



BHARAT HEAVY ELECTRICALS LIMITED
HEEP HARIDWAR INDIA-PIN 249403
FAX NO: 0091 1334 226462
PHONE NO: 0091 1334 281561

Enq. No. : T/3990/2017/5617/K

M/s.....

Sub: BHEL-HEEP/OPEN-TENDER (Turbine Component) / 2018

Dear Sir,

The Heavy Electricals Equipment Plant (HEEP) located in Haridwar, India is one of the major manufacturing plants of Bharat Heavy Electricals Ltd. The core business of HEEP includes design and manufacture of large steam and gas turbines, turbo generators and so on.

Sealed tenders with the **Tender No.** and **opening date** clearly super scribed on the cover are invited from the manufacturers (registered as well as unregistered) for the supply of the following items :-

SL. NO.	MATERIAL CODE	DESCRIPTION	SPECIFICATION NO.	QTY(Kg)	DELIVERY SCHEDULE
1	HW1070386073	Heat Resistant Steel Bars, Size 65X38	HW10786 REV:07	3000	10.08.2018
2	HW1070386090	Heat Resistant Steel Bars, Size 46X27	HW10786 REV:07	7200	10.08.2018
3	HW1070386570	Heat Resistant Steel Bars, Size 106X53	HW10786 REV:07	9500	10.08.2018
4	HW1070386596	Heat Resistant Steel Bars, Size 58X32	HW10786 REV:07	2500	10.08.2018
5	HW1070386243	Heat Resistant Steel Bars, Size 94X62	HW10786 REV:07	7200	10.08.2018

SPECIAL INSTRUCTIONS:

1. VENDOR TO OFFER AS PER SPECIFICATION (Annexure-1) HERE ENCLSD.
2. BHEL STANDARD PAYMENT TERM i.e. "PAYMENT AFTER RECEIPT AND ACCEPTANCE OF MATERIAL/ITEM AT HEEP, BHEL-STORE" AS **PER GENERAL INSTRUCTION AND STANDARD TERMS & CONDITION (GISTC),VERSION JUNE 2017, Rev:01** SHALL BE APPLICABLE.
3. THE QUOTATION SHALL BE VALID FOR A **MINIMUM PERIOD OF 120 DAYS**, EFFECTIVE FROM THE DATE OF TENDER OPENING.S
4. VENDOR TO CONFIRM THAT THEIR QUOTED RATES ARE NOT MORE THAN THOSE QUOTED FOR ANY OTHER CUSTOMER INCLUDING OTHER BHEL UNITS.
5. End of bars should be squared and sawed off properly .
6. There should be proper stamping of cross section, Heat number, material grade, vendor code/vendor name on each bar at the pitch of one meter.
7. Quantity tolerance should be (+/-10) %.
8. Date of BL/GR will be treated as date of delivery for all purposes including penalty for Late Delivery. In case, vendor quotes date of final inspection as date of delivery then date of BL/GR should be between 15 days of date of final inspection otherwise penalty for late delivery would be applicable.
9. Foreign vendors to either quote third party inspection charges (LRS/BV/TUV) separately in their offer or vendor to mention that third party inspection charges are included in the quoted prices of the offer. If vendor do not quote third party inspection charges or not mention that third party inspection charges are included in

- quoted prices, then it shall be presumed that third party inspection charges are included in the quoted prices of the offer. No further clarification shall be asked in this regard after opening of techno-commercial bid part-1.
10. All vendors to submit test certificates and guarantee certificate.
 11. All vendors to furnish quality plan (QP) in the enclosed format (Annexure-3) for our review and approval. For indigenous vendor inspection by BHEL nominated agency 'TUV' as per finally BHEL approved QP. For foreign vendor inspection by BHEL nominated agency 'TUV/BV/LRS' as per finally approved QP.
 12. Late delivery penalty will be applicable @ 0.5% per week or part thereof subject to maximum of 10% of unexecuted portion of the order. The remaining terms shall be as per **GENERAL INSTRUCTION AND STANDARD TERMS & CONDITION (GISTC), VERSION JUNE 2017, Rev:01**
 13. EARLY DELIVERY IS ALSO ACCEPTABLE. VENDOR TO OFFER BEST DELIVERY SCHEDULE.
 14. THE TOTAL QUANTITY MAY UNDERGO CHANGE AT THE TIME OF ORDERING.

The tender documents can be downloaded from our web site www.bhel.com or www.bhelhwr.co.in or www.tenders.gov.in. After downloading the tender documents from web site, while submitting the tender as detailed in "Instruction to Bidders", intending vendors must submit **Tender Fee of Rs. 2,000/- (Rupees two thousand only)** in the form of Pay Order / Demand Draft (drawn in favor of 'BHEL HARIDWAR') only. It may be noted that if hard copy of any tender document is required, then the same may be collected against copy of Pay Order / Demand Draft of requisite tender fee (while original to be submitted with Part-I). **However, if no hard copy of any tender document is required from BHEL, no tender fee is required to be submitted.**

Vendors must also remit the requisite **EMD (Earnest Money Deposit) of Rs. 1, 00,000/- (Rupees one lacs only)** in the form of Pay Order / Demand draft (drawn in favor of 'BHEL HARIDWAR'). In case of foreign bidders e-payment may also be accepted as EMD. **If EMD is not submitted along with the offer (Part-I) then the offer shall be out rightly rejected.**

HEEP BHEL Hardwar PMD: SL007 approved vendors M82012,M72519,M72518,M41431,M21181 & M06068 for all material codes are exempted for submission of requisite EMD against this tender enquiry.

Please submit separate drafts for EMD and tender fee in an envelope super-scribed with bold letters "EMD & Tender Fee" to be submitted with Part-I.

As per notification reference no. NSIC/HO/GP/15(4)/2013-14 dated 07.07.2013 Micro & Small Enterprises (MSEs) are not required to submit EMD & tender fee subjected to comply the following instruction:

As per GOI (Ministry of Finance) Office Memorandum dated 28th Feb-2018 it is mandatory from 01-04-2018 to register the Udyog Adhar Memorandum (UAM) of all MSME vendors on Central Public Procurement Portal (CPPP), failing which such MSME bidders shall not be able to avail the benefits available to MSEs as contained in Public Procurement Policy for MSEs Order-2012. All the MSME Vendors are advised to comply the same and confirmation for this should be mentioned in their offer / bids mandatorily.

BHEL will forfeit the EMD if, the successful bidder / vendor refuses to honor the order after award of the same on him and / or withdraws his bid and / or unilaterally changes the offer and / or any of its terms & conditions within the validity period.

Tenders will be received in Tender Box kept in Tender Room and should be addressed to:

**THE HEAD OF MATERIAL MANAGEMENT,
Heavy Electrical Equipment Plant,
Bharat Heavy Electricals Limited,
HARIDWAR-249403 (Uttarakhand), INDIA.**

The date for opening of tender shall be 14.05.2018. Tenders will be received up to 1.45 P.M. on **14.05.2018** and opened on the same day at 2.00 P.M. in the Tender Room. **Please note that tender received after due date & time (1.45PM on 14.05.2018) will not be REPEAT will not be opened.** BHEL will not be responsible for any type of postal / courier delay.

Bids shall be opened at 2 PM on the due date in the presence of authorized representative of the bidders who may like to be present. The authorized representative should bring authority letter from their parent company (Manufacturer) for the specific tender no. attending the bid opening.

Amendments/Corrigendum, if any, will be hosted only on the websites mentioned above. Other terms and conditions will be as per tender documents.

Foreign and Indigenous bidders against open tender will necessarily have to obtain class – III DSCs. Procedure for application is available on www.bhel.com.

Documents submitted with the offer/bid by the bidder (original supplier) shall be signed and stamped in each page by authorized representative of the bidder. Documents not signed and stamped in each page by the authorized signatory of the bidder, shall neither be accepted nor considered for evaluation of the bid.

Vendors operating from BHEL quarters, unauthorized colonies on BHEL land and Dharamshalas/ hotels shall not be considered, hence such vendors need not apply. Any vendor who is under hold (for the item)/ delisted/ banned with BHEL on date of opening of Part – 1 will not be allowed to quote for this tender. In case their offer is received, it may be out rightly rejected.

Please submit your offer only for the above requirement subject to our **GENERAL INSTRUCTIONS AND STANDARD TERMS & CONDITIONS (GISTC), Version June 2017, Rev: 01**. Please visit our site www.bhelhwr.co.in for **General Instructions and Standard Terms & Conditions (GISTC), Version June 2017, Rev: 01** for Tender Enquiries. All the bidders/vendors must ensure compliance of these GISTC.

Unregistered vendors may please visit our site www.bhel.com for filing up the Supplier Registration Form. Copy of filled Supplier Registration Form (SRF) may be submitted along with the offer.

KINDLY READ “INSTRUCTIONS TO BIDDERS.” QUOTATION NOT IN ACCORDANCE WITH THE INSTRUCTIONS ARE LIABLE TO BE DISQUALIFIED AND IGNORED.

INSTRUCTIONS TO BIDDERS FOR OPEN TENDER

Definition

Registered Vendors - Are those who are registered with BHEL, Haridwar for Megawatt rating/ Size/ Weight of tendered items in respective material grade or machining of such items.

Un-registered Vendors - Are those who are not registered with BHEL, Haridwar for Megawatt rating/ Size/ Weight of tendered items in respective material grade or machining of such items.

ESSENTIAL INSTRUCTIONS

* Un-registered vendors may be approved by BHEL, if found suitable, on the basis of data furnished by them in Supplier Registration Form (SRF) for Foreign Vendors or Indigenous Vendors (as applicable).

* BHEL team may visit the vendor (s) works for verification of capability and capacity claimed in tender Documents/offer (s).

* The tenders shall be submitted in **two parts** in separate sub-envelopes clearly super scribing type of bid, tender no., due date and the name of vendor with full contact details.

Part I –

- Tender fee (if hard copy insisted from BHEL) & EMD
- Duly filled Non-Disclosure Agreement (Annexure 4)
- Point wise reply/confirmation to **Pre-qualifying requirement (PQR)** as per Annexure-2A & 2B along with all necessary supporting documents in one go.
Noncompliance of this may lead to rejection offer.
- Techno- Commercial Bid - it should be replica of price bid (copy of price bid without price part) in line with technical requirement as per Specification. (Annexure-1).
- Quality plan (Annexure-3)

Part-II -

- Price Bid

All the sub-envelopes (Part-I, & Part-II) to be put in a single covering envelope indicating tender no., due date and the name of vendor, e-mail id, with full contact details. Offer should be complete in all respect (i.e. Part-I& Part- II). BHEL may decide to ignore the offer in case of submission of incomplete offer

* Please submit your offer according to **General Instructions and Standard Terms & Conditions (GISTC), Version: June 2017 Rev: 01** for Tender Enquiries. Please visit our site www.bhelhwr.co.in for GISTC. All the bidders/vendors must ensure compliance of these **GISTC (VERSION: June-17, REV. 01).** **GISTC (VERSION: June- 17, REV. 01)** can also be referred by login to B2B Portal for Vendors.

REFERENCES:

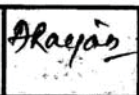
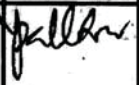
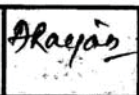
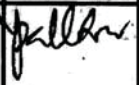
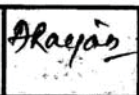
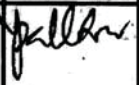
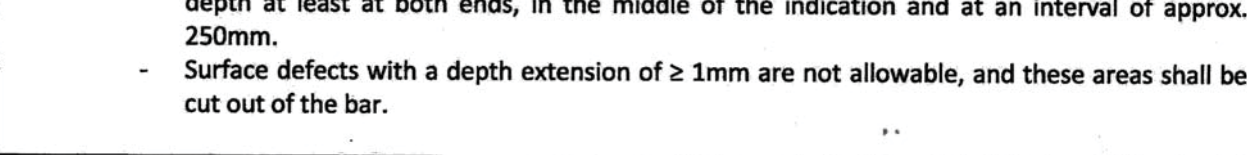
Annexure-1 (Applicable Specification HW10786, Rev:07)

Annexure-2A & 2B (Pre-Qualification Requirement)

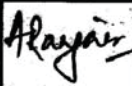
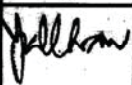
Annexure-3 (Quality plan)

Annexure-4 (NDA)

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10786 पृष्ठ का Page 2 of 8															
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को प्रतिस्थापित करने के लिए	7.0 Heat Treatment: Hardening has to be done in accordance with EN 10088 - 3, + QT 800 in line with Table A.2 (950 - 1050°C /air or liquid quenching). Tempering must be done at a temperature $\geq 650^{\circ}\text{C}$. A fully transformed and tempered martensitic microstructure must be present over the entire cross section. Hardening and tempering in bundles are not allowed. Suitable gaps between two bars are to be ensured during heat treatment for uniformity of properties. If bars need to be straightened after the heat treatment, a stress relieving heat treatment shall be performed after completion of entire straightening process. Stress relieving is to be carried out at 20 - 30°C below the tempering temperature with a subsequent slow cooling. The lowest possible residual stresses shall be targeted. Distortion of the finish machined part due to residual stresses from the manufacturing process or heat treatment process shall not occur.																		
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	8.0 Properties and their verification: 8.1 Chemical Composition: Heat analysis in weight % <table border="1" data-bbox="289 888 1414 995"> <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>0.17 - 0.22</td> <td>0.10 - 0.60</td> <td>0.30 - 0.80</td> <td>≤ 0.030</td> <td>≤ 0.020</td> <td>12.5 - 14.0</td> <td>0.30 - 0.80</td> </tr> </tbody> </table> Cobalt content must be specified in the inspection certificate for information purposes.					C	Si	Mn	P	S	Cr	Ni	0.17 - 0.22	0.10 - 0.60	0.30 - 0.80	≤ 0.030	≤ 0.020	12.5 - 14.0	0.30 - 0.80
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0.17 - 0.22	0.10 - 0.60	0.30 - 0.80	≤ 0.030	≤ 0.020	12.5 - 14.0	0.30 - 0.80													
8.2 Properties and Microstructure: The specimens shall be taken in the longitudinal direction in accordance with Attachment 1. The properties described below shall be determined at room temperature in the delivery condition, i. e. after the last heat treatment including any stress relieving heat treatment. The metallographic investigations shall be performed on the hardest and softest bar with an area of at least 320mm² each. The areas to be investigated must be in the longitudinal direction. The longitudinal direction must be indicated in the documentation. 8.2.1 Mechanical Properties: Hardness of the bars in a test unit shall be verified by Brinell hardness testing in accordance with ISO 6506 -1, HBW10/3000 or HBW 5/750 may be used. The surface of the bar shall be prepared in the area of the hardness measurement so that the result is not affected by the surface condition. Hardness testing shall be performed on 10% of each test unit but at least on 10 bars or on each bar if test unit is less than 10 bars. The greatest resulting difference in hardness shall not exceed 35HBW. Mechanical properties shall be determined on the hardest and softest bar determined in a test unit. Tensile testing shall be performed in accordance with ISO 6892 -1 or ASTM E8M (round specimen with $L_0 = 50\text{mm}$ and $d_0 = 10\text{mm}$) or ASTM E8 (standard specimen in accordance with Figure 8). Standard specimens Charpy (V-notch) in accordance with ISO 148 -1 shall be used for determining the absorbed impact energy.																			
स्वतंत्राधिकार एवं गोपनीय ; इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं अप्रयोग रूप से किसी भी तरह प्रयोग , जो कि कम्पनी के हित में हानिकारक हो या किया जाए	हस्ताक्षर एवं दिनांक SIGN & DATE 	<table border="1"> <tr> <td data-bbox="207 1843 873 1927">REV 07</td> <td data-bbox="873 1843 1019 1927">निर्माणकर्ता WORKED BY</td> <td data-bbox="1019 1843 1182 1927">Ashish Ranjan</td> <td data-bbox="1182 1843 1328 1927"></td> <td data-bbox="1328 1843 1435 1927">02.05.17</td> </tr> <tr> <td data-bbox="207 1927 873 2016"></td> <td data-bbox="873 1927 1019 2016">जांचकर्ता CHECKED BY</td> <td data-bbox="1019 1927 1182 2016">Gopal Krishnan</td> <td data-bbox="1182 1927 1328 2016"></td> <td data-bbox="1328 1927 1435 2016">02.05.17</td> </tr> </table>				REV 07	निर्माणकर्ता WORKED BY	Ashish Ranjan		02.05.17		जांचकर्ता CHECKED BY	Gopal Krishnan		02.05.17				
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सामग्री सूची संख्या INVENTORY NO. P-2182																			

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10786 पृष्ठ का Page 3 of 8													
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को SUPERSEDES करता है	The following properties must be achieved at room temperature:															
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	<table border="1"> <thead> <tr> <th>0.2 % Proof Stress (N/mm²)</th> <th>Tensile Strength (N/mm²)</th> <th>Elongation After Fracture (%)</th> <th>Reduction in area %</th> <th>Impact Energy (J)¹</th> <th>Hardness HBW</th> </tr> </thead> <tbody> <tr> <td>≥ 600</td> <td>800 - 950</td> <td>≥ 15</td> <td>≥ 50</td> <td>≥ 20</td> <td>240 - 280</td> </tr> </tbody> </table>				0.2 % Proof Stress (N/mm ²)	Tensile Strength (N/mm ²)	Elongation After Fracture (%)	Reduction in area %	Impact Energy (J) ¹	Hardness HBW	≥ 600	800 - 950	≥ 15	≥ 50	≥ 20	240 - 280
0.2 % Proof Stress (N/mm ²)	Tensile Strength (N/mm ²)	Elongation After Fracture (%)	Reduction in area %	Impact Energy (J) ¹	Hardness HBW											
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¹ Average of 3 specimens and minimum value for two specimens in accordance with EN10021, where the lowest value shall be at least 14 Joule.																
8.2.2 Microstructure: Microstructure must be uniform, without porosity, excessive segregation or other inhomogeneities. 8.2.2.1 Cleanliness: The cleanliness shall be determined as per ASTM E45 method A. Acceptance criteria: <u>Inclusion: Thin Series</u> Type A, B, C: 2 max Type D: 2.5max <u>Inclusions: Heavy Series</u> Type A, B, C, D: 1.5max Maximum Number and dimension of globular inclusions (type D) $IR(D) = n_1 + 2.5n_2$, IR (D) is converted to an area of 160mm² $IR(D) \leq 10$ n = number of globular inclusions n₁ (25-50μm); n₂(51-75μm) Any material discontinuities present at the inclusion must also be accounted for in determining the size of globular inclusion. Inclusions > 75 μm, including any material discontinuities, are not allowed. 8.2.2.2 Delta Ferrite content and grain size: - Delta ferrite content shall be < 5%. The determination of delta ferrite content shall be performed based on analysis methods in accordance with ASTM E45 Method A, "Worst field method" with V=100:1. - An average grain size of 4 or finer has to be achieved. Grain size shall be determined on the martensitic secondary grain structure in accordance with ASTM E112 or ISO643. A deviation of more than 2 grain sizes in size of individual's grains from the average grain size is not allowable. 8.3 Non-destructive Testing: 8.3.1 Test Scope: The following Non – destructive inspections shall be performed in the as delivered condition: - Visual inspections of all bars - Ultrasonic examination of all bars in accordance with TWP 1204. 100% of the volume must be tested in accordance with the recording level. 8.3.2 Recording level and acceptance criteria: - Indications of surface defects such as rolled marks shall be ground out to investigate their depth at least at both ends, in the middle of the indication and at an interval of approx. 250mm. - Surface defects with a depth extension of ≥ 1mm are not allowable, and these areas shall be cut out of the bar.																
स्वतंत्रताधिकार एवं गोपनीयता ; इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है। इसका प्रयोग एवं अभिप्राय केवल उस व्यक्ति के द्वारा ही किया जा सकता है, जो कि इस प्रलेख को लिखने के लिए ही तैयार किया गया है।	<table border="1"> <tr> <td data-bbox="196 1843 880 1936">REV 07</td> <td data-bbox="880 1843 1024 1936">निर्माणकर्ता WORKED BY</td> <td data-bbox="1024 1843 1175 1936">Ashish Ranjan</td> <td data-bbox="1175 1843 1312 1936"></td> <td data-bbox="1312 1843 1435 1936">02.05.17</td> </tr> <tr> <td data-bbox="196 1936 880 2020"></td> <td data-bbox="880 1936 1024 2020">जांचकर्ता CHECKED BY</td> <td data-bbox="1024 1936 1175 2020">Gopal Krishnan</td> <td data-bbox="1175 1936 1312 2020"></td> <td data-bbox="1312 1936 1435 2020">02.05.17</td> </tr> </table>				REV 07	निर्माणकर्ता WORKED BY	Ashish Ranjan		02.05.17		जांचकर्ता CHECKED BY	Gopal Krishnan		02.05.17		
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हस्ताक्षर एवं दिनांक SIGN & DATE सामग्री सूची संख्या INVENTORY NO. P-2102																

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10786 पृष्ठ का Page 4 of 8									
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को प्रतिस्थापित करता है	- Ultrasonic examination shall be carried out on all bars in accordance with TWP 1204. - Defects above the recording level are not acceptable and must be cut out. - It shall be confirmed in writing to the BHEL that bar sections containing defects above the recording level have been cut out of the bar. - The acceptance of material at vendor's works does not relieve the supplier of his responsibility for defects discovered at later stages. 8.3.3 Material Identity Test: An identity test must be conducted in the as – delivered condition on all bars.											
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	9.0 Process Qualification: In addition to testing as per clause 8.0 of this specification, following additional testing shall be performed in process qualification (see Attachment 2). All test results carried out during process qualification shall be submitted to BHEL for approval. - Tensile tests¹: The strength values (0.2% Proof Stress and Tensile Strength) in the transverse direction (specimen orientation ZQ) shall not differ by more than 10% from the corresponding longitudinal values. - The absorbed impact energy in the transverse direction (KQ 1 -3) should not differ by more than 25% from the values in the longitudinal direction (KI at room temperature). - FATT: Determination of FATT (fracture appearance transition temperature) in accordance with ASTM A370. The FATT should be preferably evaluated based on SEP 1670 (software). The test scope must include at least 10 specimens. FATT < 30°C is to be achieved. In accordance with ISO 6892 -2, a tensile test (in longitudinal direction) has to be performed at 500°C. The following properties must be achieved: <table border="1" data-bbox="300 1081 1388 1239"> <thead> <tr> <th>0.2 % Proof Stress (N/mm²)</th> <th>Tensile Strength (N/mm²)</th> <th>Elongation After Fracture (%)</th> <th>Reduction in area (%)</th> </tr> </thead> <tbody> <tr> <td>≥ 380</td> <td>≥ 480</td> <td>≥ 20</td> <td>≥ 60</td> </tr> </tbody> </table>				0.2 % Proof Stress (N/mm ²)	Tensile Strength (N/mm ²)	Elongation After Fracture (%)	Reduction in area (%)	≥ 380	≥ 480	≥ 20	≥ 60
0.2 % Proof Stress (N/mm ²)	Tensile Strength (N/mm ²)	Elongation After Fracture (%)	Reduction in area (%)									
≥ 380	≥ 480	≥ 20	≥ 60									
स्वत्वधिकार एवं गोपनीय : इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं प्रसारण अन्य से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो ना किया जाए	¹ For case where standard specimens in transverse direction cannot be made: - - For tensile test specimens, a round specimen with $L_0 = 5 d_0$ or a flat specimen with a proportionality factor of $k = 5.65$. Proportional specimens in accordance with Fig 8 shall be used if ASTM E8 is applied. - An undersized specimen in accordance with ISO 148 -1 for impact test specimen. Undersize dimension to be reported. - If dimension do not allow testing in the transverse direction, even with special specimen, testing will be carried out in the longitudinal direction only. Intergranular Fracture Determination Test: The fraction of Intergranular fracture shall be determined over the entire brittle fracture portion of the fracture surface of the impact test specimens tested at room temperature. The fraction of Intergranular fracture shall not exceed 10%. This test is not required for materials which indicate ≥90% ductile fracture at room temperature. Magnetic Particle Test: Performance of MT testing by the magnetic flux leakage method, alternating current phase shifted and a field strength of 20 – 65A/cm. Distribution, type and size of grain structure in-homogeneities (e.g. segregation or delta ferrite) shall not result in MT indications.											
हस्ताक्षर एवं दिनांक SIGN & DATE सामग्री सूची संख्या INVENTORY P. 21072	REV 07	निर्माणकर्ता WORKED BY आंचकर्ता CHECKED BY	Ashish Ranjan Gopal Krishnan	02.05.17 02.05.17								

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10786 पृष्ठ का Page 5 of 8	
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को प्रतिस्थापित करता है	10.0 Identification Marking: All bars are to be marked with following information: - Purchase Order Number - Size - Material Grade - Supplier Identification The details are to be clearly stamped and encircled by oil paint. Each bar shall be painted with pink colour with white strip on both ends. All the bars shall be suitably packed to protect them against corrosion and damage during transportation. Bars having maximum and minimum hardness (from which test samples are taken) shall be clearly marked by oil paint for easy identification. Their respective hardness values shall also be punched on these bars.				
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	11.0 Documentation: Prior to, but in no case later than the delivery of the material, an inspection certificate as per EN 10204 shall be provided to BHEL in duplicate; this certificate must contain the following data: (a) Material code no and P.O. number (b) Material designation (c) Heat no., heat analysis and melting methods (d) Complete information on all heat treatments performed (d) Mechanical test results including hardness range and the metallurgical examination. (e) Results of non-destructive tests, UT inspection report (f) Confirmation of the material identity check (g) Dimensions and visual inspection reports				
स्वत्वाधिकार एवं गोपनीय ; इस प्रलेख में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं आनुवांशिक रूप से किसी भी तरह प्रयोग , जो कि कम्पनी के हित में हानिकारक हो या किया जाए	12.0 Cross Referred Standard: EN10088-3, HW0993008, ISO 6506-1, ISO 6892, ASTM E8, ISO 148-1, EN10021, ASTM E45, TWP1204, ASTM E112, ISO 643, ASTM A370, EN10204 13.0 Modification with respect to last revision: • Clause 4.0 modified. • Clause 9.0 modified. • Clause 12.0 modified.				
हस्ताक्षर एवं दिनांक SIGN & DATE 					
सामग्री सूची संख्या INVENTORY NO. P. 2102	REV 07		निर्माणकर्ता WORKED BY	Ashish Ranjan	 02.05.17
			जांचकर्ता CHECKED BY	Gopal Krishnan	 02.05.17



संस्थान क्रय विनिर्देश (हीप - हरिद्वार)
PLANT PURCHASE SPECIFICATION
 (HEEP - HARIDWAR)

HW 10786

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स्वतंत्रताधिकार एवं गोपनीयता

इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रकाशित कर से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए

 हस्ताक्षर एवं तिथि
 SIGN & DATE

 सामग्री सूची संख्या
 INVENTORY

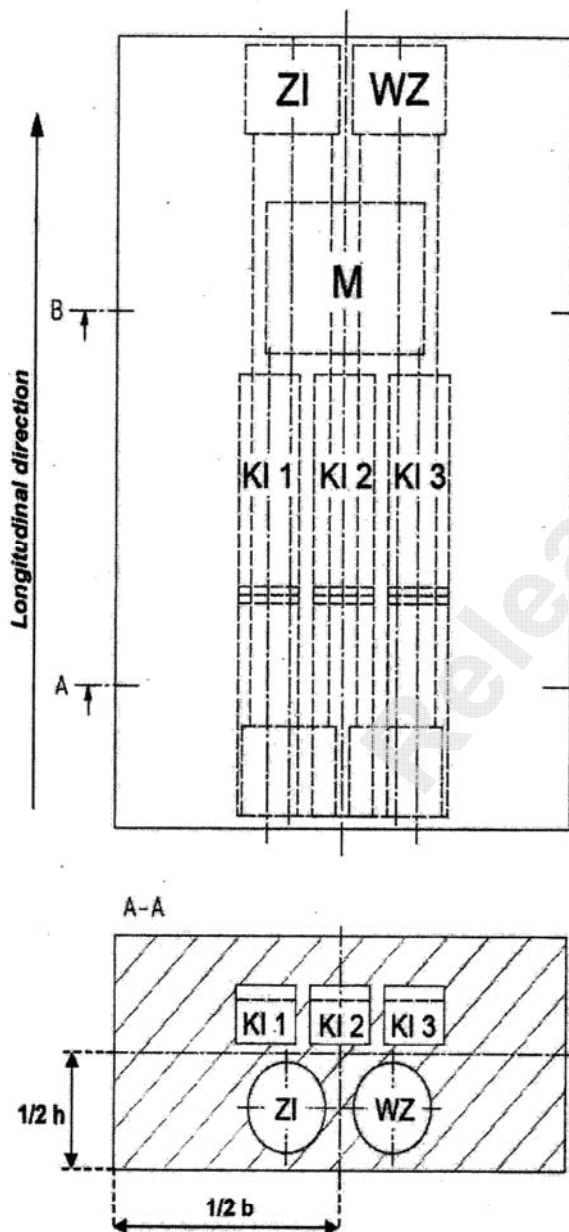
 SUPERSEDES
 INVENTORY NO.

 सामग्री सूची संख्या को
 अधिकतम अद्यतन है

 हस्ताक्षर एवं तिथि
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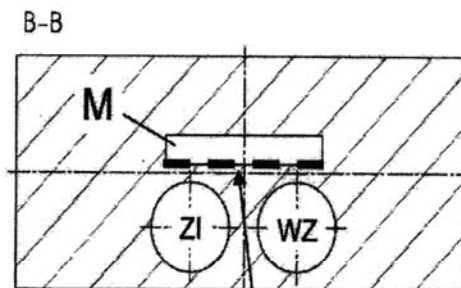
Attachment 1

Standard Testing



Label	Specimen
ZI	Tensile Specimen Centre
WZ*	Hot Tensile Specimen
KI 1 - KI 3	Notched Impact Specimen Centre
M	Metallographic Specimen

* if required in material specification



Lower Surface of the Metallographic Specimen has to be examined. Longitudinal direction must be indicated in the documentation. $A \geq 320 \text{ mm}^2$

REV 07

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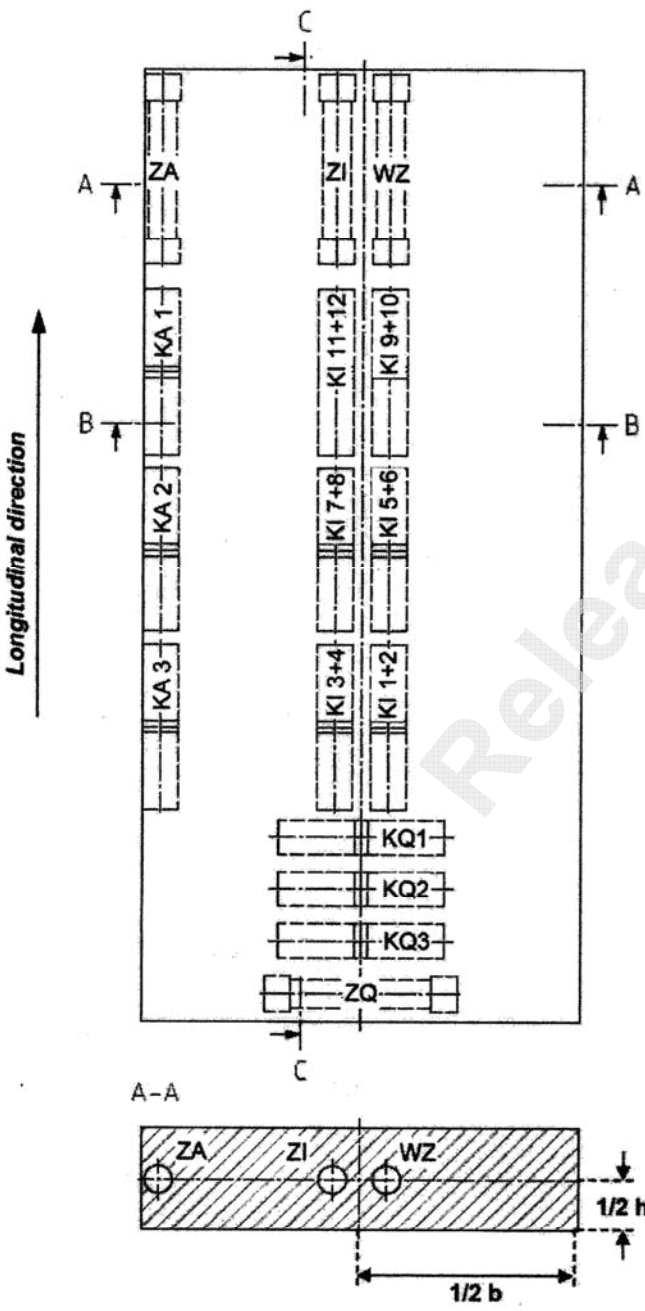
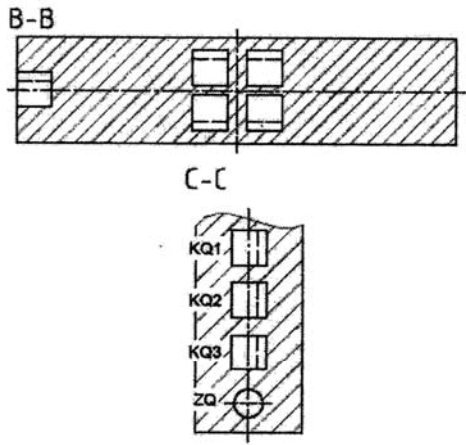
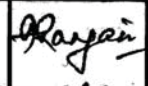
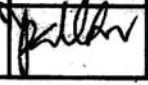
 Ashish
 Ranjan

02.05.17

 जांचकर्ता
 CHECKED BY

 Gopal
 Krishnan

02.05.17

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10786 पृष्ठ का Page 7 of 8																
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को अधिकतम अद्यतन करें	Attachment 2, Page 1/2																		
Process Qualification																			
																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Label</th> <th style="width: 80%;">Specimen</th> </tr> </thead> <tbody> <tr> <td>ZI</td> <td>Tensile Specimen Centre</td> </tr> <tr> <td>ZA</td> <td>Tensile Specimen Rim</td> </tr> <tr> <td>ZQ</td> <td>Tensile Specimen Transverse</td> </tr> <tr> <td>WZ*</td> <td>Hot Tensile Specimen</td> </tr> <tr> <td>KI 1 - KI 12</td> <td>Notched Impact Specimen Centre (FATT)</td> </tr> <tr> <td>KA 1 - KA 3</td> <td>Notched Impact Specimen Rim</td> </tr> <tr> <td>KQ 1 - KQ 3</td> <td>Notched Impact Specimen Transverse</td> </tr> </tbody> </table>				Label	Specimen	ZI	Tensile Specimen Centre	ZA	Tensile Specimen Rim	ZQ	Tensile Specimen Transverse	WZ*	Hot Tensile Specimen	KI 1 - KI 12	Notched Impact Specimen Centre (FATT)	KA 1 - KA 3	Notched Impact Specimen Rim	KQ 1 - KQ 3	Notched Impact Specimen Transverse
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KA 1 - KA 3	Notched Impact Specimen Rim																		
KQ 1 - KQ 3	Notched Impact Specimen Transverse																		
* if required in material specification																			
Note the notch positions of the notch impact specimens (see B - B and C - C).																			
																			
हस्ताक्षर एवं दिनांक SIGN & DATE सामग्री सूची संख्या INVENTORY	REV 07																		
निर्माणकर्ता WORKED BY	Ashish Ranjan		02.05.17																
जांचकर्ता CHECKED BY	Gopal Krishnan		02.05.17																

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हस्ताक्षर एवं दिनांक
SIGN & DATE

सामग्री सूची संख्या
INVENTORY



संस्थान क्रय विनिर्देश (हीप - हरिद्वार)
PLANT PURCHASE SPECIFICATION
 (HEEP - HARIDWAR)

HW 10786

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SUPERSEDES
 INVENTORY NO.

सामग्री सूची संख्या को
 प्रतिबिम्बित करता है

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 इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं अनुवाद
 बिना इसकी कीमती और प्रयोग, जो कि सम्पत्ति के हित में हानिकारक हो या किया जाए

हस्ताक्षर एवं दिनांक
 SIGN & DATE

सामग्री सूची संख्या
 INVENTORY

REV 07

निर्माणकर्ता
 WORKED BY

Ashish
 Ranjan

Ashish Ranjan

02.05.17

जांचकर्ता
 CHECKED BY

Gopal
 Krishnan

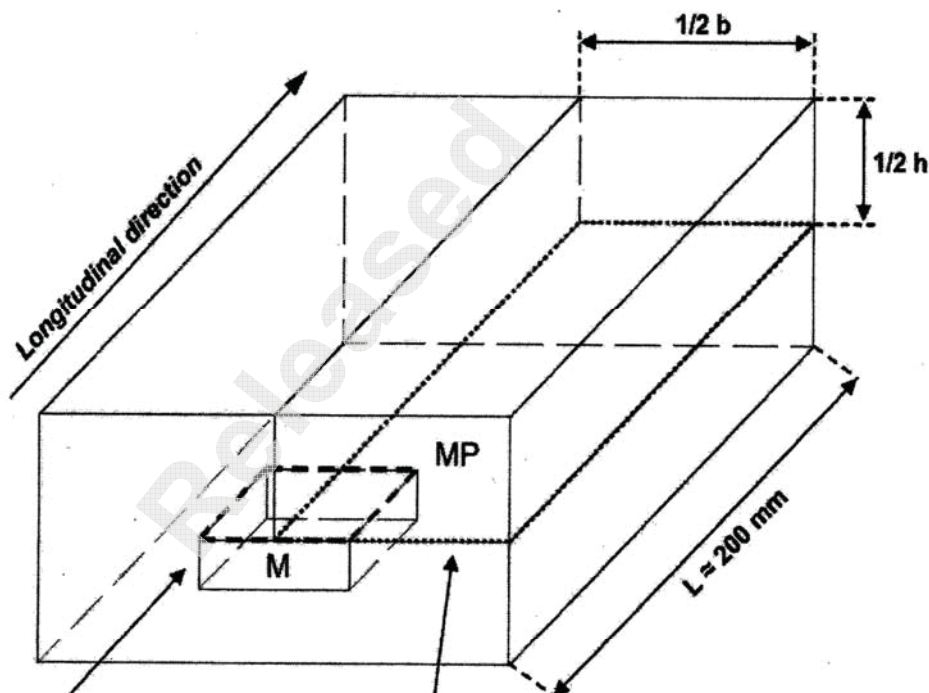
Gopal Krishnan

02.05.17

Attachment 2, Page 2/2

Process Qualification

Label	Specimen
M	Metallographic Specimen
MP	Specimen for Magnetic Particle Test



Upper Surface of the Metallographic Specimen
 has to be examined. Longitudinal direction must
 be indicated in the documentation. $A \geq 320 \text{ mm}^2$

Lower Surface of the specimen has to be examined in
 Magnetic Particle Test.

Indent No.: 20175617

Minimum Qualification Requirement for blade flats of material grade X20Cr13, HW10786 Rev 07

1. Experience Requirement:

- Vendor must have experience of manufacturing and supplying rectangular bars in material grade X20Cr13 (material number 1.4021) for Turbine application.
- Documentary evidence (like un-priced purchase order copy, test certificate covering chemical & mechanical properties, heat treatment details, dimensions etc) in support of experience to be submitted for material grade X20Cr13.

2. Prerequisite requirement for approval of any vendor is successful process qualification as per clause 9.0 of enquiry specification.

Vendor to submit process qualification test results as per clause 9.0 of HW10786, Rev07, if carried out earlier. Else, vendor must carry out process qualification test and satisfy the requirement of specification.

Following process qualification tests shall be carried out:

- Chemical Composition – As per Clause 8.1 of specification
- Mechanical Properties – As per Attachment 2 (tensile samples: ZA, ZI, ZQ, Impact Samples: KA, KQ, KI)
- Microstructure: As per Clause 8.2.2.1 & 8.2.2.2

The samples for process qualification test are to be taken from their regular manufacturing lots and shall be duly identified by 3rd party inspection agency. The details of purchase order, name of customer, rectangular cross sectional sizes, heat number, heat treatment batch number, manufacturing details (covering steel melting procedure, ingot size, reduction ratio, rolling/forging temperature, heat treatment regime followed) from which this sample has been taken are also to be furnished along with process qualification results.

Process qualification tests are to be witnessed by third party inspection agency and process qualification test results is to be duly certified by third party inspection agency like Lloyds/TUV/BVQI etc.

Process qualification results must meet the requirement of specification HW10786. Offers without process qualification results meeting specification requirement shall not be considered.

3. Manufacturing and Testing Facilities:

3.1 Vendor must be having in house rolling/forging and heat treatment facility to manufacture rectangular bars of enquired dimensions. Details of in house facilities for rolling, forging and heat treatment covering furnace size, maximum operating temperature, quenching media are to be submitted.

3.2 Vendor to furnish details of in house steel melting and refining facilities to manufacture raw material for further rolling/forging for turbine blade flats as per enquiry specification. At least one mill test certificate for material grade X20Cr13 to be submitted with offer.

In case, steel melting facility is not available in house, vendor to inform their source of raw material with following details of their source – Experience for enquiry material grade with at least one mill test certificate of enquiry material grade, melting & refining facilities.

3.3 Details of testing facilities as per the requirement of enquiry specification to be submitted with offer. Testing at Government accredited lab is also acceptable.

4. Vendor to confirm that they will meet all the requirements of BHEL specification HW10786, Rev 07 and all cross referred standards. Process qualification as per Clause 9.0 of specification HW10786 is required before start of bulk production in case of order as applicable. Vendor to confirm.

AGM/MTE



AGM/PPX-F&HE

Ashish Ranjan 15.03.18
(Ashish Ranjan)
Sr. Manager/MTE

Pre- Qualification requirement /PQR(Anneure-2B)

1. Vendors must have experience of manufacturing, supplying rectangular bars in the material grade X19CRMOVNB111 for steam turbine blade application.
2. The last supply should be within five years on date of opening tender.
3. Vendors to submit documentary evidence of at least 3 POs (like unpriced copy, TCs covering chemical and mechanical properties, heat treatment details, dimension reports etc.) and support of experience