



BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL

QUALITY ASSURANCE MOTORS

QUALITY PLAN FOR MICA TAPED CONDUCTOR TO BHEL SPEC. BP28189/ INSK46044

QA PLAN NO : QA/MT/BOI/049

REV.02

DATE: 01/08/2018

PAGE 1 OF 2

SL. NO	COMPONENT /STAGE	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
01	CC COPPER RODS (TO BE PROCURED FROM BHEL APPROVED SOURCES)	PHYSICAL PROPERTIES (DIMENSION, VISUAL, SURFACE FINISH, THICKNESS OF COPPER OXIDE FILM)	V,M	ONE SAMPLE/MELT	ASTM B-49-10/AA12024	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA
		CHEMICAL PROPERTIES	T	ONE SAMPLE/MELT	ASTM B-49-10/AA12024	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA
		MECHANICAL PROPERTIES	T	ONE SAMPLE/MELT	ASTM B-49-10/AA12024	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA
		ELECTRICAL RESISTIVITY	T	ONE SAMPLE/MELT	ASTM B-49-10/AA12024	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA
02	TESTS ON BARE COPPER (ANNEALED)	DIMENSIONAL & VISUAL CHECKS	V,M	SAMPLE /LOT	AA12030	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA.
		MECHANICAL PROPERTIES (TENSILE STRENGTH, ELOGATION, HARDNESS, STIFFNESS)	T	SAMPLE/LOT	AA12030	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA. INSTRUMENTS SHALL BE CALIBRATED BY NABL ACCREDITED LAB

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03	MICA TAPE (TO BE PROCURED FROM BHEL APPROVED SOURCES)	DIMENSIONS & SHELF LIFE	V,M	SAMPLE/LOT	BP25185	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA
		COMPOSITION OF TAPE - POLYESTER FILM, MICA PAPER, BOND CONTENT AND TOTAL SUBSTANCE	T	SAMPLE/LOT	BP25185	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA
		BDV TEST	T	SAMPLE/LOT	BP25185	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA
		TENSILE/BREAKING STRENGTH AND STIFFNESS	T	SAMPLE/LOT	BP25185	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA
		VERIFICATION OF SHELF LIFE, STORAGE OF TAPE AT <= 25 DEG C, FREE FROM SEPRATION/DELAMINATION OF POLYESTER AND MICA						TC/PHYSICAL VERIFICATION OF STORE AND TEMPERATURE. INDICATOR REVIEW BY BHEL/TPIA
04	POLYESTER FILM- NON ADHESIVE TAPE (TO BE OF BHEL APPROVED MAKES & GRADES)	DIMENSIONS, DENSITY, BDV, TENSILE, ELONGATION, SHRINKAGE	M, T	SAMPLE/LOT	BP 22887	TC	MANUFACTURER	TC REVIEW BY BHEL/TPIA
05	TAPED CONDUCTOR	DIMENSIONAL CHECK (BARE COPPER AND INSULATED COPPER) INCLUDING OVERLAPPING, & VISUAL CHECK	M,V	SAMPLE/LOT	BP28189/ INSK46044	IR	MANUFACTURER	CHP FOR WITNESS BY BHEL/TPIA
		HARDNESS /STIFFNESS TEST, BDV TEST AS PER APPLICABLE BHEL STANDARD	T	SAMPLE/LOT	BP28189/INSK46044	IR	MANUFACTURER	CHP FOR WITNESS BY BHEL /TPIA.
		RESISTIVITY/ CONDUCTIVITY	T	SAMPLE/LOT	BP28189/ INSK46044	IR	MANUFACTURER	CHP FOR WITNESS BY BHEL/TPIA
06	PACKING AND MARKING	AS PER SPEC/PO	V	100%	PO/SPEC	QCR	MANUFACTURER	

V- VISUAL, M-MEASUREMENT, T-TEST, TPIA-THIRD PARTY INSPECTION AGENCY, CHP-CUSTOMER HOLD POINT (VENDOR CAN NOT PROCEED WITHOUT GETTING CLEARANCE FROM BHEL/ TPIA, TC-TEST CERTIFICATE, TR-REPORT QC RECORD/MFG. RECORD OF MANUFACTURER, IR-INSPECTION REPORT


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(F A TOPPO)
AGM (QEM)



BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL

QUALITY ASSURANCE - MOTORS

CHECKLIST FOR INSPECTION OF MICA TAPED CONDUCTOR BY TPIA/ VENDOR

CHECKLIST REFERENCE: QFD/CIM/BOI/18-19/01 REV 00-DATED 01.08.18

ITEM DESCRIPTION	
PO NO. & DATE	
INVOICE NO & DATE	
QUANTITY	
SPEC & REV NO	
DATE OF INSPECTION	

Check Points (Relevant to PO)

SL NO	DESCRIPTION	OBSERVATIONS
1	Review of material TCs (including Copper, Mica tape, Polyester film TCs) for quantity, properties as per spec mentioned in PO. Correlation of Raw materials (Copper, Mica tape, Polyester film) to be incorporated in Vendor TCs of taped conductor.	
2	Compliance of approved vendor list and material grades of Raw materials (Copper, Mica tape, Polyester film etc.) as per applicable QAP/Specification as per annexure "A"	
3	Verification of vendor record of Copper, Mica tape, Polyester film to ensure traceability from CC rod to finished stage.	
4	Compliance of Witness points and other verification points as per applicable QAP and specification	
5	Verification of Shelf life of Mica tape used in mica tape conductor for this PO.	
6	Verification of storage conditions of tapes as per spec and calibration of temperature indicators, logbook register entries of storage temperature, dry and dust free environment etc. for materials used in this PO	
7	Verification of packing and marking as per spec. Special care for protection of water ingress during transportation in rainy season should be made.	

Other Details (For information only)

1	Details of Last surveillance audits/mica tape testing by BHEL/ NABL Accredited Lab	
2	Any other remarks	

Vendor
(Sign & Seal)

BHEL/TPIA
(Sign & Seal)

LIST OF APPROVED VENDORS AND GRADES

SL. NO.	DESCRIPTION
1)	CC Copper Rods to BHEL Spec. AA 12024/ ASTM B-49 a) Hindalco Industries Ltd., Mumbai b) Hindustan copper Ltd., Mumbai c) Sesa Sterlite Limited, Mumbai
2)	The polyester film is to be procured by the insulated copper conductor manufacturers directly. The polyester film used should be of following makes and grades only. <u>Polyester film non-adhesive tape to BP22887 (0.019 X 12 mm)</u> a) E.I. DuPont India Pvt. Ltd. (Supplier Grade – Mylar A or Melinex S) b) Mitsubishi Polyester film GMBH (Supplier Grade – Hostaphan RNK 19)
3)	The mica tape is to be procured by the insulated copper conductor manufacturers directly from any of the following vendors in the specified grades only : <u>Polyester film backed epoxy resin bonded mica paper tape to BP25185 (0.09 X 12 mm)</u> a) <u>For insulated conductors to spec. In Sk 46044 (H2)/ BP28189</u> a) M/s Lakshmanan Isola Pvt. Ltd., Bangalore as per BP25185 b) M/s Cogebi, Malaysia (Supplier Grade - KALASTIK 45.030) c) M/s Isovolta, Austria (Supplier Grade - CONDUCTOFOL 2009) d) M/s Von Roll, Switzerland (Supplier Grade - SAMICAFILM 315.14) e) M/s Krempel, Germany (Supplier Grade - KREMICA.FLEX K1034-09) b) <u>For insulated conductors to spec. In Sk 46044 (H1)</u> a) M/s Cogebi, Malaysia (Supplier Grade - KALASTIK 45.030) b) M/s Isovolta, Austria (Supplier Grade - CONDUCTOFOL 2009) c) M/s Von Roll, Switzerland (Supplier Grade - SAMICAFILM 315.14) d) M/s Krempel, Germany (Supplier Grade - KREMICA.FLEX K1034-09)