M3 / 5B2-21H1
Calendered Kraft Paper	0.110-0.140	General purpose	High density and dielectric strength
Calendered Crepe Paper	0.075-0.130	Inner and outermost layers	High mechanical characteristics
Thermally Upgraded Paper	0.055-0.075	Inner and outermost layers	High thermal properties
Epoxy Coated Kraft Paper	0.080-0.130	Inner and outermost layers	Bonding purposes and reducing bulging effect
Aramid paper (Nomex-DuPont)	0.050	Thermal class 200	Bonding purposes and reducing bulging effect
Polyester film	0.050	Gas transformers	
Glass tape	0.012-0.20	External protection	
Prepreg paper	0.10-0.40	Interleaving layer	

All papers for electrical applications according to IEC554 - Other type of papers are available on request.



Continuously Transposed Cable (CTC) consists of a number of rectangular, film insulated conductors made into an assembly and usually over wrapped with layers of insulation paper.

Continuously Transposed Cable are primarily used in power and traction transformers. CTC offers significant advantages in the design of transformers compared to transformer windings with conventional paper insulated conductors.

Advantages :

Advantages such as improved winding space factor, reduced total copper losses, enhanced mechanical strength specially in transformers undergoing short-circuit test to withstand high radial and axial forces on the winding.

SHREE CABLES & CONDUCTORS PVT. LTD. & OTHER GROUP COMPANIES 40 YEARS OF EXPERTISE IN INSULATED MAGNETWIRES

Since 1986 SHREE CABLES & CONDUCTORS PVT. LTD. has been a key supplier to the transformer industry. Today with a production capacity of more than 10,000 metric tons, a wide variety of product constructions SHREE CABLES & CONDUCTORS PVT. LTD. is a key partner to the transformer industry. Turbo power plants, Nuclear power plants, Gas and hydro power plants and installation of HVDC lines are examples of projects where the expertise of SHREE CABLES & CONDUCTORS PVT. LTD. is chosen by the global companies specializing in transformers production.

A WIDE RANGE OF PRODUCTS AND SPECIALITIES

With 30 years of expertise in Bare and Insulated conductors Shree Cables & Conductors Pvt. Ltd. offers a wide range of conductors, strand insulation, insulation materials and assembled CTC.

Epoxy-bonded transposed cable

The strand insulation can be over-coated with bondable epoxy. These epoxy resins cure under the same thermal conditions applied to the cellulose components in the drying process of the winding.

Epoxy bonded transposed cable are characterised by very high mechanical strength, which enables the winding to withstand high electro-dynamic forces, e.g. in the event of short circuit.

For low voltage windings Shree Cables & Conductors Pvt. Ltd. developed solutions without conventional paper insulation. These new types of Continuously Transposed Cable offer significant advantages:

- No bulging of paper insulation, thus oil pockets are avoided.
- Improved heat dissipation allows reduction of oil ducts and results in better space factor.

SCCNET

SCCNET CTC is a special transposed cable with or without paper insulation. It is wrapped with a transformer oil resistant polyester monofilament.

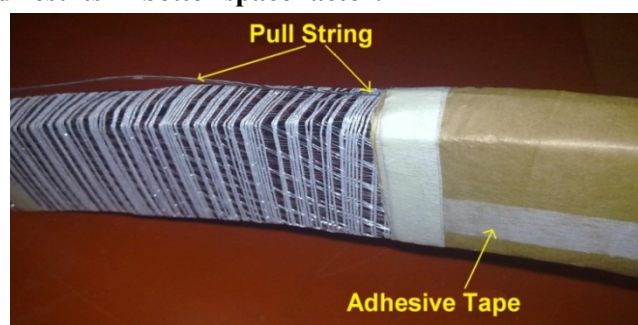
SCCNET CTC is supplied with a protection paper, which will be removed prior to the winding process.

Diamond wrap

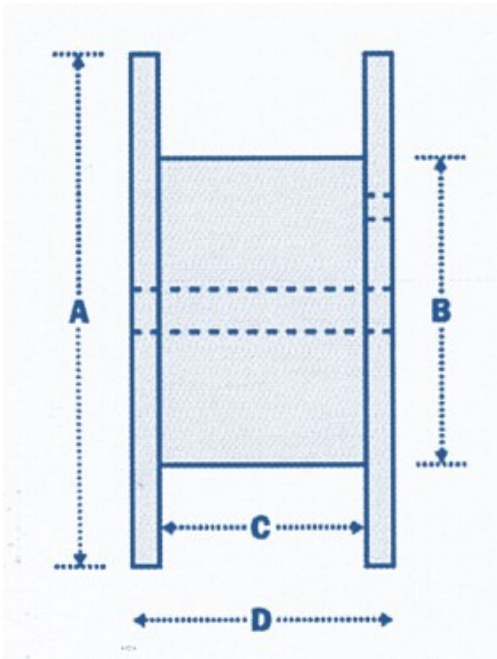
This covering currently consists of two opposing wraps of aramide paper arranged to allow free oil flow through the CTC strands for cooling purposes. A linear protection crepe paper is normally inserted on the underside of the cable.

Perforated paper

This product gives excellent heat dissipation and is suitable for epoxy application, with radial or concentric Bond. The cable is wrapped with perforated aramide paper. Perforated CTC is delivered without protection paper.



STANDARD PACKAGE OPTIONS



A
Flange Diameter (mm)
B
Barrel Diameter (mm)
C
Traverse Width (mm)
D
Overall Width (mm)
E
Bore Diameter (mm)
F
Drive Hole Location (mm)
G
Drive Hole Diameter (mm)
Approximate Capacity (Kgs.)



The drum diameter shall be based on the customer's requirements and shall be depend upon winding machine parameters at customers work site.

Shree Cables & Conductors Pvt. Ltd. can supply CTC in drums Flange diameter(A) up to 2500 mm Travers(C) up to 1200 mm and reel Weight up to 10,000 Kgs.

Let Shree Cables & Conductors Pvt. Ltd. satisfy your CTC requirements today!
For ordering or additional information please contact:



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