



BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL

QUALITY PLAN FOR PICC (Paper Insulated Copper Conductor)

QA PLAN NO: QC/TCB QAP/BO/56 REV 06

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SL	COMPONENT/ ASSY/ OPERATION	CHARACTERISTICS	TYPE OF CHECK	REF. DOC	QUANTUM OF CHECK	INSPECTION AGENCY	REMARKS
1	Kraft Insulating Paper	a) Thickness b) Routine tests c) Type Test (test to be conducted for each manufacturer once in 5 years)	M T T	BHEL SPEC AA21111	One Sample per lot for each thickness	BHEL/ TPIA/CQ	- RECORD REVIEW - PICC manufacturer shall send one set of samples (20 sheets of size 300mm x 300mm) and paper supplier's test certificates for approval from BHEL Bhopal before use. Complete consignment details like no. of reel, weight, invoice linking paper shall be sent. - Paper from BHEL Bhopal approved source shall only be used.
2	CC Rod	a) Surface finish. b) Chemical composition: i) Copper including silver ii) Oxygen content. c) Mass Resistivity. d) Elongation	V T T T	BHEL spec. AA 12024	One sample per lot.	BHEL/ TPIA/CQ	- RECORD REVIEW - Any discrepancy observed in CC rod at the receipt stage or during flattening, should be reported to BHEL, stating coil no, nature of defect with photographs. - Work should proceed only after getting decision from BHEL.
3	a) Paraffin Wax b) PVA based adhesive used for Kraft paper Bonding (anchoring the ends of paper).	Identification of material, ash content, neutralization value, inorganic acidity. i) Type grade & make. ii) Non volatile matter content, consistency, bond strength, pH Value, Compatibility with oil (Type test)	I T	IS 4654 IS 2257	One sample per lot. One sample per lot.	BHEL/ TPIA/CQ BHEL/ TPIA/CQ	RECORD REVIEW -do-

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4	Manufacturing and storage area	Proper cleaning of copper dust and normal dust in plant and machinery	V	BHEL Spec AA28125/ AA28128	100%		Vendor	- Surveillance Check By BHEL/TPIA/CQ		
5	Bare Copper Conductor (During Drawing / Flattening and annealing operation)	- Surface finish - Corner radius - Dimension - Elongation / Proof stress	V / M / T	BHEL Spec AA28125/ AA28128	100% Mother reels		Vendor	Record review by BHEL /TPIA/CQ 1-Surface defects like burrs, sharp edges, blisters, flakes, cracks, grease, foreign particles, loose copper dust and embedded impurities are not acceptable. 2-The conductor shall have smooth, bright and polished surface. Complete records to be maintained by vendor for ensuring traceability from CC rod to Finish stage		
6	Final inspection (Dimensions)	Dimensions i) Covered Thickness ii) No. of paper layers iii) Thickness and width of papers. iv) Staggering and overlap. v) Bare Thickness and width. vi) Increase in dimension due to paper insulation by difference method and by individual paper thickness method. vii) (a) Corner Radius measurement (b) Perpendicular ness of edges of conductor.	M	BHEL Spec AA28125/ AA28128	Lot Size	Sample size	BHEL /TPIA/ CQ	- CHP FOR WITNESS FOR (i) TO (vii) - Record Review for (viii) Note: Unless otherwise specified, conductor length on PO is inclusive of sample length as per sampling plan mentioned in column "quantum of check"		
					(No. of reels - for each size)					
					upto 90	3				
					91- 280	13				
					281- 500	20				

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		(c) Merging of radius with sides viii) Thickness and uniformity of wax coating. viii) Verification of Conductor length						
7	Final inspection (Tests)	1. Elongation (For annealed conductor) 2. Poof Stress (Wherever specified) 3. Electrical Resistivity 4. Insulation test (For bunched PICC)	T	BHEL Spec AA28125/ AA28128	Lot Size (No. of reels - for each size) upto 50 51-280 81-500	Sample size 1 3 5	BHEL /TPIA/CQ	CHP FOR WITNESS
8	Packing and Dispatch	1. Provision of inter-layer paper. 2. No gap between adjacent turns 3. Maintain gap of 25mm from drum flange top to packed conductor top. 4. Marking of winding direction. 5. Use of 560mm barrel drum for bunched & proof stressed conductor 6. Proper identification as per spec.	V	BHEL Spec AA28125/ AA28128	100%		Vendor	- Surveillance Check By BHEL/TPIA/CQ

Legends: V - VISUAL, M - MEASUREMENT, T - TEST, TPIA - THIRD PARTY INSPECTION AGENCY APPOINTED BY BHEL, CQ-BHEL CORPORATE QUALITY.
CHP - CUSTOMER HOLD POINT (VENDOR CAN NOT PROCEED WITHOUT GETTING CLEARANCE FROM BHEL CQ/TPIA)

Changes in the revision: Clause 4 added and renumbering done.

Prepared By

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Approved By

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