



**PLANT PURCHASING SPECIFICATION
BHOPAL**

BP 28189

REV NO. 13

PAGE 1 of 5

**SUPERSEDES
BP 28189 Rev.12**

**POLYESTER FILM - MICA TAPE INSULATED
RECTANGULAR COPPER CONDUCTOR**

1. GENERAL :

This specification governs the requirement of rectangular copper conductors insulated with a layer of polyester film tape, over which is applied one or two layers of Mica Paper Tape having polyester film as support foil for fine / medium or special grade of covering respectively. This support foil shall be on outside surface of the insulated conductor. Polyester film and mica paper tape shall be applied in same direction. The insulated conductor has temperature index of at least 155.

2. APPLICATION :

These conductors are used for stator coil of A.C. Machines.

3. COMPLIANCE WITH NATIONAL STANDARDS :

There is no Indian Standard covering this type of material.

4. SIZES :

The conductor shall be supplied to the size specified on our order.

5. TEST METHOD :

As stated against each clause.

6. SAMPLE FOR TEST:

5meter long sample of taped conductor shall be supplied for testing and approval purpose.

7. JOINTS:

No joints shall be made in the copper conductor after it is drawn. Any joint made during the drawing process shall be only resistance welded.

8. CONDUCTORS:

8.1 Conductor Material :

The bare conductor shall be manufactured from high conductivity copper complying with AA 12030 "Rectangular Copper Conductors - Annealed, controlled oxygen.

Note : It is preferable to manufacture conductor from continuous cast copper bars provided all other acceptance parameters and conditions remain same.

Revision :
Reviewed & Brought up to date

Issued by : 
**STANDARDS AND MATERIALS GROUP
TECHNICAL SERVICES DEPARTMENT**

Rev. 13

Date : 05.03.2022

Date of first Issue: Nov. 1972

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PLANT PURCHASING SPECIFICATION BHOPAL

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9. INSULATION :

9.1 Fine covering

1. One 30 % overlapped layer of Polyester Film Non-adhesive Tape to BP 22887.
2. One 30 % overlapped layer of Epoxy Mica Tape to BP 25185.

9.2 Medium covering

1. One 50 % overlapped layer of Polyester Film Non- Adhesive Tape to BP 22887.
2. One 50 % overlapped layer of Epoxy Mica Tape to BP 25185.

9.3 Special covering

1. One 30 % overlapped layer of Polyester Film Non- Adhesive Tape to BP 22887.
2. Two 30 % overlapped layers of Epoxy Mica Tape to BP 25185.

The thickness and width of Polyester Film and Mica Tape for all sizes of conductor as well as all types of covering shall be as given below.

Thickness of Polyester Film	0.019 mm
Width of Polyester Film	12 mm
Thickness of Mica Tape	0.09 mm
Width of Mica Tape	12 mm

Each layer of tape shall be continuous, firmly applied and substantially free from creases. No bonding of adhesive material shall be used except to anchor ends of tape. Any such bonding or adhesive material shall have no deleterious effect on the properties of insulation.

NOTE : To prevent the inclusion of copper dust or other extraneous matter under the tape covering, the conductor shall be fully cleaned by felt pads or other suitable means before entering the mica taping machine.

10. INCREASE IN DIMENSIONS DUE TO THE COVERING :

The increase in dimension due to covering shall be as stated below :

Type of covering	Max. increase in dimension due to covering (mm)
Fine	0.34
Medium	0.55
Special	0.70

However the overall dimensions shall not exceed the nominal size of the bare conductor plus maximum increase due to insulation as specified above.

11. PROPERTIES OF INSULATED CONDUCTORS :

11.1 Electrical Strength (BDV) at Room Temperature :

The Electrical Breakdown voltage test (AC) shall be conducted on 5 samples. The samples shall be heated in an oven at 150 ± 3 deg.C for 15 minutes and shall be cooled down to room temperature. These shall then be bent edgewise on a mandrel of 50 mm diameter. On visual examination, no damages / cracks should appear on insulated conductor surface after bending. Any bent sample with damages / cracks shall be discarded for testing and new sample shall be selected and processed as above.

The insulation shall be stripped off at the ends for electrical connection. The samples shall be placed in a metal vessel filled with steel balls of 1 to 3 mm diameter and vessel solidly connected to earth. A sinusoidal a.c. voltage of 50 HZ frequency is applied and increased from zero with uniform rate of approximately 200 volts per second until breakdown occurs. The electrical breakdown voltage (AC) shall not be less than the values specified below :

Type of Covering	BDV (kV)
Fine	2.5
Medium	3.5
Special	3.5

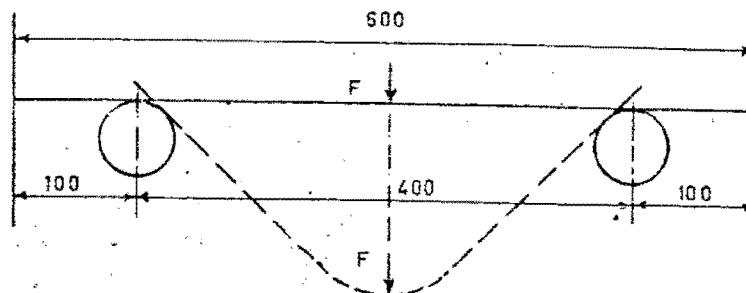
12. TEST AFTER REMOVAL OF POLYESTER-MICA PAPER TAPE

The covered conductor after removal of polyester - mica-paper tape shall meet the following requirements.

12.1 Hardness :

Area of Cross Section	Hardness (Hv)
Upto 8 mm ²	63, Max.
Above 8 mm ²	60, Max.

12.2 Stiffness Test upto 10 mm width :



The straightened flat wire 600 mm long, is placed with the width horizontal on 2 Rollers of 15 mm dia, and an axial distance of 400 mm so that there is a projection of 100 mm each on both sides.

Load is applied at the centre of the flat wire till it slides through the rollers.

The stiffness value X_w is calculated by the formula :-

$$X_w = \frac{F \times (100 \text{ mm})}{W} = \frac{N}{\text{mm}^2}$$

$$W = \text{Moment of Resistance} = \frac{B_1 S_1^2}{6} \text{ mm}^3$$

F = Load in Newtons

Where 'B₁' = width & 'S₁' = thickness, in mm

Three tests shall be carried out. The mean value shall not exceed X_w value as given in the table below :

Stiffness N/mm ²	Thickness mm			
	Upto 1.5	Over 1.5 Upto 2.5	Over 2.5 Upto 4	4 and above
X_w	130	140	145	150

13. TEST CERTIFICATE :

Unless otherwise specified three copies of the test certificate shall be supplied along with each consignment

In addition the supplier shall ensure to enclose one copy of the test certificate along with their dispatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information :

BP 28189 (Rev.13) : Polyester film-Mica Tape Insulated Rectangular Copper Conductors.

BHEL Order No.

Batch No.

Test values obtained & certificate of compliance with clause 8 to 12.



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14. PACKING AND MARKING :

The covered conductor shall be wound on drums generally conforming to IS:2069. About 60 kg of covered conductor shall be supplied in each drum. If cross section of covered conductor exceeds 15 sq. mm. bobbin dia shall be 400 to 450 mm otherwise it shall be around 300 mm. Flange dia to suit above bobbin dia shall be selected.

The wire shall be protected against possible damage, from the inner faces of the flanges of the drums, by lining each flange with thick paper or card-board. Paper spacers shall be filled in the empty space between conductor and flange of the drum.

A layer of packing paper shall be inserted between each layer of conductor during winding on drums.

Each drum shall be marked with the following :


BP 28189 : Polyester film - Mica Tape Insulated Rectangular Copper Conductors.

BHEL Order No.

Suppliers Name.

Size of Conductor.

Weight of wire (i) Gross (ii) Net.

 BHOPEL	INSULATION SKETCH		IN.SK. 46044
	INSULATION SYSTEMS ENGINEERING		Rev. No.: 03
	GUIDELINES FOR TAPING BARE RECTANGULAR COPPER CONDUCTOR FOR H-COMPACT DESIGNS		Rev. Dt.: 11/04/2016
			Sht. 1 of 2 shts.

INSULATION CLASS - F

1. GENERAL

This Insulation sketch gives the details for taping bare rectangular copper conductors to **AA-12030**. The insulated conductor will be used for manufacturing stator coils for H-Compact designs. This sketch is applicable for coils with voltage per turn ≤ 250 volts. The insulated conductor has temperature index of at least 155°C .

2. INSULATION

2.1 H-1 Covering (For Normal/ Parallel Coils)

The conductors shall be taped with one half lap layer of Polyester Film Backed Epoxy Resin Bonded Mica Paper Tape to **BP 25185** (0.09 thk. x 12 wide). The lapping of the tape shall be between 42% to 50% (lapping more than 50% is not allowed). Taping shall be done such that the polyester side of the tape faces outside.

Maximum increase in dimension after insulation shall be **0.5 mm**.

Compressed dimension for slot build-up calculation = **0.35 mm**.

2.2 H-2 Covering (For Series Coils)

The conductor shall be taped with polyester film tape followed by mica paper tape having polyester film as support foil. Both the tapes shall be applied in the same direction. The method of taping is given below:

1. The conductors shall be taped with one half lap layer of Polyester Film Non-adhesive Tape to **BP 22887** (0.019 thk. x 12 wide). The lapping of the tape shall be between 42% to 50% (lapping more than 50% is not allowed).
2. The above shall be followed with one half lap layer of Polyester Film Backed Epoxy Resin Bonded Mica Paper Tape to **BP 25185** (0.09 thk. x 12 wide). The lapping of the tape shall be between 42% to 50% (lapping more than 50% is not allowed). Taping shall be done such that the polyester side of the tape faces outside.

Maximum increase in dimension after insulation shall be **0.55 mm**.

Compressed dimension for slot build-up calculation = **0.4 mm**.

Distribution:	Date of Rev. 00: 26/08/2005	Name	Signature
CIM (IMCW)	1	Prepared by	Abha Otti
CIM (PLANNING – IMCW)	1	Checked by	Nidhi Gupta
QCX (CIM)	1	Approved by	Bishwanath Oraon
TECH-CIM	1		
AME	2	Issued by	Abha Otti

ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED



INSULATION SKETCH	IN.SK. 46044
INSULATION SYSTEMS ENGINEERING	Rev. No.: 03
GUIDELINES FOR TAPING BARE RECTANGULAR COPPER CONDUCTOR FOR H-COMPACT DESIGNS	Rev. Dt.: 11/04/2016
	Sht. 2 of 2 shts.

3. DIMENSIONAL CHECK

The dimensions of the bare copper conductor and taped copper conductor shall be measured and recorded on the copper drums.

4. ELECTRICAL STRENGTH (BDV) OF INSULATED CONDUCTOR AT ROOM TEMP.

Type of Covering	BDV (kV)
H-1	3.0 (Min.)
H-2	3.5 (Min.)

Refer BP 28189 for method of testing.

5. OTHER TESTS AND REQUIREMENTS

The hardness, stiffness and all other requirements of the taped conductor shall be as per BP-28189.


6. CHANGES DUE TO REVISION

Insulation sketch updated.

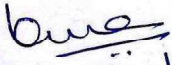
Annexure -1


Terms & Conditions:-

1. Rate contract shall be on finish basis and there is no free issue material against this RC.
2. The delivery of material should be within 4 weeks from the date of LOI. In case of hold on project after PO placement, the copper booking of corresponding size may be utilized for other available sizes as decided by BHEL.
3. QA plan (BHEL QA Plan-QA/MT/BOI/049, Rev 03, dtd-28.02.24) should be strictly followed (**Annexure -a**).
(Note: As per MOM between NTPC & BHEL dated 25-01-16, NTPC approved vendors are BHEL approved sub-vendors having permanent vendor registration code & VPR greater than 75% for the specific item.)
4. Copper & tapes shall be procured from BHEL approved vendors only (REFER QA PLAN). Compliance to INSK46100, Rev 01 is mandatory (**Annexure -b**).
5. Test Certificate of copper & tapes used for manufacturing specific PO item should be provided along with the consignment. TC's reference of raw material & tape should appear in main TC of specific PO item for traceability. The material is liable to be rejected in case of noncompliance of above condition.
6. The material is to be supplied in good quality non-returnable wooden or returnable plastic bobbins. Each vendor shall be allotted a distinctive colour for plastic bobbins. The plastic bobbins shall be returnable and available empty plastic bobbins shall be collected by the vendor on every third working day on 'as is where is' basis else they may be scrapped by BHEL Bhopal. The empty wooden drums are non-returnable. The copper received in broken or damaged bobbin shall be rejected as it is.
7. Tag on each bobbins should be in the format attached (**Annexure-c**).
8. Our customer has asked BHEL to furnish the Mica tape used for supplies of MTCW. In view of this, a roll of Mica tape to BP25185 of every manufacturer shall be required to be submitted to BHEL for purpose of testing in every six months.
9. The PO quantity shall be on weight basis. However, length supplied in each bobbin shall be as mentioned in PO. The net weight per drum may lie in the range of 30 to 75 kg each.
10. Quantity tolerance +/- 30% is allowed against rate contract quantity and +/- 2% quantity tolerance is allowed against individual PO placed against rate contract..
11. Length per drum is very important. It should not be less than as specified in PO for each drums, in any case.
12. Rate contract may be terminated at any stage as decided by BHEL, Bhopal.


29/02/24
Sr. Manager- CIM (उत्पादन) / Sr. Manager (Prodn.)
प्रीति निमजे / PREETI NIMJE
सी.आई.एम. विभाग / CIM Division
बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

AGM (CIM, CIT, DVS & PRM)


29/02/24
वी. वी. खरे / V. V. KHARE
अपर महाप्रबंधक / Addl. General Manager
सी.आई.एम. सी.आई.टी. वी.वी.एस.ए.ओ.आर.एम. / CIM, CIT, DVS & PRM
बी.एच.ई.एल., भोपाल / B.H.E.L., BHOPAL


29.02.24
(Ram Kumar Singh)
राम कुमार सिंह / RAM KUMAR SINGH
उप-प्रबंधक / Dy. Manager
सी.आई.एम. विभाग / CIM Division
बी.एच.ई.एल., भोपाल / B.H.E.L., BHOPAL



BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL

QUALITY ASSURANCE MOTORS

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

PAGE 1 OF 2

DATE: 28.02.2024

REV.03

QA PLAN NO : QA/MT/BOI/049

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



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.03

DATE: 28.02.2024

PAGE 2 OF 2

SL.	COMPONENT /STAGE	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
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 VERIFICATION OF SHELF LIFE, STORAGE OF TAPE AT <= 25 DEG C, FREE FROM SEPRATION/DELAMINATION OF POLYESTER AND MICA	T	SAMPLE/LOT	BP25185	TC	MANUFACTURER	TC 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/PHYSICAL VERIFICATION OF STORE AND TEMPERATURE INDICATOR REVIEW BY BHEL/TPIA 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.
06	PACKING AND MARKING	RESISTIVITY/ CONDUCTIVITY	T	SAMPLE/LOT	BP28189/ INSK46044	IR	MANUFACTURER	CHP FOR WITNESS BY BHEL/TPIA
		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								


(ASHISH MOHAN TELGOTE)
 Manager (QA-MOTORS)



(F.A. TOPPO)
 AGM (QEM & QTM)

ANNEXURE "A" TO CHECKLIST REFERENCE: QFD/CIM/BOI/18-19/01 REV 01-DATED
28.02.24





BHEL APPROVED SOURCES

S. NO.	DESCRIPTION
1)	<p>CC Copper Rods to BHEL Spec. AA 12024/ ASTM B-49</p> <p>a) HINDALCO INDUSTRIES LTD., MUMBAI b) HINDUSTAN COPPER LTD., MUMBAI c) SESA STERLITE LTD., MUMBAI</p>
2)	<p>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.</p> <p>Polyester Film Non-Adhesive Tape to BP22887 (0.019 mm X 12 mm)</p> <p>a) E.I.DUPONT INDIA PRIVATE LIMITED (Supplier Grade - MYLAR A/ MELINEX S) b) MITSUBISHI POLYSTER FILM GMBH (Supplier Grade - HOSTAPHAN RNK 19)</p>
3)	<p>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.:</p> <p><u>Polyester Film Backed Epoxy Resin Bonded Mica Paper Tape to BP25185 (0.09 mm X 12 mm)</u></p> <p>For insulated conductors to spec In Sk 46044 (H1)</p> <p>a) COGEBI ASIA SDN BHD (KALASTIK 45.030) b) ISOVOLTA AUSTRIA (CONDUCTOFOL 2009) c) KREMPEL GMBH (KREMICA.FLEX K1034-09) d) VON ROLL SWITZERLAND LTD. (SAMICAFILM 315.14) e) RUBY MICA COMPANY LIMITED, GIRIDIH</p> <p>For insulated conductors to spec In Sk 46044 (H2)/ BP28189</p> <p>a) COGEBI ASIA SDN BHD (KALASTIK 45.030) b) ISOVOLTA AUSTRIA (CONDUCTOFOL 2009) c) KREMPEL GMBH (KREMICA.FLEX K1034-09) d) LAKSHMANAN ISOLA (P) LTD., BANGALORE e) VON ROLL SWITZERLAND LTD. (SAMICAFILM 315.14) f) RUBY MICA COMPANY LIMITED, GIRIDIH</p>

Revision details : M/s Ruby Mica Co. Ltd. added in approved vendor list for above Sr. no. 3.

 An ISO 9001:2015 Company	INSULATION SYSTEMS ENGINEERING	IN. SK. 46100
		Rev. No.: 01
	ANNEXURE TO QUALITY PLAN FOR MICA TAPED CONDUCTOR TO BHEL SPEC. BP28189/ IN.SK.46044 (QA PLAN NO. : QA/MT/BOI/049)	Rev. Dt.: 04/08/2023
		Sht. 1 of 2 shts.

SL. NO.	DESCRIPTION	VENDOR'S RESPONSE
		COMPLIANCE (YES / NO)
1)	Mica tape to spec. BP25185 to be stored at $\leq 25^{\circ}\text{C}$ in dry and dust free environment. Shelf life expired material not to be used.	YES / NO
2)	The insulated conductor manufacturer may be asked to send mica tape/ polyester film tape sample (from regular lots) to BHEL Bhopal for inspection and testing, if required, on surveillance basis. The tape/ tapes if found not meeting BHEL specification/ application requirements or having other application/ visual defects may be put on hold by BHEL until further decision regarding pending lots. Vendor is also advised to get the mica tape/ polyester film tested on regular basis either in BHEL (on chargeable basis) or through other third party NABL accredited Lab to ensure the quality of insulation being used.	YES / NO
3)	BHEL may visit the vendor's works for inspection of mica tape, storage conditions etc., on surveillance basis. If inadequate storage/ expired shelf life material found in use at vendor's works, the whole lot is liable to be rejected/ put on hold.	YES / NO
4)	Suitable action shall be taken against vendors found using shelf life expired tape/ tape not meeting BHEL spec. requirements.	YES / NO
5)	Insulated conductor should be free from visible defects such as wrinkles/ flaking in taping, improper overlap, presence of foreign substances, separation of mica from polyester, tackiness in insulated conductor, spots on bare copper, etc.	YES / NO
Seal and sign of vendor's representative →		

Distribution:	Date of Rev. 00: 25/07/2018	Name	Signature
CIM CMM AME QFD ISE	Prepared by	Abha Otti	
	Checked by	Nidhi Gupta	
	Approved by	Bishwanath Oraon	
	Issued by	Abha Otti	
BHEL BHOPAL			

Annexure-c

FORMAT FOR LABELLING TO BE DONE ON THE FLANGES OF EACH PACKED DRUM

M/S			
EDS-			
COND. SIZE (BARE)		REEL NO.	
COND. COVERING / COND. SPEC.		GROSS WT.(IN KG)	
COND. SIZE (COVERED)		TARE WT.(IN KG)	
PO NO.		NET WT.(IN KG)	
PO ITEM NO.		LENGTH(IN MR)	

FORMAT OF LABELLING TO BE DONE BETWEEN THE FLANGES ON EACH PACKED DRUM OF

PO NO	
PO ITEM NO	
SUPPLIER	
COND. SIZE(BARE)	
COND. SPEC.	
LENGTH OF COND.	
NET WT.(IN KG)	
REEL NO.	



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 01-DATED 28.02.24

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)

Mandatory Pre-Qualification Requirements (PQR) For Vendors for Supplying Mica Paper Taped Rectangular Copper Conductor/ Wire to BHEL Specifications BP28189 & IN. SK. 46044 through Open Tender

Technical PQR			
Sl. No.	Description of Pre-Qualification Requirement (PQR)	Vendor's Response	
		Compliance (Tick/ Strike off as applicable)	Supporting Documents/ Information/ Confirmation to be submitted for Compliance
1)	Only Original manufacturers are eligible	Yes/ No	Factory license or certificate (ISO certificate, etc.) or documentary evidence of being original manufacturer of this item
2)	Bidders to confirm complete compliance to specifications, size and quantity as per BHEL enquiry/NIT	Yes/ No	Signed & stamped copies of specifications BP28189 and IN. SK. 46044 to be submitted confirming compliance. No deviation to specifications BP28189 and IN. SK. 46044 is acceptable.
3)	Bidder to confirm complete compliance to QAP QA/MT/BOI/049 and its associated documents/ annexures	Yes/ No	<ol style="list-style-type: none"> 1. Signed & stamped copies of QAP QA/MT/BOI/049, Annexure to QAP (IN. SK. 46100) to be submitted confirming compliance. 2. Manufacturer test certificates of raw materials (CC Copper Rods, Polyester Film Non-Adhesive Tape and Mica Tape) used in supplies to BHEL should be submitted with the dispatch documents along with insulated copper supplies.
4)	<p>Bidder must have in-house plant and machinery required to manufacture the tendered item as per respective technical specifications.</p> <p>Following facilities must be available:</p> <ol style="list-style-type: none"> a) Manufacturing facility for bare rectangular copper conductor/ wire b) Mica paper tape and polyester film taping facility on rectangular copper conductor/ wire 	Yes/ No	<p>Following to be submitted –</p> <ul style="list-style-type: none"> ➤ Plant & machinery facility available for manufacturing the tendered item (Refer indicative format Document no. M&P/001) ➤ Photographs of manufacturing facilities at vendor's works for bare rectangular copper conductor/ wire and mica taping (like copper drawing, annealing and mica taping machine) to be submitted.

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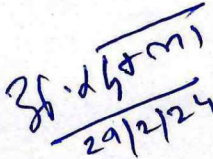
5)	All testing facilities and measuring equipment required for testing the material as per specifications AA12030/BP28189/ IN. SK. 46044 shall be available with the firm (either in-house or outsourced). The outsourced testing facilities should be duly calibrated and traceable along with accreditation in accordance to ISO 17025 to either NABL or ACCAB or equivalent international accreditation agency.	Yes/ No	Details of testing facilities and measuring equipment available for testing the tendered item as per respective specification(s) along with list of outsourced facilities (if used), to be provided (Refer indicative format Document no. TF/001). Proof of NABL/ ACCAB/ equivalent international agency accreditation in accordance of ISO 17025 of outsourced facilities to be submitted with supplies.
6)	<p>Supply Experience:</p> <p>The bidder should have successfully executed at least 3 orders (of minimum quantity 2 metric tons each) of mica paper taped rectangular copper conductor in the last seven years* to rotating electrical machine (motor/generator) manufacturer. Out of the above three POs, at least one should not be more than two years old*</p> <p>* Example – Last 5 years means current financial year and 5 previous financial years before the bid opening date</p>	Yes/ No	<ul style="list-style-type: none"> ➤ Documentary proof legible (PO and corresponding invoices) of supply by the bidder are to be submitted. Contact details of PO issuing authority with name, mobile no. and email id to be provided for facilitating verification of documents. ➤ Actual supplies made during the stipulated time will be considered (invoices should corroborate the same) ➤ The documents submitted as per above should clearly indicate the nature of copper covering (like mica taped) and customer to which supplies have been done ➤ Additional documents/specifications may have to be submitted, if required, to establish the sufficiency of supply experience
7)	The bidder should have minimum monthly supply capacity of	Yes/ No	Confirmation to be submitted
	a) 4 metric tons for IN. SK. 46044 (H1)		
	b) 8 metric tons for BP28189/ IN. SK. 46044 (H2)	Yes/ No	Confirmation to be submitted
8)	Manufacturing facilities assessment may be carried out by BHEL at supplier's works if required	Yes/ No	Confirmation to be submitted
Financial PQR			

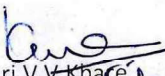
Sl. No.	Description of Pre-Qualification Requirement (PQR)	Ref Doc Submission Yes/No	Supporting Documents/ Information/ Confirmation to be submitted for Compliance
9)	➤ Average annual turnover of at least Rs 2.55 crores of last 3 financial years ending March 2023.		<p>Audited Balance Sheets or Profit & Loss statement of relevant periods or CA certificate certifying turnover for the required financial years must be submitted, which must be on his letter head mentioning his and his firm name, membership number, FRN no, UDIN, capacity in which he is signing (Proprietor/Partner), date and place of signing.</p> <p>In case the date of constitution / incorporation of the bidder is less than 3-yearold, the average turnover in respect of the completed financial years after the date of constitution shall be taken into account for this criteria.</p>

Note:

1. Compliance to above pre-qualification requirements (PQR) is mandatory. In absence of compliance to these requirements, vendor's offer is liable to be rejected.
2. BHEL reserves the right to verify the information submitted by the vendor. In case the information submitted is found false or incorrect, the offer will be rejected and suitable action may be taken as per extant guidelines.
3. BHEL has the right to verify information/ confirmation furnished, by asking for additional documents, proofs, etc.
4. All supporting documents submitted shall be valid on bid opening date failing which the offer is liable to be technically rejected.


 27.02.24
 Shri M K Maravi
 AGM (AME)


 29/2/24
 Shri Anurag Shukla
 AGM (QFD)


 29/2/24
 Shri V Khare
 AGM/CIM,CIT,DVS & PRM


 27/2/24
 Shri Yogesh Edla
 Sr. DGM/CMM-Copper

“Name of the firm”

ANNEXURE -2

Page 1 of 2

1.0 ORGANISATION CHART

“Name of the firm”

2.0 QUALIFICATION / EXPERIENCE OF PERSONNEL

Qualification of key personnel and the officials deployed

SL No	Name	Designation	Technical qualification	Experience	Responsibility

PREPARED BY	APPROVED BY
Name & Signature	Name & Signature

Document no. M&P/001

“Name of the firm”

ANNEXURE-3

Page 1 of 1,

1.0 AVAILABILITY OF MACHINERY & PLANTS (M&P) WITH THE FIRM

Details of the M&P							
Sl. No.	Name of M&P	Model	Make	Machine No.	Year of Built	Range /Capacity	Proof of ownership

PREPARED BY	APPROVED BY
Name & Signature	Name & Signature

“Name of the firm”

1.0 AVAILABILITY OF TESTING FACILITIES WITH THE FIRM

Details of the TESTING FACILITIES							
Sl. No.	Name of TESTING FACILITY	Model	Make	Machine No.	Year of Built	Range /Capacity	Proof of ownership

PREPARED BY	APPROVED BY
Name & Signature	Name & Signature