

BHEL BHOPAL	QUALITY PLAN	QP NO. QA-SC-BHEL-CIM-05
	ENAMELED AND MICA TAPED RECTANGULAR COPPER WIRE	Rev. No.: 01
	IN. SK. 46085	Rev. Date : 25/04/2017

SL NO.	COMPONENTS AND OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS	RECORD FORMAT	AGENCY			REMARKS
							P	R	W	
1	RAW MATERIAL									
1.1	CC Copper Rods	a) Physical Properties (Dimension, Visual Check, Surface Finish) b) Electrical Resistivity c) Mechanical Properties (Tensile, Elongation etc.) d) Chemical Properties (Copper, Silver, Pb, Oxygen etc.)	Record Verification of TC and PO of cc rods	Minimum One Sample/ Melt	ASTM B-49-10/ AA12024	Manufacturer TC	1, 2	2, 3	-	CC copper rods are to be procured from BHEL approved sources only as per attached list
1.2	Enamel	Colour and appearance, Viscosity, Solid content, Surface of enameled wire, Tan delta, Mandrel Winding peel test, Resistance to abrasion, BDV, Heat shock, Cut through, Shelf life	Record Verification . Supplies to be made with proper correlation of enamel used with TC. Records to be maintained for the same	Minimum one sample per lot	As per product spec. (Terebec MT 533-36 PA of M/s Elantas Beck)	Manufacturer TC	1	2, 3	-	Enamel to be procured from BHEL approved sources only as per attached list


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1.3	Insulation Tape: Polyester Film Backed Mica Paper Tape BP25185	Thickness, Width, Shelf Life, Composition, Tensile Strength, BDV, Stiffness	Record Verification. Supplies to be made with proper correlation of mica tapes used with TC. Records to be maintained for the same.	Minimum 1 sample per lot	BP25185	Manufacturer TC	1	2, 3	-	Insulation tape is to be procured from BHEL approved sources only as per attached list. Insulation tape having separation/delamination of polyester and mica during taping is not to be used. Mica tape is not to be used after expiry of shelf life. Surveillance check of tapes by BHEL at supplier works & its testing at BHEL works, if required.
2.	Bare Rectangular Copper Wire (During drawing/ flattening and annealing operations)	a) Visual Checks b) Dimensional (Width, Thickness, Corner Radius, etc.), c) Mechanical (Tensile, Elongation, Hardness, Stiffness etc.) d) Electrical (Conductivity and Resistivity etc.) e) Chemical (Oxygen Content)	Record verification	100% Mother Reels	AA12030	Manufacturer TC	2	3	-	Surface defects like burrs, sharp edges, blisters, flakes, cracks, grease, foreign particles, loose copper dust and embedded impurities are not acceptable. The copper wire shall have smooth, bright and

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3.	Enameled copper wire	a) Visual check b) Increase in dimensions due to covering c) Mechanical (Tensile strength & elongation, Flexibility test at room temp. and after ageing)	Record verification	One sample per lot	IN.SK.46085	Manufacturer TC	2	3	polished surface. The enameled copper wire shall have a smooth surface free from embedded dust particles or other foreign deleterious material with no sharp edges/ corners.
4.	Enameled & Mica Taped Copper wire	a) Visual (% lapping of mica tape) b) Increase in dimensions due to covering d) Electrical (Proof voltage test, BDV)	Record verification. Lot wise sample will be tested in BHEL after receipt of material. Supplies found not conforming to BHEL specification during testing at BHEL are liable for rejection	One sample per lot/ consignment/ size No. of samples can be increased to check consistency if no. of reels supplied is large	IN. SK. 46085	Manufacturer TC	2, 3	3	The insulated copper wire shall have smooth surface finish, free from defects, dust and damage. The taping shall be of good quality, free from wrinkles and overstretching. If, any such imperfections are found in the copper wire during manufacturing processes at BHEL, the insulated copper wire is liable to be rejected. Complete records to be maintained by vendor for ensuring traceability from CC rod to finished stage with respect to raw materials and processes.

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5.	Manufacturing and Storage Area	Proper cleaning of copper/ other dust in plant and machinery. Proper storing of mica tapes (at $\leq 25^{\circ}\text{C}$)	Visual	100%	-	-	2	3	-	Surveillance check by BHEL if required
6.	Packing and Marking	As per spec.	Sturdy plastic/ wooden bobbins, Proper covering of reels to protect against moisture / dust ingress.	100%	IN. SK. 46085	-	2	3	-	Special care for protection against water ingress during transportation in rainy season. Supplies received with water ingress are liable to be rejected.

Legends:

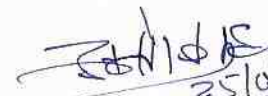
1-Sub-supplier, 2-Supplier, 3-BHEL

P- Perform, R- Review, W-Witness

Note- CC copper rods, enamel and mica tapes are to be procured from BHEL approved sources. The present list is attached for reference.


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LIST OF BHEL APPROVED SOURCES

Sl. No	Material	BHEL Approved sources
1.	BHEL approved sources for copper (raw material) to be used for making rectangular copper wire	M/s Hindustan Copper Ltd.
		M/s Hindalco Industries Ltd.
		M/s Vedanta (SESA Sterlite Limited)
2.	BHEL approved sources for polyester film backed epoxy mica paper tape to BHEL Bhopal spec BP-25185	M/s Lakshmanan Isola Pvt. Ltd., Bangalore
		M/s Cogebi, Malaysia (Supplier Grade - KALASTIK 45.030)
		M/s Isovolta, Austria (Supplier Grade - CONDUCTOFOL 2009)
		M/s Vonroll, Switzerland (Supplier Grade - SAMICAFILM 315.14)
		M/s Krempel, Germany (Supplier Grade - KREMICA.FLEX K1034-09)
3.	BHEL approved sources for enamel	M/s Elantas Beck (Supplier Grade - Terebec MT 533-36 PA)

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