


प्रत्येक पृष्ठ पर SIGN & DATE		उत्पाद क्रय विनिर्देश (हीप : हरिद्वार) PRODUCT PURCHASE SPECIFICATION (HEEP: HARIDWAR)	TG60536 मुख्य पृष्ठ PREFACE SHEET
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प्रत्येक पृष्ठ पर SIGN & DATE	SUPERSEDES INVENTORY NO. सामग्री	<u>SILVER BEARING COPPER PROFILES</u>
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केवल आंतरिक प्रयोग हेतु
 प्रदायक को देने से पूर्व इस मुख्य पृष्ठ को निकाल दें।
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ANY OTHER INFORMATIONS

प्रत्येक पृष्ठ पर SIGN & DATE	SUPERSEDES INVENTORY NO. 6165	स्वीकृति APPROVED : R.C. SHARMA <i>R.Sharma</i> 19.2.22	Gr. No. 2.65
REV.NO. 03	DATE 19.02.22	तैयार PREPARED : TGE	जारी ISSUED : TSX
			दिनांक DATE : 07.09.98

SUPERSEDES INVENTORY NO.	SILVER BEARING COPPER PROFILES
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHEL Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>1. GENERAL: This specification governs the quality of silver bearing copper conductors and filler profiles.</p> <p>2. APPLICATION: Used for rotor coils in Turbogenerators.</p> <p>3. COMPLIANCE WITH NATIONAL STANDARDS: There is no standard covering this material. This specification is broadly based on Siemens TLV 9716-04: April 2000 and TLV 9713-02: October 2000 and BHEL Experience.</p> <p>4. DIMENSIONS AND TOLERANCE:</p> <p>a) Profile Size: Dimensions of conductor and filler profiles and Tolerances thereof shall be as per drawing/purchase order.</p> <p>b) Length: The conductor and filler profiles shall be supplied in straight lengths as per drawing/purchase order. The straight lengths shall be cut within +10/-0 mm of the length specified in the drawing/order.</p> <p>c) Straightness and flatness over length: For material Grade 2, the deviation from straightness across both axes 'X' and 'Y' should not be more than 0.5 mm/m and 2 mm on the overall length. Any deviation from straightness shall be gradual and not abrupt. The angle of any deviation shall be such that if the angle was continued, the deviation obtained would not exceed the values specified over the corresponding lengths.</p> <p>5. SELECTION OF TEST SAMPLES: Two test samples shall be taken from each melt for each conductor and filler profile of material supplied against any order, to determine mechanical properties, chemical composition, hydrogen embrittlement test and electrical resistivity.</p>
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New Version SIGN & DATE	19/02/22	TSX MTE QAX PSG MEMBER	Ashish B.G. TRIPATHI N. D. ...	TRANSLATED BY WORKED BY CHECKED BY SUPERVISED BY	SHIVANGI GUPTA ASHA GUPTA ASHA GUPTA	नाम NAME दिनांक एवं हस्ताक्षर SIGNATURE & DATE
SUPERSEDES	REV.NO. 03 DATE 19-02-22 CHANGE ADVICE NO. TGE-22-24	स्वीकृति APPROVED : R.C. SHARMA		जारी ISSUED: TSX	दिनांक DATE: 07.09.98	
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6. CHEMICAL COMPOSITION:
 Test shall be carried out on the finished material in the condition as supplied and the material shall conform to the following Chemical Composition applicable for CuAg0.1P as per DIN EN 13605:

Silver (Ag)	0.08-0.12%
Phosphorus (P)	0.001-0.007%
Bismuth (Bi)	0.0005% max.
Copper	Residual
Total Impurities	0.03% max.

7. MECHANICAL PROPERTIES:
 The material when tested in accordance with DIN EN ISO 6892-1 or IS 1608 shall meet the following properties:

	Grade 1	Grade 2
	CuAg0.1PF20	CuAg0.1PF25
Tensile Strength	200-250 N/mm ²	≥220 N/mm ²
0.2% proof stress	≤120 N/mm ²	≥190 N/mm ²
Elongation (5.65x vS ₀)	≥38 %	≥17 %
Hardness	45-70 HB	70-90 HB

8. MANUFACTURE:
 The conductor and filler profiles are to be manufactured by extrusion followed by cold drawing.

9. FINISH:


- The surface must be shining, smooth and free of surface imperfections such as tool marks, cracks, fractures, inclusion of slag/foreign particles, peeling and other similar flaws.
- The conductor and filler profiles must be free of grease, metal chips, residues, burnt drawing agents or other reaction products.
- The cooling canals must have a clean, bright surface free from grease and oil. Acid residues and engrained or loose particles of copper are not permitted. In case the canals are shot blasted, they must be free of residues of blasting agents.

10. ELECTRICAL RESISTIVITY:
 The electrical resistivity of the material in as received condition at 20°C, shall not be more than 0.01786 ohm mm²/m i.e. 96.53 % IACS value (Conductivity ≥56 m/ohm mm²).

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प्रयोगशाला का गोपनीय
 इस दस्तावेज में दी गई जानकारी प्रयोगशाला का स्वतंत्र संपत्ति है। इसे बिना अनुमति के किसी भी प्रकार से प्रकाशित, प्रतिलिखित, प्रसारित या अन्य किसी भी प्रकार से प्रयोग नहीं किया जानना चाहिए।

Date of issue SIGN & DATE		<h2 style="margin: 0;">उत्पाद क्रय विनिर्देश (हीप : हरिद्वार)</h2> <h3 style="margin: 0;">PRODUCT PURCHASE SPECIFICATION</h3> <p style="margin: 0;">(HEEP: HARIDWAR)</p>	<h2 style="margin: 0;">TG60536</h2>
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11. TEST METHODS:

- a) **MECHANICAL PROPERTIES:** This is to be done as per DIN EN ISO 6892-1 or IS 1608. The test pieces shall be taken from the central ridge of the profile for 2-canal profiles and from the wide portion besides the cooling canal for 1-canal profile.
- b) **ELECTRICAL RESISTIVITY:** This is to be done as per DIN EN 13605 or IS 3635.
- c) **TESTING FOR HYDROGEN EMBRITTLEMENT SUSCEPTIBILITY:** Close Bend Test is to be conducted as per ISO 2626 or ASTM B577 or IS 191 for ensuring oxygen freedom of the silver bearing copper.
- d) **SURFACE EXAMINATION:** The outer surfaces of 100% hollow conductors and filler profiles are to be visually inspected for surface flaws. The examination of cooling canals of hollow conductors is to be done on test pieces of approximately 30mm long cut from both the ends of conductors for each profile. The canal must be cut along their length and evaluated with the naked eye.

12. TEST CERTIFICATES:

Test certificates shall be furnished which shall give the following information:

- a) BHEL Purchase Order no.
- b) BHEL Drawing No.
- c) Purchase specification no. and material grade
- d) Size and no. of conductor and filler profiles
- e) Melt no.
- f) Dimensional report
- g) Test result of mechanical properties, electrical resistivity and chemical composition
- h) Surface examination report
- i) Test results of Hydrogen Embrittlement Test

13. PACKING:

Each conductor/filler profile is to be identified by markings at the end with respective material code. The conductor and filler profiles shall be suitably packed in wooden boxes for sea worthy transport which shall be finished smooth internally with no protruding screws or nail ends so as to prevent damage from bending, twisting, moisture, etc. during transit and storage.

Each box shall be labelled giving the following information:

- a) Manufacturer's name and trade mark
- b) BHEL purchase order no.
- c) Purchase specification no. and material grade
- d) Size and no. of conductor and filler profiles
- e) Net and gross weight

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			जाचकर्ता CHECKED BY	ASHA GUPTA	 19.02.22



उत्पाद क्रय विनिर्देश (हीप : हरिद्वार)
PRODUCT PURCHASE SPECIFICATION
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TG60536

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14. ACCEPTANCE:

Acceptance of the material shall be based on verification of the Test Certificates. If any concealed or non-admissible flaws are found/established at later stage, the entire lot of material shall be returned to the vendor.

15. CROSS-REFERRED STANDARDS:

- a) EN13605
- b) DIN EN ISO 6892-1
- c) IS 1608
- d) IS 191
- e) ISO 2626
- f) IS 3635
- g) ASTM B577

Handwritten signature and date

REV. NO.
 03

निर्माकता WORKED BY	SHIVANGI GUPTA
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