

Testing

Our Quality Assurance Laboratory is equipped with testing facilities to assess:

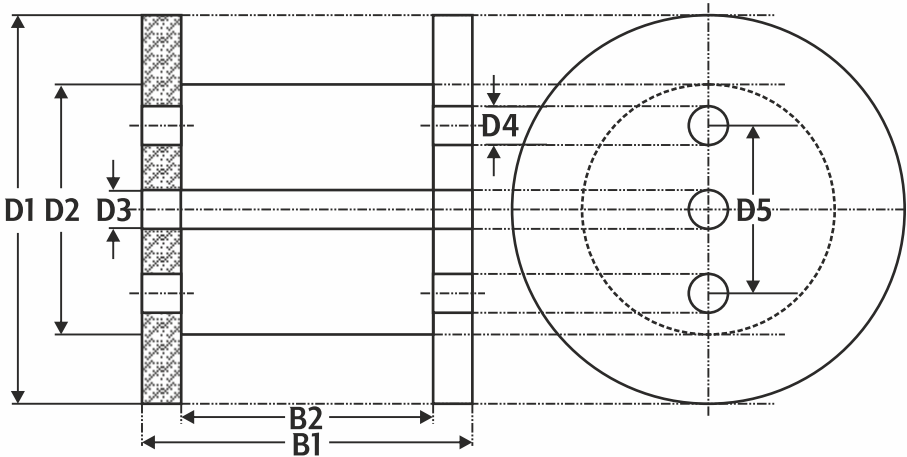
- Physical Properties
- Mechanical Properties
- Electrical Properties
- Thermal Properties
- Chemical Properties

Reference Specifications

CTC construction can be tailored to customer specifications in order to improve specific performance for winding. Standard and customised products are designed to meet international norms such as International Electrotechnical Commission (IEC), International Standards Organization (ISO), Deutsch Industries Norm (DIN) and respective national standards.

Production Scope (Packing)

KSH Standard Reel Sizes (Returnable Reels)



D1 Flange mm	D2 Core mm	D3 Bore mm	D4 Driving Hole mm	D5 Distance Of Driving Hole mm	B1 Total Outer Width mm	B2 Total Inner Width mm	Reel Tare Weight Apr. Kg	Fill Weight Apr. Kg
1250	900	82	55	560	630	530	120	1300
1400	900	82	55	560	630	530	140	1500
1600	1000	82	55	560	630	530	180	2500
1800	1100	82	55	560	1000	530	280	5000
2000	1200	82	55	560	1200	530	380	7500

\*\*Flange Thickness 50mm  
\*\* Drum sizes shown are as per KSH standard. Other sizes as per requirement can be provided.



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Continuously Transposed Cables (CTC)



Typical Applications

- Oil Filled Power Transformers
- HVDC Transformers
- Large Distribution Transformers
- 765 Kv EHV Transformers and Reactors
- 1200 Kv EHV Transformers

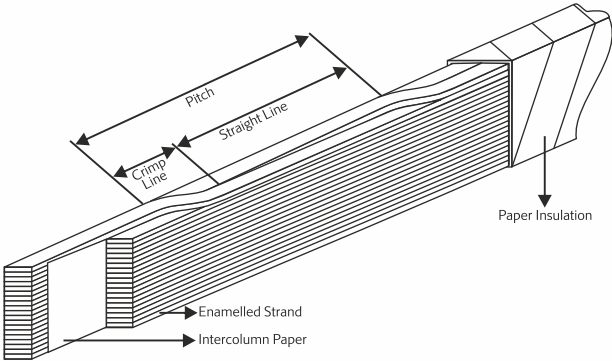


Product Description

Continuously Transposed cables (CTC) are special magnetic wires made up of multiple stranded rectangular copper conductors, which are individually enamelled, transposed continuously, and insulated by covering with electrical grade paper or netting tape.

Advantages of using CTC in Transformer Design

- ✂ Lower costs due to reduction in copper used
- ✂ Reduced winding time thereby increasing productivity for transformer manufacturers
- ✂ Deliver greater electric efficiency by minimizing load losses
- ✂ Improved cooling of the conductor due to the improved heat dissipation
- ✂ Improving mechanical strength of the windings due to the composite construction of the transposed conductors
- ✂ Transformer size becomes smaller thereby reducing the overall cost of the transformer



Production Scope (Enamelled)

Individual Enamelled Strands with Polyvinyl Acetal Enamel (PVA 120 Class) + Bondable Epoxy Resin.

Designation	Type of Enamel	Grade	Increase in Dimensions (mm)
PVA - POLY VINYL ACETAL	Polyvinyl Formal Resins	1	0.10 ± 0.02
		2	0.14 ± 0.03
PVA - POLY VINYL ACETAL + Epoxy	Polyvinylformal + B Stage Epoxy Resins	1	0.17 ± 0.03
		2	0.19 ± 0.03
Dual Coat 200	Polyesterimide + Polyamide Imide Resins	1	0.11 ± 0.02
		2	0.14 ± 0.03

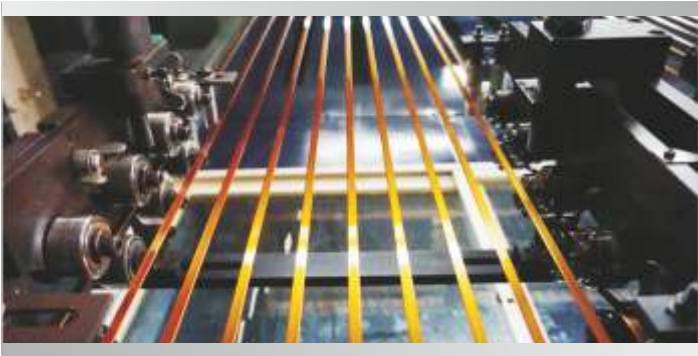
\*\*\* Movable dies used to coat the strands

Benefits of Epoxy coating

- ✂ Reduction of risks of short circuiting
- ✂ Exceptionally strong bond strength in the winding
- ✂ Epoxy resin cures in the same thermal treatment for drying paper (100-120°C)
- ✂ Better insulation of each single strip
- ✂ Conductors in the winding become like a solid beam and can withstand strong electrodynamic stresses created during short circuit testing
- ✂ Small thickness of coating needed in order to achieve very strong bonding (0.02-0.06 mm) Improves the windability of the CTC
- ✂ No-pollution, because the B-stage resin does not contain residue of harmful solvents

Epoxy is a thermosetting resin. Enamelled wires are covered by a thin layer of epoxy tack. The Epoxy system is characterized by the following properties.

- ✂ Uniform melting
- ✂ High grade curing
- ✂ Stability of B-stage (more than 6 months at 32°C)
- ✂ Suitable for the insulation system of oil transformers



Enamelling Line



Transposing Head

Production Scope (CTC)

- ✂ Number of Strands5 - 79
- ✂ Width of Individual Strands3 mm - 12.5 mm
- ✂ Thickness of individual Strands0.9 mm - 3.2 mm
- ✂ Paper Insulation Increasemaximum 24 layers (3.60 mm)
- ✂ Pitchmin 36 mm - max 200 mm

Work Hardened Copper (Controlled Proof Stress) can be produced according to BS 1432 (CPR Rp 0.1% designation or Rp 0.2%).

Controlled Proof Stress Copper	Rp (0.2%) MPa	Controlled Proof Stress Copper BS 1432	Rp (0.2%) MPa
Annealed	80-110	CPR1	140 - 200
CPR-A	90 - 120	CPR2	170 - 220
CPR-B	120 - 150	CPR3	220 - 260

Insulation Options of CTC

- ✂ Kraft Paper
- ✂ Thermally Upgraded Paper
- ✂ High Density Micro Crepe (Dennison / Cindus)
- ✂ Nomex®410
- ✂ Special Paper as per customer requirements
- ✂ Netting Tape

Paper Makes

- ✂ Weidmann - USA
- ✂ Munksjo - Sweden
- ✂ Nordic / Amotfors - Sweden
- ✂ Dupont - USA
- ✂ Pucaro - Germany
- ✂ Cindus - USA
- ✂ Tervakoski - Finland

Other Options

- ✂ CTC with short pitches thereby increasing flexibility and windability of cable
- ✂ Inter-column separator can be provided
- ✂ Returnable Reels

Dust Free Manufacturing Facility



Stringent Quality Assurance

