

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 19361
			पृष्ठ का Page 1 of 4

SUPERSEDES
INVENTORY NO.

STEEL FORGINGS FOR BEARING LINERS / SHELLS
(Gr : C 22+N)

Based on TLV 9056 01 10/2006

1.0 GENERAL:

This specification governs the quality requirements of low hydrogen content Steel Forgings (Gr: C 22+N; material no. 1.0402) in heat treated condition.

2.0 APPLICATION:

Suitable for bearing liners / shells to be used for babbitting purpose.

3.0 CONDITION OF DELIVERY:

Normalized.
Unless otherwise specified in BHEL order / drawing, rough machining of the forgings shall be carried out.

4.0 DIMENSION AND TOLERANCES:

Forging shall be supplied to the dimensions and tolerances as per the ordering drawing.

5.0 MANUFACTURING:

Forgings shall be manufactured from steel produced by the electric furnace. Hydrogen content in the steel shall not exceed 3 ppm. It is recommended to use vacuum treated steel. If this is not feasible, then dehydrogenation annealing is to be carried out at 650°C for 30 hours. The prescribed hold time of 30 hours may be achieved during successive heat treatment (e.g. 5 X 6 hours), provided a cumulative hold time of 30 hours at 650°C is obtained.

Sufficient discard shall be made from each ingot to ensure freedom from pipe, segregation and other defects. The ingot shall be thoroughly forged under suitable press / hammer to ensure homogeneity throughout the complete section.

6.0 HEAT TREATMENT:

The forging shall be normalized as per EN 10083-2 to get the mechanical properties specified as per CI 11.0.

Normalizing temperature shall be between 880-920°C.

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स्वाधिकार एवं गोपनीय
इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रकाश एवं अप्रकाश रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।

हस्ताक्षर एवं दिनांक
SIGN & DATE
11/9/09

सामग्री सूची संख्या
INVENTORY NO.
P-2981

TSX				नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
IPSc	V.K. Chauhan	<i>[Signature]</i>	अनुवादक TRANSLATED BY		
STE	A. SHAH	<i>[Signature]</i>	निर्माणकर्ता WORKED BY	SUJEET KUMAR	<i>[Signature]</i> 8/11/09
QAX	NK Manwani	<i>[Signature]</i>	जांचकर्ता CHECKED BY	ASHISH RANJAN	<i>[Signature]</i> 8/11/09
सहभत विभाग AGREED DEPTT	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	JP MEENA	<i>[Signature]</i> 9/9/09
स्वीकृति APPROVED : PLANT STANDARDS COMMITTEE			G.No 2.60		
REV 03			निर्माण PREPARED : MTE	जारी : मानक विभाग ISSUED : STANDARDS DIVISION	दिनांक : DATE : 26-8-1986
10-09-09					

शीप की संस्था को अधिकारित करना है
 SUPERSEDES INVENTORY NO.

7.0 FINISH:
As mentioned in the drawing.

8.0 FREEDOM FROM DEFECTS
The forgings shall be free from defects such as cracks, flakes, seams, segregation, non-metallic inclusions and other defects which may affect the utility of the forgings.

9.0 CHEMICAL COMPOSITION

Heat analysis in weight % shall be as follows:

C	0.17 - 0.24	Si	≤ 0.40	Mn	0.40 - 0.70
P	≤ 0.045	S	≤ 0.045	Cr	≤ 0.40
Mo	≤ 0.10	Ni	≤ 0.40	H₂	≤ 3 ppm
Cr+Mo+Ni			≤ 0.63		

Slight deviation in chemical composition are permissible after agreement by the purchaser, provided service properties are not affected. However, the maximum carbon content shall not be exceeded.

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10.0 TEST SAMPLES:
A hardness test shall be performed on all forgings.

The mechanical properties (1tensile specimen) are to be determined at one forging per melt and heat treatment batch. In the case of rings, the specimens are to be taken out of a tangential ring.

In case of bars, the specimens are to be taken in longitudinal direction according to EN 10083-1. For bars with diameter (d) or side lengths (a,b) > 100 mm, the specimens shall be taken at a distance d/3 or a/3 and b/3 from the respective surfaces. In this case, transverse specimens are also allowed. Additional tests are to be specially agreed upon.

When different dimensions are produced within the same heat and heat treatment batch, the heaviest one shall be used for the determination of the mechanical properties. The tangential test ring or the sample for determination of the mechanical properties may not be cut from the forging before the heat treatment.



स्वत्वाधिकार एवं गोपनीय
 इस प्रलेखन में की गई सूचना भारत भारी इंजीनियरिंग्स की सम्पत्ति है. इसका प्रयोग एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाना है.


11.0 MECHANICAL PROPERTIES
Mechanical test, shall always be carried on the heaviest section forgings of the same melt and heat treatment batch.



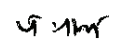
11.1 Tensile:
When tested as per IS:1608, the test pieces after being heat treated as per CI:6.0 shall show the following properties.

Yield strength : 240 N/mm², min.
 Tensile strength : 420 - 530 N/mm²
 Elongation (l = 5d), % min. : 27

हस्ताक्षर एवं दिनांक
SIGN & DATE
 11/14/07

शीप की संस्था INVENTORY NO. P-2981	REV 03	निर्माणकर्ता WORKED BY ASHISH		20.03.07
		जांचकर्ता CHECKED BY J.P. Meena		20.03.07

दिनांक एवं स्थान SIGN & DATE		<p align="center">संस्थान क्रय विनिर्देश (हीप - हरिद्वार)</p> <p align="center">PLANT PURCHASE SPECIFICATION</p> <p align="center">(HEEP - HARIDWAR)</p>	<p align="right">HW 19361</p> <p align="right">पृष्ठ का Page 3 of 4</p>	
सामग्री सूची संख्या को SUPERSEDES INVENTORY NO.		<p>11.2 HARDNESS - BRINELL (For information only): min. 120 HB30</p> <p>12.0 NONDESTRUCTIVE TESTING:</p> <p>12.1 Following NDE shall be performed in delivery condition:</p> <ul style="list-style-type: none"> - Visual inspection - 100% UT- inspection according to EN 10228-3. <p>Depending on the forging geometry, following inspection types are applicable:</p> <ul style="list-style-type: none"> - for long type components type 1 (table 3) - for discs and plate- like components: type 2 (table 3) - for ring or bushing- like components: type 3b and 3c (table 3) <p>12.2 Criteria for registration and decision</p> <p>Regarding the UT- inspection quality class 3 (table 5) according to EN10228-3 shall be applied.</p> <p>The decision limit for loss of back wall echo is ≤ 4 dB and for the real reflector length 10 mm.</p> <p>13.0 RECTIFICATION OF DEFECTS:</p> <p>Rectification of defects in forgings shall not be carried out by the supplier without the prior written permission of BHEL.</p> <p>14.0 TEST CERTIFICATES:</p> <p>Unless otherwise stated in the order, three copies of test certificates shall be supplied as per 3.1 of EN10204.</p> <p>In addition, the supplier shall ensure to enclose one copy of the test certificate alongwith their despatch documents to facilitate quick clearance of the material.</p> <p>The following details shall be furnished in the test certificate:</p> <p>HW19361 : Steel forgings – C 22+N BHEL order Heat No. , and melting type. Dimensional inspection Details of heat treatment cycle followed. Results of chemical analysis Results of mechanical tests, including hardness test. All individual values shall be reported. Results of ultrasonic tests Confirmation of the visual inspection Results of additional tests called for in the drawing/order. Mill test certificate</p>		
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<p align="center">स्वात्सधिकार एवं गोपनीय</p> <p>इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है सुरक्षा प्रयोजन एवं आरक्षण रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।</p>				
<p>स्थान एवं दिनांक SIGN & DATE</p> <p><i>20/1/06</i></p>				
<p>सामग्री सूची संख्या INVENTORY NO.</p> <p>P-2981</p>	<p>REV 03</p>	<p>निर्माणकर्ता WORKED BY</p> <p>ASHISH</p>	<p>जांचकर्ता CHECKED BY</p> <p>P. N. N.</p>	<p>21/1/06</p> <p>20/2/06</p>

दिनांक एवं हस्ताक्षर SIGN & DATE		<p style="text-align: center;">संस्थान क्रय विनिर्देश (डीप - हरिद्वार)</p> <p style="text-align: center;">PLANT PURCHASE SPECIFICATION</p> <p style="text-align: center;">(HEEP - HARIDWAR)</p>	<p style="text-align: right;">HW 19361</p> <p style="text-align: right;">पृष्ठ का Page 4 of 4</p>	
समीची सूची संख्या को अधिष्ठानित करना है SUPERSEDES INVENTORY NO.	<p>15.0 DEVIATIONS</p> <p>Any deviation from this delivery specification has to be reported to BHEL immediately using Performa PU-25 supplied with the order. Any deviation is generally accepted only if this has been approved by BHEL in a written form.</p> <p>16.0 CLEARANCE FOR DELIVERY</p> <p>The clearance for dispatch is based on the total results of all tests performed considering the service stresses of the component. BHEL has the right to accept deviations of the specified values, if it is shown by individual judgment that the service properties are not reduced.</p> <p>The clearance does not release the manufacturer from the responsibility for hidden defects that are detected at later stage of manufacturing.</p> <p>17.0 PACKING AND MARKING:</p> <p>Forgings shall be suitably packed to prevent corrosion and damage during transit.</p> <p>Machined surfaces shall be properly protected with anti-corrosive compounds.</p> <p>Each package or forging (when supplied separately) shall be legibly marked with the following information:</p> <p>HW19361 BHEL Order No. Drawing no. Batch No. Weight. Supplier's name.</p> <p>18.0 REFERRED STANDARDS (Latest Publications Including Amendments):</p> <p>1. IS : 1608 2. EN 10228-3. 3. EN10204 4. EN10083-1 5. EN10083-2</p>			
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समीची सूची संख्या INVENTORY NO. P-2981	REV 03	निर्माणकर्ता WORKED BY ASHISH		20/11/06
		जांचकर्ता CHECKED BY P. N. N.		20/11/06