

दिनांक एवं स्थान SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)	HW 19584 मुख पृष्ठ PREFACE SHEET
श्रमजी सूची संख्या को SUPERSEDES INVENTORY NO.	STAINLESS STEEL PRECISION CASTING (GX20Cr14) केवल आंतरिक प्रयोग हेतु प्रदायक को देने से पूर्व इस मुखपृष्ठ को निकाल दें । FOR INTERNAL USE ONLY REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS.		
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	समतुल्य मानक/सूची आदि COMPARABLE STANDARDS / CATALOGUES ETC. } : NIL		
स्वत्वधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं आशयक रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हितकारक हो न किया जाए ।	सुझाए/सम्भावित प्रदायक एवं श्रेणी SUGGESTED / PROBABLE SUPPLIERS AND GRADES } : AS PER PMD कोई अन्य जानकारी ANY OTHER INFORMATIONS } : BASED ON TLV 9240 01 06/ 2008		
श्रमजी सूची संख्या INVENTORY NO.	दिनांक एवं स्थान SIGN & DATE	2294 28/11/09	
श्रमजी सूची संख्या INVENTORY NO.	REAFFIRMED REV. 04 DATE: 24.02.2020	WORKED BY ASHOK KUMAR CHECKED BY SURESH KUMAR APPROVED : PLANT STANDARDS COMMITTEE PREPARED : MTE	संस्थान मानक समिति PS 2.60 जारी : मानक विभाग ISSUED : STANDARDS DIVISION दिनांक : DATE: 12.7.93

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	1.0 SCOPE OF APPLICATION The specification governs the quality of precision casting e.g Locking Piece and Clamping Piece in steel grade GX20Cr14 according to SEW 410 (material no. 1.4027) and the following additional requirements.																																														
	2.0 APPLICABLE REFERENCE DOCUMENTS SEW 410, EN 1371-2, EN 10204, EN 10045, EN 444, EN 12681, DIN 50125, VDG-Merkblatt P690 and P695-2, ASTM E 192 Equivalent standards with prior permission are acceptable.																																														
	3.0 GENERAL REQUIREMENTS Before starting the production the manufacturer shall check the ordering drawing with respect to casting and inspection specific design. He should outline his objectives regarding optimization of casting and inspection technology, coordinating his goals with BHEL. Before starting the production, the manufacturer shall submit the following documents to the purchaser. - A manufacturing and inspection sequence plan (MIP) establishing the quality assured sequence of operations. A schedule for the individual manufacturing steps is to be added; - A heat treatment plan with information on temperatures, holding times and cooling rates; - Test instructions for NDT which are performed as part of his own QA measures.																																														
	4.0 MANUFACTURING 4.1 General Manufacturing as per SEW 410 4.2 Heat Treatment According to SEW 410 Quenching : 1000-1050°C, holding time dependent on wall thickness Tempering: 650-750°C, shall be mentioned inclusive of all temperature fluctuations in the furnace, and holding time according to the wall thickness																																														
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		The tempering temperature in the middle of this range is ideal. The uniformity of the temperature in the furnace (+/- 5°C) must be insured. A calibration record about the uniformity of the temperature distribution in the furnace must be presented to BHEL, one time before heat treatment. Sub contracting for heat treatment on the casting must be informed to BHEL.																	
सुपरसेड INVENTORY NO.	5.0 PROTOTYPE MANUFACTURING & TEST In case of manufacturing a new clamping piece type for the first time, the manufacturer shall – as qualification – determine the condition for the mass production by manufacturing and testing of some prototype clamping piece (minimum 10 pieces). The following tests shall be performed on those prototype clamping pieces: Heat analysis according to SEW 410. Figures in the following table are for information only. Mandatory figures shall be taken from the standard.																		
सामग्री सूची संख्या नं. अधिकृतित करता है	<table border="1"> <thead> <tr> <th>C</th> <th>Si</th> <th>Mn</th> <th>P</th> <th>S</th> <th>Cr</th> <th>Ni</th> </tr> </thead> <tbody> <tr> <td>0.16-0.23</td> <td>≤1.00</td> <td>≤1.00</td> <td>≤0.045</td> <td>≤0.030</td> <td>12.5-14.5</td> <td>≤1.00</td> </tr> </tbody> </table>					C	Si	Mn	P	S	Cr	Ni	0.16-0.23	≤1.00	≤1.00	≤0.045	≤0.030	12.5-14.5	≤1.00
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	The determination of the mechanical properties for each melt and heat treatment lot is carried out on samples from separately poured blocks (not from the cast-on the section) which must be heat treated with the clamping pieces and which have the dimension 12x12x62mm. <u>Scope of testing:</u> A tensile sample according to DIN 50125 (B6x30) and 3 Charpy-V-notch according to EN 10045 <u>Second Probe test:</u> A second probe set (4 blocks) must be poured if necessary. These blocks have to be kept by the manufacturer minimum 2 months. Photo of the cast pattern with the separately poured blocks is required. Following Mechanical properties shall be achieved at room temperature <table border="1"> <thead> <tr> <th>0.2% Proof Strength (N/mm²)</th> <th>Tensile Strength (N/mm²)</th> <th>Elongation (l₀=5d) (%)</th> <th>Impact Energy (J)</th> </tr> </thead> <tbody> <tr> <td>≥ 540</td> <td>740 - 880</td> <td>≥ 12</td> <td>≥ 13)</td> </tr> </tbody> </table> *) 3 charpy-V-notch: All single values ≥13J					0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation (l ₀ =5d) (%)	Impact Energy (J)	≥ 540	740 - 880	≥ 12	≥ 13)						
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हस्ताक्षर एवं दिनांक SIGN & DATE 25/5/10	Rev 04																		
सामग्री सूची संख्या INVENTORY P-2294	निर्माणांक WORKED BY SKumar		25/5/10		जांचकर्ता CHECKED BY TSG														

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सुपरसेड्स INVENTORY NO.		सामग्री सूची संख्या को संशोधित करना है	- Visual inspection of all clamping pieces Acceptance: - Missing material up to $\varnothing$ 1.0 mm. - Plus material up to 0.5 mm and $\varnothing$ 1.0 mm. - Dimension inspection of 2 clamping pieces - Dimension inspection of the check dimension indicated in the drawing on minimum 8 clamping pieces. The requirements given in the drawing and VDG-Merkblatt P690, D1. - Cast surface roughness according to drawing on minimum 2 clamping pieces. - Marking: The model No. and 'X' given in the drawing are to be cast. - Additional marking as following: Number of the inspection certificate (one certificate per heat treatment batch). At the end of the prototype test, a report shall be written which shall contain all results of the above required inspections and tests. This report shall be submitted to the purchaser before starting mass production. - Model no. on each page - Material no. and material designation - Heat no. and heat analysis - Complete information of all heat treatment performed included diagram - Photo of the cast pattern with the separately poured blocks - Mechanical test results. All individual values shall be reported - Microstructure & Hardness test results - Result of nondestructive inspections (PT & X-ray) including records - Result of dimensional check including records - Confirmation of visual inspection If all requirements are fulfilled, mass production may be started. The procedure defined in the prototype manufacturing shall be kept. Additionally the customer receives 20 clamping pieces and 4 poured blocks for determination of mechanical properties.		
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way, detrimental to the interest of the company			6.0 Properties of the Clamping Piece of the Mass production and Tests 6.1 Chemical Composition Heat analysis per melt according to SEW 410 6.2 Mechanical properties Hardness test (Brinell) on 5% of the clamping piece of each heat and heat treatment batch. Values shall be 230-270 HB. The BHEL reserves the right to check the mechanical properties in accordance with clause 5 at the Clamping Pieces. 6.2.1 Microstructure The microstructure shall consist of fine tempered martensite without any segregation or other phases. 6.3 Outer and Inner Quality/ Non destructive Testing Following NDE shall be performed in delivery condition: - Surface crack inspection Dye penetrant inspection according to 5% of the parts. Quality level 1 without crack should be achieved. - Cast surface roughness according to drawing on one of the Clamping Pieces per heat treatment batch		
स्वत्वधिकार एवं गोपनीय प्रतः प्रत्येक में ही माई प्रमाण पत्र पर हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्येक एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में इतिक्रमिक हो म किया जाय !					
हस्ताक्षर एवं दिनांक SIGN & DATE	25/5/10				
सामग्री सूची संख्या INVENTORY NO.	P-2294	Rev 04	निर्माणकर्ता WORKED BY SKumar	जांचकर्ता CHECKED BY TSG	25/5/10

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SUPERSEDES INVENTORY NO. सातवीं सूची संख्या को प्रतिस्थापित करना है	- Visual inspection on 2% of the parts Acceptance: - flatly recessed surface defect upto $\varnothing$ 1.0mm - surface defect upto 0.5mm and $\varnothing$ 1.0mm - Dimension inspection Dimension inspection of the check dimensions indicated in drawing on 2% of the Clamping Pieces - RT examination as described in chapter 5 on 1% of the clamping pieces (but at least 20 pieces) .			
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	7.0 Marking - The Model no. is given in the drawing and 'X' are to be cast on the casting. - Additional marking as following: Number of inspection certificate (one certificate per heat treatment batch).			
	8.0 Documentation Prior to but in no case latter than with delivery an inspection certificate 3.1 according to EN 10204 in country and English language shall be provided to the purchaser and it shall contain the following - Order no. on every page - Model no. on every page - Material designation - Heat no. and heat analysis per melt - Complete information on all heat treatments performed per heat treatment batch included diagram - Microstructure & Hardness test results - Confirmation of visual inspection - Confirmation of dimensions - Confirmation of quality achieved and test reports of non destructive inspections - Confirmation of surface roughness			
	9.0 Deviations Any deviation from this delivery specification has to be reported to BHEL immediately using Performa PU-25 supplied in the order. Any deviation is generally accepted only if this has been approved by BHEL in a written form. In case of any deviation from specified properties, also if the proof by testing is not required the purchaser has the right to reject the material			
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	11.0 Packing The casting shall be suitably packed in a condition to withstand for an indefinite time exposure to all climatic conditions without developing any external and internal defects. The casting shall be properly protected from damage during transportation.			
सातवीं सूची संख्या INVENTORY NO. P-2294	दिनांक एवं हस्ताक्षर SIGN & DATE 28/5/10	निर्माणकर्ता WORKED BY SKumar	जांचकर्ता CHECKED BY TSG	28/5/10 28/5/10

