

BHARAT HEAVY ELECTRICALS LIMITED
HEEP HARIDWAR INDIA-PIN 249403
FAX NO: 0091 1334 226462/223948
PHONE NO: 0091 1334 284144

Tender No.: Rate Contract/Steel Rounds/FY2020-21

Due Date: 29.06.2020

Sub: Rate Contract FY2020-21 (Steel Rounds and MS Rods)

BHEL is one of the largest engineering and manufacturing companies of its kind in India engaged in design, engineering, construction, testing, commissioning and servicing of a wide range of products and services with over 180 product offerings to meet the ever-growing needs of the core sectors of economy.

For bulk buying of Steel Rounds and MS Rods across BHEL, 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 Rate Contract of Steel Rounds and MS Rods. Rate Contract will be valid for 1 year from the date of finalization of contract.

Refer Annexure- 1A for details of items.

Tender No.	Item Description
Rate Contract/Steel Rounds/FY2020-21	Steel Rounds and MS Rods of Various Diameters

The tender documents & Specification of item can be downloaded from our web site www.bhel.com or www.bhelhwr.co.in. **Only those vendors who fulfill the Minimum Qualifying Requirements (as per Annexure-IIA to IIT) will be considered for further technical evaluation.**

The last date for downloading tender documents shall be 28.06.2020 & opening of tender shall be 29.06.2020. Tenders will be received up to 01.45 P.M. on **29.06.2020** and opened on the same day at 2.00 P.M. in the Tender Room. **Please note that tender received after due date & time (01.45 PM on 29.06.2020) will not be opened.** BHEL will not be responsible for any type of postal / courier delay.

Intending vendors must remit requisite **EMD 200,000/- (Rupees Two Lacs)** for indigenous vendors (or equivalent amount in foreign currency for foreign vendors) in the form of pay order or bank draft while submitting the tender documents as detailed in "Instruction to Bidders", after downloading from this web site. In case of foreign bidders, e-payment may also be accepted as EMD. Details of BHEL account as per following-

Bank Details	SWIFT Details of bank	Contact Details of Banker
STATE BANK OF INDIA RANIPUR BRANCH, OPP: BHEL MAIN GATE, SECTOR-5, RANIPUR, HARIDWAR, UTTRAKHAND, INDIA PIN CODE : 249403	SWIFT NO : SBININBB225 CC ACCOUNT NO : 10667995458 IFSC CODE : SBIN0000586	Chief Manager (IBD) Contact No. +91 1334 224201 +91 1334 226125 Fax: +91 1334 226512

EMD is waived off for-

- a) Central/ State – PSUs/ Government departments
- b) As per government guidelines, MSE suppliers are exempted for submission of EMD (Valid Documentary proof against MSE must be submitted along with offer to avail the benefits).

The total quantity may undergo change at the time of ordering.

The details of each item with required delivery are given in **Annexure-IA (Details of Items)**

Please submit your Techno-Commercial offer only for the above requirement subject to our terms and conditions.

IN ADDITION TO VENDORS MENTIONED ABOVE, OFFERS SHALL ONLY BE CONSIDERED OF THOSE VENDORS WHO WILL SUBMIT EMD. PLEASE SUBMIT DRAFTS FOR EMD DRAWN IN FAVOUR OF BHARAT HEAVY ELECTRICALS LTD. HEEP, HARIDWAR IN ANOTHER ENVELOPE SUPERSCRIBED WITH BOLD LETTERS "EMD". The tender will 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 attending the bid opening.

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

Vendors must fill up Annexure– II (A to T) respectively for the items they are quoting in confirmation to Pre- Qualification Requirements and quality requirements.

ESSENTIAL INSTRUCTIONS

1. **Only those bids will be considered which have been submitted with requisite EMD.**
2. **BHEL team may visit the vendor (s) works for verification of capability and capacity claimed in tender documents/offer (s).**
3. The tenders shall be submitted in two parts
 - i. Part I - Techno -Commercial Bid & Pre-Qualification Requirement,
 - ii. Part II - Price Bid
4. **The Quotation should be from the Principal / Original Manufacturer, failing which the quotation is likely to be ignored. In Case the quotation is submitted through agent, the quotation must accompany original authorization letter and following to be followed-**
 - a. Either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both.
 - b. In case bids are received from both the manufacturer/ supplier and the agent, bid received from the agent shall be ignored.
 - c. The agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender.

The authorization letter from the manufacturer, clearly indicating contact details like Name, E-mail & address of manufacturer and relationship with agent and its validity to be submitted with bid. The authorization letter should be tender specific. In case order is to be placed and executed by the agent, the following aspects are to be ensured-

- a. The manufacturer should meet the PQR requirements as defined in the tender.
 - b. In order to establish capability of agent to execute the order, the agent should have annual turnover of at least equal to the estimated value of the goods required under the subject tender during one Financial Year and Net worth of the bidder (agent) should be positive.
 - c. Manufacturer and bidder should jointly confirm Guarantee for the Quality of product and timely delivery as stipulated in NIT.
5. Documents submitted with the offer/bid by the bidder shall be signed and stamped in each page by authorized representative of the bidder. In case the bid is submitted by FAX, the bidder shall simultaneously ensure submission of signed and stamped (in each page) original bid to BHEL. If the documents are received in soft form, the same should be transmitted through vendor's authorized e-mail followed by the signed and stamped copy of the same documents. Documents not signed and stamped in each page by the authorized signatory of the bidder, shall not be accepted and considered for evaluation of the bid.
6. Any corrections / amendments shall be properly & fully authenticated with signature. No overwriting is acceptable.
7. Part-I containing Techno-Commercial bid & Pre-Qualification Requirement will be opened on the date and time specified in the tender notice in the presence of those vendors who wish to attend.
8. Part-II (Price Bids) along with supplementary price bids, if necessary, will be opened at a later date of only those bidders whose techno-commercial bid has been found acceptable.
9. Suitability of delivery shall be the important criteria for evaluation of techno commercial bid.
10. Currency exchange rate will be applicable on the date of opening of Part-I (Techno-commercial Bid) for evaluation purpose.
11. **Evaluation of Bid: - The bid shall be evaluated**
 - a. **Cost to BHEL basis. (Basic Cost + Insurance + Inspection + Transportation + Duty + Taxes)**
 - b. **The loading, if any, on account of LD penalty, payment terms or any other cost determined at later stage, which shall be communicated to the vendor.**
12. Rate Contract when finalized shall be in the name of the bidder only and change of name during tender evaluation (without certificate from registrar of company) and after submission of the tender is liable to make the offer ineligible for participation.
13. All test certificates / Guarantee certificates to be submitted in TRIPLICATE along with dispatch documents.
14. BHEL reserves the right to open the price bid (part-II) along with the opening of techno-commercial offer at its option and in that case vendor will be informed accordingly.
15. **BHEL reserves the right to go for reverse auction. Vendors are requested to give their best price. In case of failure of reverse auction the paper bid shall be processed. 'Guidelines for Reverse Auction are available at following link**
http://www.bhel.com/vendor_registration/vendor.php
16. Total weight--/Gross/Net in Kg & also package size essentially should be indicated if not exact then approximate.

Tender No. RC/Steel Rounds/FY2020-21

17. BHEL will evaluate the technical bids against essential criteria/requirements. BHEL may seek clarifications, if required, from the qualified bidders only. These clarifications will be communicated to the eligible vendors. **The offers of those bidders, who are unable to respond in specified time frame, are likely to be ignored.**
18. **Please note this rate contract is for bulk buying across BHEL, hence any BHEL unit can place purchase order with any delivery location within India.**

Note: Please visit our site www.bhelhwr.co.in for General Instructions and Standard Terms & Conditions (GISTC) for Tender Enquiries for Indian & Foreign Vendor. All the bidders / vendors must ensure compliance of latest GISTC.

GISTC are available in following link

<https://www.bhelhwr.co.in/bhelweb/Gistc.jsp>

IN CASE YOU ARE NOT MAKING AN OFFER AGAINST THIS ENQUIRY, THEN PLEASE ARRANGE TO SEND A LETTER OF REGRET.

DETAILS OF COMPOSITION OF PART-I (TECHNO-COMMERCIAL BID) & PART-II (PRICE BID)

PART-I (TECHNO-COMMERCIAL BID) shall comprise of following documents:

- a. Confirmation to Minimum Qualification Requirement and Quality Requirement as per Annexure-IIA- IIT.
- b. Complete technical offer as per specification, drawings, technical requirement along with un-priced bid.
- c. Delivery schedule.
- d. Validity of offer for 120 days to be indicated.
- e. **Deviation with reference to specification/drawing, if any, should be clearly indicated on a separate sheet.**
- f. Details of activity outsourced.
- g. Endorsed Quality Plan (if applicable) for items for which offer submitted.

PART –II (Price Bid)

- a. Price bid with prices to be submitted as part-II of the tender.
- b. Prices should remain firm till the validity of rate contract.
- c. **In case of foreign vendors, Bidders need to quote their prices on CFR any sea port in Mumbai in Euro/USD/JPY/UK Pound/SF/Singapore Dollar or any other internationally freely tradable currency only.** The name of the currency should be clearly indicated in your bids.

Offers received other than CFR basis may result in non-consideration of such bids. However, if BHEL agrees to accept the CFR / FOB condition, to arrive at landed cost at our plant/site, loading shall be done as per latest GISTC.

In case of Indigenous vendor, prices must be quoted on FOR- Destination basis.

In exceptional case, if BHEL accepts the EX-Works prices such offers will be loaded by 1.5% of EX-Works value towards freight or with actual freight charges as per BHEL freight rate contract whichever is higher.

Insurance – Marine in case of foreign vendor & inland in case of Indigenous vendor shall be taken care by BHEL.

- d. **Prices are to be written in both Figures & Words. In case of any difference between the two, the figure written in words shall be considered for evaluation. No over writing in this is acceptable.**
- e. Penalty for Late Deliveries shall be applicable @0.5% per week or part thereof on the value of respective delayed supplies subject to a maximum of 10% of the value of respective delayed supplies. In case of any variation in LD penalty, your prices shall be loaded to the extent LD penalty not accepted by you.

MARKING OF ENVELOPE:

- Each envelope is to be super scribed as “TENDER FOR (ITEM NAME) AGAINST TENDER NO. **Rate Contract/Steel Rounds/FY2020-21** DUE ON **29.06.2020**.”
- Drafts for EMD to be kept in one envelop – **Envelop –A**. On the Top of the envelope, please write Draft No., Issuing Bank Details & Amount. Those vendors who are quoting for more than one tender must submit a statement in the envelopes of all those tenders giving details of all the tenders being quoted. However, the draft of each tender should be kept in individual tender envelop.
- Techno-Commercial & Pre-Qualification Requirement document- Part-I to be kept in another envelop – **Envelop-B** & to be marked as Techno-Commercial Offer.
- Price Bid – Part-II to be kept in another envelop – **Envelop-C** & to be marked as Price Bid.
- Envelop-A, Envelop-B & Envelop-C are to be kept in one envelop super scribed as above

Parallel system for tender submission to cope lockdown/ COVID- 19 situation-

1. All vendors submitting their bids through e-mail may be advised to have following clear subject line-
 - (i) Tender Enquiry Reference No. _____
 - (ii) Bid Opening Date (Part 1, Techno-Commercial). _____

Vendor to submit their bids as attachment (pdf format) with password protection and share the password through mail (tendercell.heep@bhel.in) after 1:45 PM (IST) on the day of bid opening, however if no password is received up to 4:00 PM (IST) bids will not be opened and will be ignored. Submission of bids through email shall be considered as consent to open the bid without physically witnessing the event.

2. Tender box placed in Ground floor in Main Admin Building, HEEP (BHEL), Haridwar so that vendors can submit their bid easily.

ANNEXURE-IA

Item Details

TENDER REQUIREMENT FOR BULK TENDERING OF ROUNDS (MS/AS/SS) & MS ROD FOR FY 2020-21

Sl.	Specification/ item	Dia (mm)	Length (mm)	Tota Requirement (MT)
1	AA10108 Rev: 11			
1.1	Structural Steel Standard Quality	6	5000-6000	300.152
1.2	Structural Steel Standard Quality	8	5000-6000	80.529
1.3	Structural Steel Standard Quality	10	5000-6000	62.730
1.4	Structural Steel Standard Quality	12	5000-6000	31.302
1.5	Structural Steel Standard Quality	16	5000-6000	152.100
1.6	Structural Steel Standard Quality	20	5000-6000	100.000
1.6	Structural Steel Standard Quality	22	5000-6000	0.450
1.7	Structural Steel Standard Quality	25	5000-6000	80.125
1a	AA10108 Rev: 11*			
1a.1	MS Rod (Earthing Material)	40	Minimum 9000	1927.000
1a.2	MS Rod (Earthing Material)	40	6000-9000	907.120
2	AA10109 Rev: 03			
2.1	Hot Rolled Carbon Steel Bars	16	Random as per Spec.	1.000
2.2	Hot Rolled Carbon Steel Bars	20	Random as per Spec.	1.000
2.3	Hot Rolled Carbon Steel Bars	25	3300 or multiple	50.000
2.4	Hot Rolled Carbon Steel Bars	40	Random as per Spec.	1.000
2.5	Hot Rolled Carbon Steel Bars	63	Random as per Spec.	1.000
2.6	Hot Rolled Carbon Steel Bars	80	Random as per Spec.	1.000
2.7	Hot Rolled Carbon Steel Bars	90	3250 or multiple	100.000
2.8	Hot Rolled Carbon Steel Bars	100	3250 or multiple	100.000
2.9	Hot Rolled Carbon Steel Bars	110	3500 mm	100.000
	Note- For fix length items, length tolerance will be +50/-0 mm			
3	AA10208 Rev: 07			
3.1	Hot Rolled Carbon Steel Bars	12	Random as per Spec.	3.000
3.2	Hot Rolled Carbon Steel Bars	16	Random as per Spec.	3.000
3.3	Hot Rolled Carbon Steel Bars	20	Random as per Spec.	6.000
3.4	Hot Rolled Carbon Steel Bars	100	Random as per Spec.	5.000
4	AA10218 Rev: 07			
4.1	Hot Rolled Carbon Steel Bars- H & T	20	Random as per Spec.	1.000
4.2	Hot Rolled Carbon Steel Bars- H & T	32	Random as per Spec.	1.000
4.3	Hot Rolled Carbon Steel Bars- H & T	45	Random as per Spec.	2.000
4.4	Hot Rolled Carbon Steel Bars- H & T	56	Random as per Spec.	2.000
4.5	Hot Rolled Carbon Steel Bars- H & T	71	Random as per Spec.	1.000
4.6	Hot Rolled Carbon Steel Bars- H & T	90	Random as per Spec.	1.000
4.7	Hot Rolled Carbon Steel Bars- H & T	110	Random as per Spec.	1.000
4.8	Hot Rolled Carbon Steel Bars- H & T	140	Random as per Spec.	3.000
5	AA10501 Rev: 14			
5.1	1.5% Ni-Cr Mo Hot Rolled Carbon Steel Bars	20	Random as per Spec.	1.000
5.2	1.5% Ni-Cr Mo Hot Rolled Carbon Steel Bars	32	Random as per Spec.	1.000
5.3	1.5% Ni-Cr Mo Hot Rolled Carbon Steel Bars	40	Random as per Spec.	1.000
5.4	1.5% Ni-Cr Mo Hot Rolled Carbon Steel Bars	56	Random as per Spec.	1.000
5.5	1.5% Ni-Cr Mo Hot Rolled Carbon Steel Bars	71	Random as per Spec.	1.000
5.6	1.5% Ni-Cr Mo Hot Rolled Carbon Steel Bars	100	Random as per Spec.	3.000
5.7	1.5% Ni-Cr Mo Hot Rolled Carbon Steel Bars	165	Random as per Spec.	1.000
6	AA10503 Rev: 04			
6.1	3.5% Ni-Cr Mo Case Hardening Bars	32	5000-6000	50.000
7	AA10620 Rev: 09			
7.1	Alloy Steel Bars	40	Random as per Spec.	3.000

7.2	Alloy Steel Bars	50	Random as per Spec.	3.000
7.3	Alloy Steel Bars	90	Random as per Spec.	7.000
7.4	Alloy Steel Bars	100	Random as per Spec.	5.000
7.5	Alloy Steel Bars	110	Random as per Spec.	5.000
8	AA10622 Rev: 10			
8.1	Alloy Steel Bars	25	Random as per Spec.	1.000
8.2	Alloy Steel Bars	40	Random as per Spec.	1.000
8.3	Alloy Steel Bars	56	3000-6000	1.000
8.4	Alloy Steel Bars	63	Random as per Spec.	2.000
8.5	Alloy Steel Bars	71	Random as per Spec.	3.000
8.6	Alloy Steel Bars	80	Random as per Spec.	6.000
8.7	Alloy Steel Bars	90	Random as per Spec.	9.000
8.8	Alloy Steel Bars	100	3000-6000	2.000
8.9	Alloy Steel Bars	110	Random as per Spec.	6.000
8.10	Alloy Steel Bars	115	Random as per Spec.	5.000
8.11	Alloy Steel Bars	125	3000-6000	2.000
8.12	Alloy Steel Bars	140	Random as per Spec.	10.000
8.13	Alloy Steel Bars	165	Random as per Spec.	10.000
8.14	Alloy Steel Bars	160	Random as per Spec.	5.000
9	HW10566 Rev: 02			
9.1	Alloy Steel Round Bars	50	Random as per Spec.	1.000
9.2	Alloy Steel Round Bars	80	Random as per Spec.	5.000
9.3	Alloy Steel Round Bars	95	Random as per Spec.	5.000
9.4	Alloy Steel Round Bars	150	Random as per Spec.	5.000
10	HW10568 Rev: 04			
10.1	Heat Resistant Bars Steel	30	3000-6000	1.000
10.2	Heat Resistant Bars Steel	40	3000-6000	1.000
10.3	Heat Resistant Bars Steel	50	3000-6000	2.000
10.4	Heat Resistant Bars Steel	80	3000-6000	4.000
11	AA10725 Rev: 07			
11.1	Stainless Steel Bars (Austenitic) TI Stabilized. Solution Annealed	25	Random	2.000
11.2	Stainless Steel Bars (Austenitic) TI Stabilized. Solution Annealed	28	Random	5.000
11.3	Stainless Steel Bars (Austenitic) TI Stabilized. Solution Annealed	40	Random	3.000
11.4	Stainless Steel Bars (Austenitic) TI Stabilized. Solution Annealed	63	Random	1.000
11.5	Stainless Steel Bars (Austenitic) TI Stabilized. Solution Annealed	71	Random	1.000
12	HW10661 Rev: 01			
12.1	Steel Bars Grade X12CrMoWVNbN10-1-1	95	Random	5.000
12.2	Steel Bars Grade X12CrMoWVNbN10-1-1	110	Random	8.000
12.3	Steel Bars Grade X12CrMoWVNbN10-1-1	115	Random	8.000
12.4	Steel Bars Grade X12CrMoWVNbN10-1-1	140	Random	5.000
12.5	Steel Bars Grade X12CrMoWVNbN10-1-1	160	Random	0.500
12.6	Steel Bars Grade X12CrMoWVNbN10-1-1	180	Random	0.500
12.7	Steel Bars Grade X12CrMoWVNbN10-1-1	225	Random	0.500
12.8	Steel Bars Grade X12CrMoWVNbN10-1-1	240	Random	1.000
13	HW10662 Rev: 02			
13.1	Steel Bars Grade X10CrMoVNb9-1	55	Random	0.500
14	HW10673 Rev: 03			
14.1	02% Proof Stress Heat Resistant Bars	25	Random as per Spec.	0.500
14.2	02% Proof Stress Heat Resistant Bars	45	4000	5.000
14.3	02% Proof Stress Heat Resistant Bars	50	2220	2.000
14.4	02% Proof Stress Heat Resistant Bars	60	Random as per Spec.	8.000
14.5	02% Proof Stress Heat Resistant Bars	65	Random as per Spec.	3.000

14.6	02% Proof Stress Heat Resistant Bars	70	Random as per Spec.	5.000
14.7	02% Proof Stress Heat Resistant Bars	80	Random as per Spec.	15.000
14.8	02% Proof Stress Heat Resistant Bars	90	Random as per Spec.	3.000
14.9	02% Proof Stress Heat Resistant Bars	100	Random as per Spec.	10.000
14.10	02% Proof Stress Heat Resistant Bars	150	Random as per Spec.	10.000
	Note- For fix length items, length tolerance will be +50/-0 mm			
15	HW10674 Rev: 02			
15.1	0.2% Proof Stress Heat Resistant Bars	100	Random	5.000
16	HW10683 Rev: 03			
16.1	Steel Bars Grade X22CrMoV12-1	20	Random as per Spec.	0.500
16.2	Steel Bars Grade X22CrMoV12-1	45	Random as per Spec.	0.500
16.3	Steel Bars Grade X22CrMoV12-1	65	Random as per Spec.	2.000
16.4	Steel Bars Grade X22CrMoV12-1	70	Random as per Spec.	5.000
16.5	Steel Bars Grade X22CrMoV12-1	80	Random as per Spec.	3.000
16.6	Steel Bars Grade X22CrMoV12-1	90	Random as per Spec.	2.000
16.7	Steel Bars Grade X22CrMoV12-1	100	Random as per Spec.	3.000
16.8	Steel Bars Grade X22CrMoV12-1	135	Random as per Spec.	5.000
16.9	Steel Bars Grade X22CrMoV12-1	140	Random as per Spec.	5.000
17	HW10685 Rev: 04			
17.1	Alloy Steel Round Bars Gr. 10CrMo910	85	Random	0.500
17.2	Alloy Steel Round Bars Gr. 10CrMo910	110	Random	1.000
18	HW10760 Rev: 00			
18.1	Steel Bars Grade X5CrNiCuNb16-4	90	Random	1.000
19	HW10784 Rev: 03			
19.1	Austenitic Alloy Steel Bars	36	7085	2.300
19.2	Austenitic Alloy Steel Bars	16	Random	0.500
19.3	Austenitic Alloy Steel Bars	45	4600	0.500
19.4	Austenitic Alloy Steel Bars	42	5200	2.000
19.5	Austenitic Alloy Steel Bars	36	Random	0.500
19.6	Austenitic Alloy Steel Bars	42	7150	4.000
	Note- For fix length items, length tolerance will be +10/-0 mm			
20	HW18813 Rev: 01			
20.1	Steel Bars Grade 26NiCrMoV14-5	56	Random	1.000
20.2	Steel Bars Grade 26NiCrMoV14-5	100	Random	10.000
Total				4351.308

Remarks

* Requirement of MS Rod at 1a have following special conditions

1. Application of rod as underground earthing.
2. These rods shall be welded together to form mat/ring.
3. Material to be offered for inspection by BHEL
4. Manufacturer must be customer approved. In case not approved, customer approval to be obtained by manufacturer. Manufacturer to furnish required documents for the same.

4a. Customers for requirement 1a.1 are- NTPC Ltd, Telangana State Power Generation Corporation, West Bengal Power Development Corporation Ltd & NLC India Ltd/NTPL.

4b. Customers for 1a.2 are- Tamil Nadu Generation and Distribution Ltd, Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd, NTPC Ltd & Maharashtra State Power Generation Co. Ltd.

Suppliers quoting for requirement 1.a.1 & 1.a.2 must obtain customer approval form above cus

ANNEXURE-I B**COMPLIANCE SHEET FOR TECHNICAL/COMMERCIAL TERMS AND CONDITIONS
FOR BULK Purchase****PLEASE FILL THIS ANNEXURE & ATTACH WITH YOUR TECHNO-COMMERCIAL BID.**

Offer must be sent in two separate sealed envelopes containing techno-commercial offer in one envelope marked "TECHNO-COMMERCIAL BID" and prices in second envelope marked "PRICE-BID". Both the envelopes must be contained in the main envelope. Tender name and due date to be marked on all the envelopes.

You are requested to kindly confirm /clarify the following:-

S. No.	Description	Vendor's Confirmation
1	Vendor to confirm that they meet each & every clause of our specifications/Drawings for which they are quoting.	YES / NO
1a	If "No" to serial number 1, vendor to specify each deviated clause & submit in a separate sheet.	
2	Validity: Confirm that validity of the offer shall be 120 days from the date of tender opening.	YES / NO
3	Confirm that Prices will be firm throughout validity of rate contract. (Rate contract shall be valid till for 1 year from the date of finalization of contract & may be extended for further one year after mutual agreement with supplier with approval of competent authority.).	YES / NO
3	Confirm that un-priced part of price bid is enclosed with technical commercial offer	YES / NO
4	Evaluation of the tender on landed cost will remain the same i.e. FOR price = Basic price per MT + All India freight per MT , for each item in the tender. IGST/SGST/CGST/UTGST will be paid extra at the prevailing rate for the item in the tender/ Rate Contract/ PO as notified by GOI. Hence suppliers shall quote the following in the tender excluding the taxes, a. Basic Price /MT for each item. b. All over India freight (anywhere to anywhere basis)/ MT for each item. Please note, no ODC charges are payable by BHEL separately.	YES / NO
5	Confirm that payment term shall be "100% payment after receipt and acceptance of material.	YES / NO
6	Penalty for Late Deliveries shall be applicable @0.5% per week or part thereof on the value of respective delayed supplies subject to a maximum of 10% of the value of respective delayed supplies.	YES / NO
7	All documents like Mill Test Certificate, LR copy, Guarantee/Warranty certificate, Any other document mentioned in PO, shall be sent along with the vehicle/ consignment. For all consignments received within the calendar month, input credit will be availed within that month in line with monthly returns filing cycle. In case of any discrepancy in the document or non-submission of documents mentioned in the PO, then BHEL will not be able to accept or account the material, in such case availing of tax credit will be deferred to next month or so.	YES / NO
8	Confirm that all test certificates to be submitted as per BHEL specification in TRIPLICATE along with dispatch documents	YES / NO
9	Right of acceptance – BHEL reserves the right to reject any or all quotations without assigning any reasons thereof. BHEL also reserves the right to increase or decrease the tendered quantities. Vendors should be prepared to accept order for reduced quantities without any extra charges. Vendor should also be prepared for giving discount in case of increase in quantity.	YES / NO
10	Confirm acceptance of Risk Purchase clause.	YES / NO

Remarks-

1. Quantity tolerance $\pm 10\%$ acceptable for all items.
2. Comparative Statement will be evaluated on item wise basis after combining DEEC, PI and Merit quantity.
3. Risk purchase clause shall be applicable. If you do not confirm this in your offer, then it shall be presumed to be acceptable and no further confirmation will be taken after opening of techno-commercial bid part- 1.
4. After placement of order vendor should submit their invoices against goods and services immediately after supply of goods & services but not later than 30 days from the invoice date. In case of any delay, consequential losses like loss of input credit and non-availability of concessional forms etc., shall be to the vendor account.
5. Penalty for Late Deliveries shall be applicable @0.5% per week or part thereof on the value of respective delayed supplies subject to a maximum of 10% of the value of respective delayed supplies.
6. For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017, 28.05.2018 & 29.05.2019 (Annexure- VII, VIII & IX) and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of contract/ PO/WO against NIT.

In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and/ or local content in respect of this procurement, same shall be applicable.

7. NOTE: THE QUANTITY INDICATED ABOVE CAN BE INCREASED/ DECREASED.
8. **Suppliers quoting for requirement at Sl. no. 1 a (MS Rod, Earthing material) have to follow/confirm special conditions (additionally) mentioned in remarks at the bottom of requirement (refer annexure- IA).**

ANNEXURE-II A**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : AA10108 Rev 11

A. BIS Approved vendors for IS: 2062 rounds:

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)
1.	Vendor to submit valid BIS approval certificate for manufacturing and supply of round bars of IS 2062. BIS approved vendor will be qualified directly based on their certificate.	
2.	Vendor to submit manufacturing and testing facility available in house for record. In case of out sourcing of any operation, vendor to inform their source and details of their manufacturing/testing facilities.	
3.	Vendor to confirm they will supply items as per enquiry specification and dimension.	

B. For vendors not having BIS approval:

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																				
1.	Vendor must be having experience of manufacturing and supplying round bars as per IS: 2062 material grade E250 or higher material grade of carbon steel or alloy steel of enquiry dimensions. Vendor to submit their past supply experience in format below.																					
	<table><tr><th>Sl. No.</th><th>Dimension (diameter X length)</th><th>Material Grade & Standard</th><th>Name of customer/Purchase order No/Date of Supply</th><th>Quantity</th></tr><tr><td>1</td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td></tr></table>		Sl. No.	Dimension (diameter X length)	Material Grade & Standard	Name of customer/Purchase order No/Date of Supply	Quantity	1					2					3				
	Sl. No.		Dimension (diameter X length)	Material Grade & Standard	Name of customer/Purchase order No/Date of Supply	Quantity																
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	3																					
Vendor to submit documentary evidence like test certificates covering chemical, mechanical properties, heat treatment condition, supply dimension details in support of experience.																						
2.	Vendor must have in-house manufacturing facility to manufacture round bar of enquiry dimensions. Details of manufacturing facilities like steel melting, rolling/forging, heat treatment, etc. are to be provided.																					
3.	In case in-house steel melting facility not available, vendor to provide details of their steel supplier with their facility details.																					
4.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification AA10108. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																					
5.	Vendor to confirm that they will meet all the requirements of BHEL specification AA10108, Rev 11.																					
Note- 1. In case of trader/stockist, vendor to submit details as per A or B as applicable of their principal manufacturer only from whom they will supply quoted items. Offers of trader/stockist without these details will not be considered. 2. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 3. This is applicable for both registered as well as un-registered vendors.																						

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II B**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : AA10109 Rev 03

A. BIS Approved vendors for IS: 1570 rounds:

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)
1.	Vendor to submit valid BIS approval certificate for manufacturing and supply of round bars of IS 1570. BIS approved vendor will be qualified directly based on their certificate.	
2.	Vendor to submit manufacturing and testing facility available in house for record. In case of out sourcing of any operation, vendor to inform their source and details of their manufacturing/testing facilities.	
3.	Vendor to confirm they will supply items as per enquiry specification and dimension.	

B. For vendors not having BIS approval:

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																				
1.	Vendor must be having experience of manufacturing and supplying round bars as per IS: 1570 material grade 20C8 or higher material grade of carbon steel or alloy steel of enquiry dimensions. Vendor to submit their past supply experience in format below.																					
	<table><tr><th>Sl. No.</th><th>Dimension (diameter X length)</th><th>Material Grade & Standard</th><th>Name of customer/Purchase order No/Date of Supply</th><th>Quantity</th></tr><tr><td>1</td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td></tr></table>		Sl. No.	Dimension (diameter X length)	Material Grade & Standard	Name of customer/Purchase order No/Date of Supply	Quantity	1					2					3				
	Sl. No.		Dimension (diameter X length)	Material Grade & Standard	Name of customer/Purchase order No/Date of Supply	Quantity																
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	2																					
	3																					
Vendor to submit documentary evidence like test certificates covering chemical, mechanical properties, heat treatment condition, supply dimension details in support of experience.																						
2.	Vendor must have in-house manufacturing facility to manufacture round bar of enquiry dimensions. Details of manufacturing facilities like steel melting, rolling/forging, heat treatment, etc. are to be provided.																					
3.	In case in-house steel melting facility not available, vendor to provide details of their steel supplier with their facility details.																					
4.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification AA10109. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																					
5.	Vendor to confirm that they will meet all the requirements of BHEL specification AA10109, Rev 03.																					
Note- 1. In case of trader/stockist, vendor to submit details as per A or B as applicable of their principal manufacturer only from whom they will supply quoted items. Offers of trader/stockist without these details will not be considered. 2. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 3. This is applicable for both registered as well as un-registered vendors.																						

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II C**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : AA10208 Rev 07

A. BIS Approved vendors for IS: 1570 rounds:

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)
1.	Vendor to submit valid BIS approval certificate for manufacturing and supply of round bars of IS 1570. BIS approved vendor will be qualified directly based on their certificate.	
2.	Vendor to submit manufacturing and testing facility available in house for record. In case of out sourcing of any operation, vendor to inform their source and details of their manufacturing/testing facilities.	
3.	Vendor to confirm they will supply items as per enquiry specification and dimension.	

B. For vendors not having BIS approval:

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																				
1.	Vendor must be having experience of manufacturing and supplying round bars as per IS: 1570 material grade 40C8 or higher material grade of carbon steel or alloy steel of enquiry dimensions. Vendor to submit their past supply experience in format below.																					
	<table><tr><th>Sl. No.</th><th>Dimension (diameter X length)</th><th>Material Grade & Standard</th><th>Name of customer/Purchase order No/Date of Supply</th><th>Quantity</th></tr><tr><td>1</td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td></tr></table>		Sl. No.	Dimension (diameter X length)	Material Grade & Standard	Name of customer/Purchase order No/Date of Supply	Quantity	1					2					3				
	Sl. No.		Dimension (diameter X length)	Material Grade & Standard	Name of customer/Purchase order No/Date of Supply	Quantity																
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	2																					
	3																					
Vendor to submit documentary evidence like test certificates covering chemical, mechanical properties, heat treatment condition, supply dimension details in support of experience.																						
2.	Vendor must have in-house manufacturing facility to manufacture round bar of enquiry dimensions. Details of manufacturing facilities like steel melting, rolling/forging, heat treatment, etc. are to be provided.																					
3.	In case in-house steel melting facility not available, vendor to provide details of their steel supplier with their facility details.																					
4.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification AA10208. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																					
5.	Vendor to confirm that they will meet all the requirements of BHEL specification AA10208, Rev 07.																					
Note- 1. In case of trader/stockist, vendor to submit details as per A or B as applicable of their principal manufacturer only from whom they will supply quoted items. Offers of trader/stockist without these details will not be considered. 2. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 3. This is applicable for both registered as well as un-registered vendors.																						

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II D**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : AA10218 Rev 07

A. BIS Approved vendors for IS: 5517 rounds:

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)
1.	Vendor to submit valid BIS approval certificate for manufacturing and supply of round bars of IS 5517 BIS approved vendor will be qualified directly based on their certificate.	
2.	Vendor to submit manufacturing and testing facility available in house for record. In case of out sourcing of any operation, vendor to inform their source and details of their manufacturing/testing facilities.	
3.	Vendor to confirm they will supply items as per enquiry specification and dimension.	

B. For vendors not having BIS approval:

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																				
1.	Vendor must be having experience of manufacturing and supplying round bars as per IS: 5517 material grade 40C8 or higher material grade of carbon steel or alloy steel of enquiry dimensions. Vendor to submit their past supply experience in format below.																					
	<table><tr><th>Sl. No.</th><th>Dimension (diameter X length)</th><th>Material Grade & Standard</th><th>Name of customer/Purchase order No/Date of Supply</th><th>Quantity</th></tr><tr><td>1</td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td></tr></table>		Sl. No.	Dimension (diameter X length)	Material Grade & Standard	Name of customer/Purchase order No/Date of Supply	Quantity	1					2					3				
	Sl. No.		Dimension (diameter X length)	Material Grade & Standard	Name of customer/Purchase order No/Date of Supply	Quantity																
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	2																					
	3																					
Vendor to submit documentary evidence like test certificates covering chemical, mechanical properties, heat treatment condition, supply dimension details in support of experience.																						
2.	Vendor must have in-house manufacturing facility to manufacture round bar of enquiry dimensions. Details of manufacturing facilities like steel melting, rolling/forging, heat treatment, etc. are to be provided.																					
3.	In case in-house steel melting facility not available, vendor to provide details of their steel supplier with their facility details.																					
4.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification AA10218. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																					
5.	Vendor to confirm that they will meet all the requirements of BHEL specification AA10218, Rev 07.																					
Note- 1. In case of trader/stockist, vendor to submit details as per A or B as applicable of their principal manufacturer only from whom they will supply quoted items. Offers of trader/stockist without these details will not be considered. 2. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 3. This is applicable for both registered as well as un-registered vendors.																						

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II E**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : AA10501 Rev 14

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Minimum qualification requirements: Vendor must have experience of manufacturing and supplying forged/rolled bars of Ni-Cr-Mo-V/Ni-Cr-Mo steels. Vendor must have manufactured and supplied at least three purchase orders in last seven years on issue of enquiry date in material grade 40Ni6Cr4Mo3 as per IS 5517 Type J or higher Cr-Ni-Mo/Cr-Ni-Mo-V grades. Material supplied in hardened and tempered condition will only be considered for experience. In support of above, details of the experience to be submitted with offer in the format given below. <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Size</th> <th>Purchase order number</th> <th>Name of customer</th> <th>Quantity</th> <th>Date of Supply</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> For documentary evidence, vendor to submit un-priced PO copy, test certificates covering chemical composition, mechanical properties, heat treatment, dimensional report of above supply.	Sl. No.	Size	Purchase order number	Name of customer	Quantity	Date of Supply	1						2						3						
Sl. No.	Size	Purchase order number	Name of customer	Quantity	Date of Supply																					
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2																										
3																										
2.	Vendor must have in-house manufacturing facilities like melting, secondary refining/degassing, rolling/forging, heat treatment etc. to manufacture enquiry grade round bars of enquired sizes. For documentary evidence vendor to submit details as per below • Steel melting: Details of secondary refining/degassing facility • Rolling facility: Minimum and maximum dimension which can be rolled (diameter and length) • Forging facility: Press/hammer details, minimum and maximum dimension which can be forged (diameter and length) • Heat treatment: Furnace details covering size, temperature range, calibration details, quenching media (air/oil/polymer) etc.																									
3.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification AA10501. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
4.	Vendor to confirm that they will meet all the requirements of BHEL specification AA10501, Rev 14.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II F**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : AA10503 Rev 04

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Minimum qualification requirements: Vendor must have experience of manufacturing and supplying forged/rolled bars of Ni-Cr-Mo-V/Ni-Cr-Mo steels. Vendor must have manufactured and supplied at three purchase orders in last seven years on issue of enquiry date in material grade 14NiCrMo13-4 or higher Ni-Cr-Mo/Cr-Mo-Ni-V grades like 26NiCrMoV14-5, 26NiCrMo14-6, 21CrMoV57, X10CrMoVNb9-1, X22CrMoV121, X12CrMoWVNbN10-1-1, etc. In support of above vendor to submit experience details as per format below: <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Size</th><th>Purchase order number</th><th>Name of customer</th><th>Date of Supply</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> Vendor to submit documentary evidence like unpriced purchase order copy, test certificates covering chemical, hardness, heat treatment, supply dimension details in support of experience of at least one purchase order supplied in last three years.	Sl. No.	Size	Purchase order number	Name of customer	Date of Supply	Quantity	1						2						3						
Sl. No.	Size	Purchase order number	Name of customer	Date of Supply	Quantity																					
1																										
2																										
3																										
2.	Vendor to submit details of manufacturing facilities, in-house / within the Group Company / outsourced, to manufacture enquiry items: - Steel Melting & Refining - Rolling / Forging - Heat Treatment Details of above facilities are to be submitted. In case of outsourcing of any operation, vendor to submit details of operation outsourced with details of their sub supplier. Details of facility & past experience for outsourced operation to their sub supplier to be submitted.																									
3.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification AA10503. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
5.	Vendor to confirm that they will meet all the requirements of BHEL specification AA10503, Rev 04.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II G**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : AA10620 Rev 09

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	<u>Minimum Experience Requirement:</u> (a) Vendor must have manufactured and supplied round bars in material grade 21CrMoV57 against at least one purchased order. (b) Vendor must have successfully executed at least three orders in material grade 21CrMoV57 or higher material grades like X22CrMoV121, X10CrMoVNb9-1, X12CrMoWVNbN10-1-1 on the tender opening date. Material supplied in hardened and tempered condition only will be considered for experience. <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Size</th><th>Date of Supply</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> In support of above, details of the experience to be submitted with offer in the format given below: As documentary evidence, vendor to submit test certificates, un-priced PO copies for the above supplies.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
1																										
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3																										
2.	<u>Manufacturing & Testing Facility Requirement:</u> a) Vendor must have in-house manufacturing facilities like melting, secondary refining including vacuum degassing, rolling / forging, heat treatment etc. to manufacture round bars as per BHEL specification AA10620 and enquiry size. Vacuum degassed steel shall be used. Details of the manufacturing facilities like steel melting, secondary refining including vacuum degassing, rolling / forging, heat treatment etc. shall be provided with offer. Outsourcing of any of above operation is not acceptable. Vendor shall submit following manufacturing details with relevant supporting documents with offer: - Steel melting facility including secondary refining & vacuum degassing facility - Rolling/Forging facility details - Heat Treatment - Furnace details, furnace and instrument calibration certificate, quenching media (air, oil, polymer) b) Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification AA10620. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
3.	Vendor to confirm that they will meet all the requirements of BHEL specification AA10620, Rev 09.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	For Foreign Vendors- Testing & certification as per ordering standard/ specification. For Indigenous Vendors- Quality Plan to be submitted by vendors along with offer for BHEL review and approval. Inspection by BHEL nominated agency TUV, as per finally approved Quality Plan.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II H**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
Material Grade : 20CrMoVTiB 4-10 (Material No. 1.7729 EN10269)
BHEL Specification : AA10622 Rev 10

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Vendor must have experience of manufacturing and supplying forged/rolled bars of material grade 20CrMoVTiB 4-10, material number 1.7729. Material supplied in hardened and tempered condition only will be considered for experience. Minimum experience requirement: Vendor must meet any one of the following experience criteria in grade 20CrMoVTiB 4-10 on the enquiry issue date: a) Successfully executed at least three orders in last seven years Or b) Supplied minimum 10 Tons in last seven years Or c) Executed at least one order and having Creep Rupture data for 1000hrs for material grade or Creep Properties as per EN10269. Creep Rupture data/ Creep test results has to be submitted with offer. In support of above vendor to submit experience details as applicable as per format below: <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Name of customer</th> <th>Purchase order number</th> <th>Size</th> <th>Date of Supply</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Vendor to submit documentary evidence like unpriced purchase order copy, test certificates covering chemical, mechanical properties, heat treatment, supply dimension details in support of experience.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
1																										
2																										
3																										
2.	Vendor must have following manufacturing facilities, in-house / within the Group Company, to manufacture enquiry items: - Steel Melting & Refining - Rolling / Forging - Heat Treatment Details of above facilities are to be submitted.																									
3.	Vendor to confirm that it has adequate testing facilities to carry out test as per AA10622. Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification AA10622. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
4.	Vendor to confirm that they will meet all the requirements of BHEL specification AA10622.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	For Foreign Vendors- Testing & certification as per ordering standard/ specification. For Indigenous Vendors- Quality Plan to be submitted by vendors along with offer for BHEL review and approval. Inspection by BHEL nominated agency TUV, as per finally approved Quality Plan.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II I**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
Material Grade : 26NiCrMoV14-5 (1.6957 of EN10269)/26NiCrMo14-6 (1.6958 of EN10269)
BHEL Specification : HW10566, Rev 02

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Minimum qualification requirements: Vendor must have experience of manufacturing and supplying forged/rolled bars of Ni-Cr-Mo-V/Ni-Cr-Mo steels. Vendor must have manufactured and supplied at least three purchase orders in last seven years in material grade 26NiCrMoV14-5 / 26NiCrMo14-6 or higher Ni-Cr-Mo/ Cr-Mo-Ni-V grades like X22CrMoV121, 21CrMoV57, X10CrMoVNb9-1, X12CrMoWVNbN10-1-1 etc. Material supplied in hardened and tempered condition only will be considered for experience. In support of above vendor to submit experience details as per format below: <table><tr><th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Size</th><th>Date of Supply</th><th>Quantity</th></tr><tr><td>1</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td><td></td></tr></table> Vendor to submit documentary evidence like unpriced purchase order copy, test certificates covering chemical, mechanical properties, heat treatment, supply dimension details in support of experience of at least one purchase order supplied in last three years.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
1																										
2																										
3																										
2.	Vendor to submit details of manufacturing facilities, in-house / within the Group Company / outsourced, to manufacture enquiry items: - Steel Melting & Refining - Rolling / Forging - Heat Treatment Details of above facilities are to be submitted. In case of outsourcing of any operation, vendor to submit details of operation outsourced with details of their sub supplier. Details of facility & past experience for outsourced operation to their sub supplier to be submitted.																									
3.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW10566. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
4.	Vendor to confirm that they will meet all the requirements of BHEL specification HW10566, Rev 02.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II J**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
Material Grade : 16Mo3 (Material No. 1.5415, EN10222-1)
BHEL Specification : HW10568, Rev 04

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Minimum qualification requirements: Vendor must have experience of manufacturing and supplying forged/rolled bars of 16Mo3/Ni-Cr-Mo-V/Ni-Cr-Mo steels. Vendor must have manufactured and supplied against at least three purchase orders in last seven years in material grade 16Mo3 or higher Mo-V/Ni-Cr-Mo/Cr-Mo-Ni-V grades like 11CrMo910/X22CrMoV121, 21CrMoV57, X10CrMoVNb9-1, X12CrMoWVNbN10-1-1 etc. Material supplied in hardened and tempered condition only will be considered for experience. In support of above vendor to submit experience details as per format below: <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Size</th><th>Date of Supply</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> Vendor to submit documentary evidence like unpriced purchase order copy, test certificates covering chemical, mechanical properties, heat treatment, supply dimension details in support of experience of at least one purchase order supplied in last three years.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
1																										
2																										
3																										
2.	Vendor to submit details of manufacturing facilities, in-house / within the Group Company / outsourced, to manufacture enquiry items: - Steel Melting & Refining - Rolling / Forging - Heat Treatment Details of above facilities are to be submitted. In case of outsourcing of any operation, vendor to submit details of operation outsourced with details of their sub supplier. Details of facility & past experience for outsourced operation to their sub supplier to be submitted.																									
3.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW10568. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
4.	Vendor to confirm that they will meet all the requirements of BHEL specification HW10568, Rev 04.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II K**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : HW10673 Rev 03

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Minimum Experience Requirement: (a) Vendor must have manufactured and supplied round bars in material grade 21CrMoV57 against at least one purchased order. (b) Vendor must have successfully executed at least three orders in material grade 21CrMoV57 or higher material grades like X22CrMoV121, X10CrMoVNb9-1, X12CrMoWVNbN10-1-1 on the tender opening date. Material supplied in hardened and tempered condition only will be considered for experience. In support of above, details of the experience to be submitted with offer in the format given below: <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Size</th><th>Date of Supply</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> As documentary evidence, vendor to submit test certificates, un-priced PO copies for the above supplies.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
1																										
2																										
3																										
2.	<u>Manufacturing & Testing Facility Requirement:</u> a) Vendor must have in-house manufacturing facilities like melting, secondary refining including vacuum degassing, rolling / forging, heat treatment etc. to manufacture round bars as per BHEL specification HW10673, Rev 03 and enquiry size. Vacuum degassed steel shall be used. Details of the manufacturing facilities like steel melting, secondary refining including vacuum degassing, rolling / forging, heat treatment etc. shall be provided with offer. Outsourcing of any of above operation is not acceptable. Vendor shall submit following manufacturing details with relevant supporting documents with offer: - Steel melting facility including secondary refining & vacuum degassing facility - Rolling/Forging facility details - Heat Treatment - Furnace details, furnace and instrument calibration certificate, quenching media (air, oil, polymer) b) Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW10673. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
3.	Vendor to confirm that they will meet all the requirements of BHEL specification HW10673, Rev 02.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	For Foreign Vendors- Testing & certification as per ordering standard/ specification. For Indigenous Vendors- Inspection by BHEL nominated agency TUV, as per Quality Plan no. QA/CF/QP/368/OT, rev 00.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II L**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
Material Grade : 25CrMo4 (Material No. 1.7218)
BHEL Specification : HW10674, Rev 02

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Vendor must have experience of manufacturing and supplying forged/rolled bars of 25CrMo4/Ni-Cr-Mo-V/Ni-Cr-Mo steels. Vendor must have manufactured and supplied against at least three purchase orders in last seven years in material grade 25CrMo4 or higher Cr-Mo/Cr-Mo-V/Ni-Cr-Mo/Cr-Mo-Ni-V grades like 11CrMo910, X22CrMoV121, 21CrMoV57, X10CrMoVNb9-1, X12CrMoWVNbN10-1-1 etc. Material supplied in hardened and tempered condition only will be considered for experience. In support of above vendor to submit experience details as per format below: <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Name of customer</th> <th>Purchase order number</th> <th>Size</th> <th>Date of Supply</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Vendor to submit documentary evidence like unpriced purchase order copy, test certificates covering chemical, mechanical properties, heat treatment, supply dimension details in support of experience of at least one purchase order supplied in last three years.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
1																										
2																										
3																										
2.	Vendor to submit details of manufacturing facilities, in-house / within the Group Company / outsourced, to manufacture enquiry items: - Steel Melting & Refining - Rolling / Forging - Heat Treatment Details of above facilities are to be submitted. In case of outsourcing of any operation, vendor to submit details of operation outsourced with details of their sub supplier. Details of facility & past experience for outsourced operation to their sub supplier to be submitted.																									
3.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW10674. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
4.	Vendor to confirm that they will meet all the requirements of BHEL specification HW10674, Rev 02.																									
Note- - Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. - This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II M**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : AA10725 Rev 07

Sl. No.	Technical Requirement	Documents to be submitted	Vendor's confirmation (Y/N)
1.	Vendor must be certified by Bureau of Indian Standards (BIS) for manufacturing of round bars of material grade X04Cr18Ni10Ti of IS:6603 (equivalent to ASTM A276M, Type 321 /X6CrNiTi10-10 EN10088-3) for enquiry dimensions.	- Copy of valid BIS certificate for material grade X04Cr18Ni10Ti of IS: 6603 for enquiry round dimensions. - Details of manufacturing & testing facilities to be submitted for record.	
2.	Enquiry round bars shall be supplied meeting all the requirements of BHEL specification AA10725 Rev 07.	<u>Vendor to confirm</u>	

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
<i>Note- This is applicable for both registered as well as un-registered vendors.</i>		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II N**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : HW10661, Rev 01

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Minimum experience requirement: Vendor must have experience of manufacturing and supplying forged/rolled bars of material grade X12CrMoWVNbN10-1-1 (material no. 1.4906). Material supplied in hardened and tempered condition only will be considered for experience. Vendor must meet any one of the following experience criteria in grade X12CrMoWVNbN10-1-1 during last 7 years as on date of enquiry: a) Successfully executed at least three orders Or b) Supplied minimum 3 Tons Or c) Executed at least one order and having Creep Rupture data for minimum 1000hrs. Creep Rupture data/ Creep test results has to be submitted with offer. In support of above vendor to submit experience details as applicable as per format below: <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Size</th><th>Date of Supply</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> Documentary evidence (like un-priced purchase order copy, test certificate covering chemical & mechanical properties, heat treatment details, dimensions, creep data etc.) in support of experience to be submitted for material grade X12CrMoWVNbN10-1-1.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
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2																										
3																										
2.	Manufacturing and Testing Facilities: a) Vendor must have in-house manufacturing facilities like steel melting, secondary refining including electro slag re-melting, rolling / forging, heat treatment etc. to manufacture round bars as per BHEL specification HW10661 and enquiry size. Electro Slag re-melted steel shall be used. Outsourcing of any of above operation is not acceptable. Details of the manufacturing facilities like steel melting, secondary refining including electro slag re-melting, rolling / forging, heat treatment etc. shall be provided with offer. b) Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW10661. In case of outsourcing of any test, vendor to confirm to carry out testing at Government accredited labs only.																									
3.	Process Qualification: Vendor to submit process qualification test results as per Clause 11.0 (hot tensile test and microstructure examination as per Clause 11.2.1 and 11.2.3), if available. If process qualification test results not available, vendor to carry out process qualification tests (hot tensile test and microstructure examination as per Clause 11.2.1 and 11.2.3) and satisfy the requirement of specification. Vendor to submit process qualification test results with offer. Process qualification test results must be witnessed by Customer/Third Party Inspection agency.																									
4.	Vendor to confirm that they will meet all the requirements of BHEL specification HW10661, Rev 01 and all cross referred standards.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	For Foreign Vendors- Testing & certification as per ordering standard/ specification. For Indigenous Vendors- Inspection by BHEL nominated agency TUV, as per Quality Plan no. QA/CF/QP/369/OT, rev 01.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II O**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
Material Grade : X22CrMoV121 (Material No. 1.4923, EN10269)
BHEL Specification : HW10683, Rev 03

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Experience Requirement: (i) Vendor must have experience of manufacturing and supplying forged or rolled round/flat bars of material grade X22CrMoV121 (material no. 1.4923). Material supplied in hardened and tempered condition only will be considered for experience. Vendor must meet any one of the following experience criteria in grade X22CrMoV121 during last 7 years as on date of enquiry: a) Successfully executed at least three orders Or b) Supplied minimum 10 Tons Or c) If vendor successfully executed at least one purchase order in material grade X22CrMoV121 but not meeting the condition a) & b) above, then vendor to carry out process qualification as per clause 12.0 of enquiry specification from their manufactured material. The test is to be witnessed by 3rd party and results should satisfy the specification requirement. Test results is to be submitted with offer. In support of above vendor to submit experience details, as applicable, preferably as per format below: <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Size</th><th>Date of Supply</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> As documentary evidence, vendor to submit test certificates covering chemical composition, heat treatment, mechanical properties, dimensional details, process qualification test result (if applicable). The correlation of test certificates with purchase order referred in support of experience has to be ensured by vendor.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
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2																										
3																										
2.	Manufacturing and Testing Facilities: a) Vendor must have in-house manufacturing facilities like steel melting, secondary refining including electro slag re-melting, rolling / forging, heat treatment etc. to manufacture round bars as per BHEL specification HW10683 and enquiry size. Outsourcing of any of above operation is not acceptable. Details of the manufacturing facilities like steel melting, secondary refining including, rolling / forging, heat treatment etc. shall be provided with offer. b) Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW10683. In case of outsourcing of any test, vendor to confirm to carry out testing at Government accredited labs only.																									
3.	Vendor to confirm that they will meet all the requirements of BHEL specification HW10683, Rev 03 and all cross referred standards.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	For Foreign Vendors- Testing & certification as per ordering standard/ specification. For Indigenous Vendors- Inspection by BHEL nominated agency TUV, as per Quality Plan no. QA/CF/QP/367/OT, rev 00.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II P**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
Material Grade : 10CrMo9-10 (Material No. 1.7380, EN10273)
BHEL Specification : HW10685, Rev 04

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Vendor must have experience of manufacturing and supplying forged/rolled bars of 10CrMo9-10/CrMo/Ni-Cr-Mo-V/Ni-Cr-Mo steels. Vendor must have manufactured and supplied against at least three purchase orders in last seven years in material grade 11CrMo910 or higher Cr-Mo/Ni-Cr-Mo/Cr-Mo-Ni-V grades like X22CrMoV121, 21CrMoV57, X10CrMoVNb9-1, X12CrMoWVNbN10-1-1 etc. Material supplied in hardened and tempered condition only will be considered for experience. In support of above vendor to submit experience details as per format below: <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Name of customer</th> <th>Purchase order number</th> <th>Size</th> <th>Date of Supply</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Vendor to submit documentary evidence like unpriced purchase order copy, test certificates covering chemical, mechanical properties, heat treatment, supply dimension details in support of experience of at least one purchase order supplied in last three years.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
1																										
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3																										
2.	Vendor to submit details of manufacturing facilities, in-house / within the Group Company / outsourced, to manufacture enquiry items: - Steel Melting & Refining - Rolling / Forging - Heat Treatment Details of above facilities are to be submitted. In case of outsourcing of any operation, vendor to submit details of operation outsourced with details of their sub supplier. Details of facility & past experience for outsourced operation to their sub supplier to be submitted.																									
3.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW10685. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
4	Vendor to confirm that they will meet all the requirements of BHEL specification HW10685, Rev 04.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II Q**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : HW10760, Rev 00

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Minimum experience requirement: Vendor must have experience of manufacturing and supplying forged/rolled bars of material grade X5CrNiCuNb16-4 (material no. 1.4542) against at least one purchase order in last 7 years as on date of enquiry. Material supplied in precipitation hardened condition only will be considered for experience. In support of above vendor to submit experience details as applicable as per format below: <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Size</th><th>Date of Supply</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> 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 X5CrNiCuNb16-4.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
1																										
2																										
3																										
2.	Manufacturing and Testing Facilities: a) Vendor must have in-house manufacturing facilities like steel melting, secondary refining including as per Clause 4.0 of specification, rolling / forging, heat treatment etc. to manufacture round bars as per BHEL specification HW10760 and enquiry size. Outsourcing of any of above operation is not acceptable. Details of the manufacturing facilities like steel melting, secondary refining, rolling / forging, heat treatment etc. shall be provided with offer. b) Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW10760. In case of outsourcing of any test, vendor to confirm to carry out testing at Government accredited labs only.																									
3.	Vendor to confirm that they will meet all the requirements of BHEL specification HW10760, Rev 00 and all cross referred standards.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	Testing & certification as per ordering specification.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II R**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
Material Grade : X40MnCrN19K (Material No. 1.3813)
BHEL Specification : HW10784, Rev 03

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Vendor must have experience of manufacturing and supplying bars (round/rectangular) of material grade X40MnCrN19 (material number 1.3813) with material properties comparable to enquiry specification HW10784. Details of the experience for material grade X40MnCrN19 is to be submitted preferably in the format given below: <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Dimensions</th><th>Date of Supply</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> At least one test certificates covering chemical composition, mechanical properties, non-destructive test report and dimension reports from the above purchase orders is to be submitted with offer in support of experience.	Sl. No.	Name of customer	Purchase order number	Dimensions	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Dimensions	Date of Supply	Quantity																					
1																										
2																										
3																										
2.	Manufacturing Facilities: a) Vendor must have at least either of the following in house - rolling/forging/cold drawing and heat treatment facilities OR - steel melting facility b) Details of in house facilities and facilities outsourced to be submitted covering steel melting/rolling/forging/cold drawing/heat treatment facility details. c) For manufacturer not having in house steel melting facility, vendor to submit at least one mill test certificate of material grade X40MnCrN19 of their sub supplier.																									
3.	Details of the testing facilities (in-house or outsourced) are to be submitted. In case of outsourcing of any test, vendor to submit details of testing house. Outsourced testing shall be carried out at Government accredited labs only.																									
4.	Vendor to confirm that they will meet all the requirements of BHEL specification HW10784, Rev 03.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	For Foreign Vendors- Testing & certification as per ordering standard/ specification. For Indigenous Vendors- Quality Plan to be submitted by vendors along with offer for BHEL review and approval. Inspection by BHEL nominated agency TUV, as per finally approved Quality Plan.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II S**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
Material Grade : 26NiCrMoV14-5 (1.6957 of EN10269)/26NiCrMo14-6 (1.6958 of EN10269)
BHEL Specification : HW18813, Rev 01

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Vendor must have experience of manufacturing and supplying forged/rolled bars of Ni-Cr-Mo-V/Ni-Cr-Mo steels. Vendor must have manufactured and supplied at least three purchase orders in last seven years in material grade 26NiCrMoV14-5 / 26NiCrMo14-6 or higher Ni-Cr-Mo/ Cr-Mo-Ni-V grades like X22CrMoV121, 21CrMoV57, X10CrMoVNb9-1, X12CrMoWVNbN10-1-1 etc. Material supplied in hardened and tempered condition only will be considered for experience. In support of above vendor to submit experience details as per format below:																									
	<table><tr><th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Dimensions</th><th>Date of Supply</th><th>Quantity</th></tr><tr><td>1</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td><td></td></tr></table>		Sl. No.	Name of customer	Purchase order number	Dimensions	Date of Supply	Quantity	1						2						3					
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	3																									
Vendor to submit documentary evidence like unpriced purchase order copy, test certificates covering chemical, mechanical properties, heat treatment, supply dimension details in support of experience of at least one purchase order supplied in last three years.																										
2.	Vendor to submit details of manufacturing facilities, in-house / within the Group Company / outsourced, to manufacture enquiry items: - Steel Melting & Refining - Rolling / Forging - Heat Treatment Details of above facilities are to be submitted. In case of outsourcing of any operation, vendor to submit details of operation outsourced with details of their sub supplier. Details of facility & past experience for outsourced operation to their sub supplier to be submitted.																									
3.	Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW18813. In case of outsourcing of any test, vendor to agree to carry out testing at Government accredited labs only.																									
4.	Vendor to confirm that they will meet all the requirements of BHEL specification HW18813, Rev 01.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	For Foreign Vendors- Testing & certification as per ordering standard/ specification. For Indigenous Vendors- Inspection by BHEL nominated agency TUV, as per Quality Plan no. QA/CF/QP/412, rev 00.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-II T**Pre- Qualification Requirements****➤ Technical Requirements-**

Item : Round Bars of different diameters as per indent
BHEL Specification : HW10662, Rev 02

Sl. No.	Technical Requirement	Vendor's confirmation (Y/N)																								
1.	Minimum experience requirement: Vendor must have experience of manufacturing and supplying forged/rolled bars of material grade X10CrMoVNb9-1 (material no. 1.4903). Material supplied in hardened and tempered condition only will be considered for experience. Vendor must meet any one of the following experience criteria in grade X10CrMoVNb9-1 during last 7 years as on date of enquiry: a) Successfully executed at least three orders Or d) Supplied minimum 10 Tons Or e) Executed at least one order and having Creep Rupture data for minimum 1000hrs. Creep Rupture data/ Creep test results has to be submitted with offer. In support of above vendor to submit experience details as applicable as per format below: <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Name of customer</th><th>Purchase order number</th><th>Size</th><th>Date of Supply</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>3</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> Documentary evidence (like un-priced purchase order copy, test certificate covering chemical & mechanical properties, heat treatment details, dimensions, Creep data etc) in support of experience to be submitted for material grade X10CrMoVNb9-1.	Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity	1						2						3						
Sl. No.	Name of customer	Purchase order number	Size	Date of Supply	Quantity																					
1																										
2																										
3																										
2.	Manufacturing and Testing Facilities: a) Vendor must have in-house manufacturing facilities like steel melting, secondary refining including electro slag re-melting, rolling / forging, heat treatment etc. to manufacture round bars as per BHEL specification HW10662 and enquiry size. Outsourcing of any of above operation is not acceptable. Details of the manufacturing facilities like steel melting, secondary refining including electro slag re-melting, rolling / forging, heat treatment etc. shall be provided with offer. b) Vendor to furnish in house testing facilities to carry out testing as per the requirements of BHEL specification HW10662. In case of outsourcing of any test, vendor to confirm to carry out testing at Government accredited labs only.																									
3.	Process Qualification: Vendor to submit process qualification test results as per Clause 11.0 (hot tensile test and microstructure examination as per Clause 11.2.1 and 11.2.3), if available. If process qualification test results not available, vendor to carry out process qualification tests (hot tensile test and microstructure examination as per Clause 11.2.1 and 11.2.3) and satisfy the requirement of specification. Vendor to submit process qualification test results with offer. Process qualification test results must be witnessed by Customer/Third Party Inspection agency.																									
4.	Vendor to confirm that they will meet all the requirements of BHEL specification HW10662, Rev 02 and all cross referred standards.																									
Note- 1. Above are mandatory qualification requirements. Offers of vendors not meeting these requirements will not be considered. 2. This is applicable for both registered as well as un-registered vendors.																										

➤ Quality Requirements-

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	For Foreign Vendors- Testing & certification as per ordering standard/ specification. For Indigenous Vendors- Inspection by BHEL nominated agency TUV, as per Quality Plan no. QA/CF/QP/332, rev 03.	
Note- This is applicable for both registered as well as un-registered vendors.		

Signature with stamp**Name:****Name of Firm:****Designation:****Date:**

ANNEXURE-III

(Specifications)

- 1. AA10108 Rev: 11**
- 2. AA10109 Rev: 03**
- 3. AA10208 Rev: 07**
- 4. AA10218 Rev: 07**
- 5. AA10501 Rev: 14**
- 6. AA10503 Rev: 04**
- 7. AA10620 Rev: 09**
- 8. AA10622 Rev: 10**
- 9. HW10566 Rev: 02**
- 10. HW10568 Rev: 04**
- 11. AA10725 Rev: 07**
- 12. HW10661 Rev: 01**
- 13. HW10662 Rev: 02**
- 14. HW10673 Rev: 03**
- 15. HW10674 Rev: 02**
- 16. HW10683 Rev: 03**
- 17. HW10685 Rev: 04**
- 18. HW10760 Rev: 00**
- 19. HW10784 Rev: 03**
- 20. HW18813 Rev: 01**



CORPORATE PURCHASING SPECIFICATION

AA10108

Rev No. 11

PAGE 1 of 2

STRUCTURAL STEEL-STANDARD QUALITY (PLATES, SECTIONS, STRIPS, FLATS & BARS)

(ORDERING DESCRIPTION)

1.0 GENERAL:

This specification governs the quality requirements of structural steel plates, strips, flats, bars and sections such as angles, beams, channels and tees etc. of IS: 2062 – 2011, Gr: E250, Quality A

2.0 APPLICATION:

For general engineering purpose.

3.0 CONDITION OF DELIVERY:

Plates, Bars & Sections: Hot rolled in straight lengths without twists & Bends

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

Material shall comply with the requirements of IS: 2062 – 2011, Gr: E250, Quality A

Material offered to EN 10025-2:2004 Gr. S275JR is also acceptable. The tolerance on dimensions for plates shall comply with EN 10029.

5.0 DIMENSIONS AND TOLERANCES:

5.1 DIMENSIONS:

5.1.1 Sizes

Material shall be supplied to the dimensions specified on BHEL Order.

5.1.2 Length

Unless otherwise specified, hot rolled bars and sections shall be supplied in 3 to 6 metres length.

5.2 Tolerances:

5.2.1 The tolerances on hot rolled material shall comply with IS: 1852. However, no plate shall be under the specified thickness at any point.

Revisions:

As per Cl. No. 38.1 of MOM of MRC-S&GPS

APPROVED:

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE – MRC(S&GPS)

Rev No.11

Amd No.

Reaffirmed

Prepared

Issued

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Dt:22-02-2014

Dt:

Year:

HPEP, Hyderabad

Corp.R&D

July, 1976

24/4/14

CS-1059

AA10108	CORPORATE PURCHASING SPECIFICATION	
Rev No. 11		
PAGE 2 of 2		

5.2.2 Straight for hot rolled bars:

Unless otherwise specified, the permissible deviation in straightness shall not exceed 5 mm in any 1000 mm length.

6.0 HARDNESS (BRINELL):

When tested in accordance with IS: 1500, the material shall show a brinell hardness in the range of 120-156 HB.

Note: Hardness test shall be conducted only when tensile test cannot be performed.

7.0 TEST CERTIFICATES:

Unless otherwise specified, three copies of test certificates shall be supplied.

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.

AA10108 Rev.11 / IS:2062 Grade: E250 Quality A / EN 10025-2 Gr. S275JR,

BHEL order no., Melt no. Size, Results of chemical analysis and Mechanical tests, Supplier's name, Identification no. TC no., Signature of competent authority etc.

8.0 PACKING AND MARKING:

Plates shall be transported suitably to avoid damage during transit.

For plates below 10 mm thick, each pile (preferably of 16 plates) and each plate 10 mm thick & over shall be marked with melt no. AA10108, BHEL order no., Supplier's name, Identification no., Size & weight on any one corner and encircled with paint preferably of white colour.

9.0 REFERRED STANDARDS (Latest publications including amendments):

1) IS: 1500 2) IS: 1852 3) EN 10029

CS-1059 24/4/14



CORPORATE PURCHASE SPECIFICATION

AA 101 09

Rev. No. 03

PAGE 1 OF 4

HOT ROLLED CARBON STEEL BARS (CLOSE TOLERANCES)

1.0 GENERAL

This specification governs the quality requirements of Hot Rolled Carbon Steel Bars having closed tolerances.

2.0 APPLICATION :

Production of machined parts (Note: AA 101 08 for general engineering purposes where close tolerances are not required).

3.0 CONDITION OF DELIVERY :

Hot Rolled .

Bars shall be supplied in straight lengths with ends square and true.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply with the requirements of the following National standard and also meet the requirements of this specification.

IS : 1570, (Part 2-Sec.1)-1979	:	Schedules for Wrought Steels- Part 2 :
(Reaffirmed 1998)	:	Carbon Steels (Unalloyed Steels) -Sec.1:
Gr : 20 C8 (C20), Hot rolled	:	Wrought products (other than wire) with
		specified Chemical Composition
		and related Properties.

5.0 DIMENSIONS AND TOLERANCES :

5.1 Dimensions:

5.1.1 Sizes:

Bars shall be supplied to the dimensions specified on BHEL order.

5.1.2 Length :

Bars shall be supplied in lengths of not less than 2.5 metres.

Revisions :

CI 24.4.3 of MOM of MRC-S&GPS

APPROVED :

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (S&GPS)

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Dt: 15.01.2002

Dt :

Aug 2007

BHOPAL

Corp. R&D

AUGUST, 1983

**5.2 Tolerances :**

The tolerances on bars shall be as follows:

5.2.1 On Size:

Diameter / width across flats, mm	Tolerance
Upto and including 20	— 0 + 0.38
Above 20	— 0 + 2 percent

5.2.2 Straightness :

Unless otherwise agreed to, the permissible deviation in straightness, shall not exceed 5 mm in any 1000 mm length.

6.0 MANUFACTURE:

The steel shall be manufactured by the open hearth, electric, basic oxygen or a combination of these processes.

Material shall be manufactured from killed steel.

Sufficient discard shall be made from each ingot to ensure freedom from piping, harmful segregation and internal and surface defects.

7.0 FREEDOM FROM DEFECTS :

The bars shall be sound, straight and free from cracks, surface flaws, laminations, rough, jagged and imperfect wedges and internal & surface defects such as seams, laps and injurious imperfections. Bars shall be free from twists and bends.

8.0 CHEMICAL COMPOSITION :

The melt analysis of steel and the permissible variation in the composition of the material from the melt analysis shall be follows :

Element	Melt analysis, percent,		Permissible variation, percent,
	Min.	Max.	
Carbon	0.15	0.25	+ 0.02
Silicon	0.05	0.35	+ 0.03
Manganese	0.60	0.90	+ 0.04
Sulphur	---	0.045	+ 0.005
Phosphorus	---	0.045	+ 0.005



CORPORATE PURCHASE SPECIFICATION

AA 101 09

Rev. No. 03

PAGE 3 OF 4

9.0 TEST SAMPLES :

9.1 Tensile :

Bars from the same melt and of the same size shall be grouped in batches of 40,000 kg or part thereof. One tensile test piece shall be cut from a selected bar from each batch.

For bars of sizes upto and including 40 mm, the test pieces shall be machined concentrically from the bars selected for test. Alternatively the full cross-section of the bars may be tested.

For bars of sizes over 40 mm the longitudinal axes of the test pieces shall not be less than 12.5 mm from the surface of the bars selected for test.

Tensile test pieces shall have a gauge length equal to $5.65 \sqrt{S_o}$.

9.2 Bend Test:

One bend test shall be carried out for every 40,000 kg or part thereof the bars of the same size and from the same melt.

The bend test pieces shall preferably be cut from bars already selected for tensile test.

Bars of sizes upto and including 20mm shall be tested full size and the edges may be rounded to a radius not exceeding 1.6mm.

Bars of sizes over 20mm shall be turned down to a diameter of 20mm.

10.0 MECHANICAL PROPERTIES :

10.1 Tensile:

The test pieces shall show the following properties, when tested in accordance with IS:1608:

Tensile strength : 440 - 520 N/mm²

Elongation on $5.65 \sqrt{S_o}$ gauge length : 24 percent , min.

10.2 Bend:

Bend test shall be conducted in accordance with IS:1599. The test piece shall be bent through an angle of 180°, until the internal radius is equal to the size of the test piece. It shall not break and shall be free from cracks on the outside as seen by an unaided eye. No account need be taken of small cracks appearing at the edges.

11.0 HARDNESS (BRINELL):

When tested in accordance with IS:1500, the material shall show a Brinell hardness in the range of 126 - 179 HB.

Note: Hardness test shall be conducted only when tensile test can not be performed.

CS-722

**12.0 TEST CERTIFICATES :**

Three copies of test certificates shall be supplied, unless otherwise stated on the order.

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

The test certificate shall bear the following information :

AA 1011 09; Rev. No. 03

BHEL order No,

Supplier's Reference :

Name

Identification No.

Melt No.

Details of heat treatment.

Results of Tests :

Results of Dimensional inspection.

Results of chemical analysis and mechanical tests.

13.0 PACKING AND MARKING :

The material shall be suitably packed in bundles - hessian wrapped-to prevent sagging, corrosion and damage during transit. A suitable clear temporary rust preventive shall be applied on all the bars.

Each bar over 50 mm shall be stamped at one end with "AA 101 09", melt no., BHEL order No., at one end or on the end face.

Bars 50 mm and below shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

A metal label shall be securely attached to each bundle and shall bear the following information :

AA 101 09: Hot rolled carbon steel bars (Close tolerance).

BHEL Order No.

Consignment/Identification No.

Melt No.

Size and Weight.

Supplier's Name.

14.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS: 1500

2. IS : 1570, Part II, Sec.1

3. IS :1599

4. IS : 1608

CS-722



CORPORATE PURCHASE SPECIFICATION

AA 102 08

Rev. No. 07

PAGE 1 OF 4

HOT ROLLED / FORGED CARBON STEEL BARS, Gr: 40 C8-NORMALISED

1.0 GENERAL

This specification governs the quality requirements of Hot Rolled / forged Carbon Steel Bars, Normalised.

2.0 APPLICATION

Production of machined parts for general engineering purposes.

3.0 CONDITION OF DELIVERY

Hot Rolled / forged and Normalised.

Note: Sizes upto 100mm in hot rolled
 >100 to 180mm in hot rolled or forged
 above 180mm in forged.

Bars shall be supplied in straight lengths with ends square and true.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

Material shall comply with the requirements of the following National Standards and also meet the requirements of this specification.

IS : 1570-Part II, Section 1-1979	: Schedule for wrought Steels-Carbon steels
Gr:40C8 (C40), Normalised	: (Unalloyed Steels)

5.0 DIMENSION AND TOLERANCES

5.1 Sizes

Bars shall be supplied to the dimensions in BHEL order.

5.2 Length:

Unless otherwise specified, hot rolled bars shall be supplied in 3 to 6 metres length and forged bars shall be supplied in lengths of 1.5 to 3 metres

Revisions :

Cl 26.6.18 of MOM of MRC-S&GPS

APPROVED :

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (S&GPS)

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Prepared

Issued

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Dt: 15.01.2004

Dt :

Year :

BHOPAL

Corp. R&D

AUGUST, 1976

CS-901

**5.2 Tolerances:**

5.2.1 For Forged bars: The tolerances shall be as per Cl 5.2.2 for bars ≤ 100 mm.
The tolerances shall be +8 mm -0 mm for bars > 100 mm

5.2.2 Tolerances on hot rolled bars shall comply with those of Grade 2 of IS:3739: Dimensional Tolerances for Carbon and Alloy Constructional Steel Products, reproduced below:

5.2.2.1 Round Square Bars:

Nominal Size mm		Tolerances, mm	
Over	Up to & Including	Permissible deviation	Out of round / square
—	25	± 0.50	0.50
25	50	± 0.75	0.75
50	80	± 1.00	1.00
80	100	± 1.25	1.25
> 100		$\pm 1.6\%$ of diameter or width of side	75 % of total tolerance (+ and -)

5.2.2.2 Flats:

Nominal width, mm		On width	Tolerance, mm		
Over	Up to & Including		On thickness		
			6 to 13	Over 13 to 25 including	Over 25 to 50 including
—	50	± 1.0	± 0.5	± 0.8	± 1.0
50	100	± 2.0	± 0.5	± 1.0	± 1.5
100	150	± 3.0	---	---	± 2.0

5.2.3 Straightness:

Unless otherwise agreed to, the permissible deviation shall not exceed 5mm in any 1000mm length.

6.0 MANUFACTURE:

Material shall be manufactured from fully killed steel.



CORPORATE PURCHASE SPECIFICATION

AA 102 08

Rev. No. 07

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7.0 FREEDOM FROM DEFECTS :

The bars shall be sound, straight and free from internal and surface defects such as seams, laps, cracks or any other defects which may impair the end use.

Bars shall be free from twists and bends.

8.0 HEAT TREATMENT :

The bars shall be normalised at a temperature of 830 - 860°C

9.0 CHEMICAL COMPOSITION :

The melt analysis of steel and the permissible variation in the composition of the material from the melt analysis shall be as specified below :

Element	<u>Melt analysis, percent</u>		Permissible Variation, percent
	Min.	Max.	
Carbon	0.35	0.45	± 0.02
Silicon	0.10	0.35	± 0.03
Manganese	0.60	0.90	± 0.04
Sulphur	---	0.035	+ 0.005
Phosphorus	---	0.035	+0.005

10.0 TEST SAMPLES :

10.1 One sample shall be taken from each melt for chemical analysis.

10.2 One sample shall be taken from each heat treatment batch for testing of mechanical properties. Test pieces for mechanical tests shall be taken in the longitudinal direction of the piece.

10.3 For ruling section upto & including 40mm, the test piece shall be machined coaxially from the test bars. For ruling section above 40mm the longitudinal axis shall be atleast 12.5 mm from surface of the test bars.

Test methods for determining mechanical properties shall be as per IS:1608 (For tensile test).

11.0 MECHANICAL PROPERTIES (IN NORMALISED CONDITION) :

Mechanical properties of the material shall be as follows:

Tensile strength : 580 - 680 N/mm²

Yield strength : 320 N/mm², min

Elongation on 5.65 √So : 18%, min.

AA 102 08	CORPORATE PURCHASE SPECIFICATION	
Rev. No. 07		
PAGE 4 OF 4		

12.0 ULTRASONIC TEST:

- 12.1 Each bar above 100 mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects. The norms of acceptance shall be as per category 2 of the above standard.
- 12.2 **Optional tests:** If specified on order, each bar > 40 to 100mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects and the norms of acceptance shall be as per category 2.

13.0 TEST CERTIFICATES :

Three copies of test certificates shall be supplied, unless otherwise stated on the order. In addition, the supplier shall ensure to enclose one copy of the test certificate along with their despatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information :

AA 102 08; Rev. No. 07: Hot rolled /forged carbon steel bars, Gr.:40 Normalised

BHEL order No,

Supplier's Reference :

Name

Identification No.

Melt No.

Details of heat treatment.

Results of Tests :

Results of Dimensional inspection.

Results of chemical analysis, mechanical tests & Ultrasonic test.

14.0 PACKING AND MARKING :

The material shall be suitably packed in bundles-hessian wrapped to prevent sagging, corrosion and damage during transit. A suitable clear temporary rust preventive shall be applied on all the bars. Each bar of 50 mm and above shall be stamped with AA 102 08, melt no, BHEL order no, at one end or on the end face.

Bars below 50mm shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

A metal label shall be securely attached to each bundle and shall bear the following information :

AA 102 08 : Hot Rolled / Forged Carbon Steel Bars, 40C8-Normalised.

BHEL Order No.

Consignment/Identification No.

Melt No.

Size and Weight.

Supplier's Name.

15.0 REFERRED STANDARDS (Latest Publications Including amendments):

1. IS : 1570 Part II

2. IS : 1608

3. IS : 3739

4. AA 085 01 18

**HOT ROLLED / FORGED CARBON STEEL BARS - H & T****1.0 GENERAL**

This specification governs the quality requirements of Hot Rolled / Forged Carbon Steel Bars, Hardened and Tempered.

2.0 APPLICATION

For general engineering purposes.

3.0 CONDITION OF DELIVERY

Hot Rolled / Forged hardened and tempered.

Note: Sizes upto 100mm in hot rolled
>100 to 180mm in hot rolled or forged
above 180mm in forged

The ends of bars shall be reasonably square and true.

The bars shall be supplied in straight lengths without twists and bends.

4.0 COMPLIANCE WITH NATIONAL STANDARDS

The material shall comply with the requirements of the following National standard and also meet the requirements of this specification.

IS : 5517-1993 (Reaffirmed 1998)
Gr:40 C 8
Hardened & Tempered

Steel for
Hardening and Tempering

5.0 DIMENSIONS AND TOLERANCES**5.1 Sizes**

The bars shall be supplied to the dimensions specified on BHEL order.

5.2 Tolerances:**5.2.1 For Forged bars:**

The tolerances shall be + 8 mm - 0mm.

5.2.2 Tolerances on hot rolled bars shall comply with those of Grade 2 of IS:3739: reproduced below:

Revisions :

CI 24.4.19 of MOM of MRC-S&GPS

**APPROVED : Interplant Material
Rationalisation Committee-MRC (S&GPS)**

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Year :

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Corp. R&D

SEP. '76

**Round and Square Bars :**

Nominal size. mm		Tolerance, mm	
Over	Upto & Including	Permissible deviation	Out of round/ square
---	25	± 0.50	0.50
25	50	± 0.75	0.75
50	80	± 1.00	1.00
80	100	± 1.25	1.25
100	125	± 1.50	1.50
125	160	± 2.00	2.00
160	200	± 2.50	2.50
200	250	± 3.00	3.00

5.2.3 On Straightness

Unless otherwise agreed to, the permissible deviation in straightness, shall not exceed the following limits in any 1000 mm length of the bar.

Upto & incl. 40 mm size of bars - 6 mm

Above 40 mm size of bars - 5 mm

5.3 Length

Bars shall be supplied in 3 to 6 metres length or in multiples with maximum of 10% shorts down to 1 metre.

Forged bars shall be supplied in length of 1.5 to 3 metres.

6.0 MANUFACTURE

Material shall be manufactured from fully killed steel.

7.0 HEAT TREATMENT

The recommended heat treatment is as follows:

Harden in oil / water from a temperature of 830-860°C.

Temper at a suitable temperature between 550-660°C.

8.0 FREEDOM FROM DEFECTS

The bars shall be sound, straight and free from internal and surface defects, such as seams, laps, cracks or any other defects which may impair the end use.



9.0 CHEMICAL COMPOSITION

The melt analysis of steel and the permissible variation in the composition of the finished product from the melt analysis shall be follows:

Element	Melt analysis, percent,		Permissible variation, percent, in product analysis
	Min.	Max.	
Carbon	0.35	0.45	± 0.02
Silicon	0.10	0.35	± 0.03
Manganese	0.60	0.90	± 0.04
Sulphur	---	0.035	+ 0.005
Phosphorus	---	0.035	+ 0.005

10.0 TEST SAMPLES :

10.1 One sample shall be taken from each melt for chemical analysis.

10.2 One sample shall be taken from each heat treatment batch for testing of mechanical properties. Test pieces for mechanical tests shall be taken in the longitudinal direction of the piece.

For ruling section up to & including 40mm, the test piece shall be machined coaxially from the test bars. For ruling section above 40mm the longitudinal axis shall be atleast 12.5 mm from surface of the test bars.

Test methods for determining mechanical properties shall be as per IS:1598 (For IZOD impact test)/IS:1757 (For impact test in ISO-V Charpy) and IS:1608 (For tensile test).

10.3 For ruling section above 200mm, tensile test sample can be taken in tangential or transverse direction.

11.0 MECHANICAL PROPERTIES (In Hardened and Tempered Condition)

Ruling section, mm	Tensile strength, N/mm ²	0.2%/PS/YS N/mm ² , min	Y.E 5.65√So min	* IZOD impact J, min
≤ 30	700 -850	480	17	35 (30)
>30	600-750	380	18	41 (35)

- Average of 3 samples applicable for sizes above 16 mm ruling section only. Values in bracket are in ISO - V Charpy.

**12.0 ULTRASONIC TEST**

12.1 Each bar above 100 mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects.
The norms of acceptance shall be as per category 2 of the above standard.

12.2 Optional tests: If specified on order, each bar > 40 to 100mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects and the norms of acceptance shall be as per category 2.

13.0 TEST CERTIFICATES:

Three copies of test certificates shall be supplied, unless otherwise stated on the order.

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

The test certificate shall bear the following information :

BHEL References :

AA 102 18; (Rev. No. 07)

BHEL order No,

Supplier's References :

Name

Identification No.

Melt No.

Details of heat treatment.

Result of Tests:

Dimensional inspection.

Results of chemical analysis, mechanical and & Ultrasonic tests.

14.0 PACKING AND MARKING

The material shall be suitably packed in bundles hessian wrapped to prevent sagging, corrosion and damage during transit.

A suitable clear temperature rust preventive shall be applied on all the bars.

Each bar $\geq$ 50 mm shall be stamped with 'AA 102 18'.

Bars below 50 mm shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

A metal label shall be securely attached to each bundle and shall bear the following information :

AA 102 18 : Hot Rolled / Forged Carbon Steel Bars - H & T.

BHEL Order No.

Consignment/Identification No.

Melt No.

Size and Weight.

Supplier's Name.

15.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS : 1598

2. IS : 1608

3. IS : 1757

4. IS : 3739

5. IS : 5517

6. AA 085 01 18



CORPORATE PURCHASE SPECIFICATION

AA 105 01

Rev. No. 14

PAGE 1 OF 4

1.5% NICKEL-CHROMIUM-MOLYBDENUM HOT ROLLED/FORGED STEEL BARS - H & T

1.0 GENERAL:

This specification governs the quality requirements of 1.5% Nickel-Chromium-Molybdenum Hot rolled/forged Steel Bars, Gr: 40 Ni6Cr4Mo3 in Hardened and Tempered condition.

2.0 APPLICATION:

For the manufacture of bolts, studs and various components of machines.

3.0 CONDITION OF DELIVERY:

Hot Rolled / Forged; Hardened and tempered.

Note: Sizes upto 100mm in hot rolled
>100 to 180mm in hot rolled or forged
above 180mm in forged

The ends of bars shall be reasonably square and true.

The bars shall be supplied in straight lengths without twists and bends.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply with the requirements of the following National standard and also meet the requirements of this specification.

IS: 5517-1993 : Steel for
Gr: 40 Ni 6 Cr 4 Mo 3, Type: J : Hardening and Tempering
Hardened & Tempered

5.0 DIMENSIONS AND TOLERANCES:

5.1 Sizes: Bars shall be supplied to the dimensions specified on the order.

5.1.1 Length: Unless otherwise specified, hot rolled bars shall be supplied in 3 to 6 metres length or in multiples with maximum 10%, shorts down to 1 metre.

Forged bars shall be supplied in lengths of 1.5 to 3.0 metres.

Revisions: Revised as per email dt 18.12. 08
from Shri Gopal Bhatt from Bhopal

APPROVED:
INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (S&GPS)

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CORP. R&D

APRIL, 1977

**5.2 Tolerance:**

5.2.1 Hot rolled bars: The bars shall not vary from specified diameter or distance across flats by more than $\pm 2\frac{1}{2}\%$.

5.2.2 Forged bars: The tolerance on the forged bars shall be as follows.

<u>Diameter, mm</u>	<u>Tolerance, mm</u>
50 mm to 175 mm	+ 8.0 mm
Above 175 mm	+ 12.5 mm

Note: (Hot rolled & forged bars).

Insignificant surface defects in the form of dent and ripple marks are permissible provided their depth does not exceed half the tolerance on each size.

6.0 MANUFACTURE:

Material shall be manufactured from fully killed steel.

7.0 HEAT TREATMENT:

The recommended heat treatment is as follows:

Harden in oil / water from a temperature of 830-850°C.

Temper at a suitable temperature between 550-660°C.

8.0 FREEDOM FROM DEFECTS:

The bars shall be sound, straight and free from internal and surface defects, such as seams, laps, cracks or any other defects which may impair the end use.

9.0 CHEMICAL COMPOSITION:

The melt analysis of steel and the permissible variation in the composition of the finished product from the melt analysis shall be follows:

Element	<u>Melt analysis, percent.</u>		Permissible variation, percent, in product analysis
	Min.	Max.	
Carbon	0.35	0.45	± 0.02
Silicon	0.10	0.35	± 0.03
Manganese	0.40	0.70	± 0.04
Nickel	1.25	1.75	± 0.05
Chromium	0.90	1.30	± 0.05
Molybdenum	0.20	0.35	± 0.03
Sulphur	---	0.035	+ 0.005
Phosphorus	---	0.035	+ 0.005



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10.0 TEST SAMPLES :

10.1 One sample shall be taken from each melt for chemical analysis.

10.2 One sample shall be taken from each heat treatment batch for testing of mechanical properties. Test pieces for mechanical tests shall be taken in the longitudinal direction of the piece.

For ruling section up to & including 40mm, the test piece shall be machined coaxially from the test bars. For ruling section above 40mm the longitudinal axis shall be at least 12.5 mm from surface of the test bars.

Test methods for determining mechanical properties shall be as per IS:1598 (For IZOD impact test)/IS:1757 (For impact test in ISO-V Charpy) and IS:1608 (For tensile test) or any other reputed International Standard.

10.3 For ruling section above 200mm, tensile test samples can be taken in tangential or transverse direction.

11.0 MECHANICAL PROPERTIES (In Hardened and Tempered Condition):

Ruling section, mm	Tensile strength, N/mm ²	0.2% PS/YS N/mm ² min	% E 5.65 √So min	* IZOD impact J, min	Hardness ** BHN
upto 30	1200, min	1000	10	30 (25)	360 - 420
> 30 to = 63	1100-1250	880	11	41 (35)	330 - 390
> 63 to = 100	1000-1150	800	13	48 (42)	300 - 350
>100 to = 150	900-1050	700	15	55 (50)	270 - 300
>150	800 - 950	600	16	55 (50)	240 - 285

* Average of 3 samples applicable for sizes above 16 mm ruling section only. Values in bracket are in ISO - V Charpy.

** Hardness shall be reported for information only.

12.0 ULTRASONIC TEST:

12.1 Each bar above 100 mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects. The norms of acceptance shall be as per category 2 of the above standard.

12.2 **Optional tests:** If specified on order, each bar >40 to 100mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects and the norms of acceptance shall be as per category 2.

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13.0 TEST CERTIFICATES:

Three copies of test certificates shall be supplied, unless otherwise stated on the order. 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:

BHEL References :

AA 105 01, Rev. No.14: 1.5% Nickel-Chromium-Molybdenum Hot Rolled / Forged Steel Bars-H&T.

BHEL order No,

Supplier's References :

Name

Identification No.

Melt No.

Details of heat treatment.

Result of Tests:

Dimensional inspection.

Results of chemical analysis, mechanical and & Ultrasonic tests.

14.0 PACKING AND MARKING

The bars shall be suitably packed in bundles to prevent corrosion and damage during transit.

Each bar equal to or greater than 50 mm in diameter or of equivalent cross sectional area shall be stamped with 'AA 10501' and melt number on the side near the end or on the face.

Bars below 50 mm shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

A metal label shall be securely attached to each bundle and shall bear the following information:

AA10501: 1.5% Nickel-Chromium-Molybdenum Hot Rolled/Forged Steel Bars -H&T.

BHEL Order No.

Consignment/Identification No.

Melt No.

Size and Weight.

Supplier's Name.

15.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS: 1598

2. IS: 1608

3. IS: 1757

4. IS: 5517

5. AA 085 01 18

**CORPORATE PURCHASING SPECIFICATION**

AA 105 03

Rev. No. 04

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**3.5% NICKEL-CHROMIUM-MOLYBDENUM CASE HARDENING
STEEL BARS - ANNEALED****1.0 GENERAL:**

This specification governs the quality requirements of 3.5% nickel-chromium-molybdenum case hardening steel bars in material grade 14NiCrMo13-4 (1.6657).

2.0 APPLICATION:

For case hardened components requiring high wear resistant surfaces coupled with tough cores to resist shock loads and strength to give longer service life.

3.0 CONDITION OF DELIVERY:

Hot rolled / forged and annealed.

Note: Sizes upto 100mm in hot rolled
>100 to 180mm in hot rolled or forged
above 180mm in forged

The ends of bars shall be reasonably square and true.

The bars shall be supplied in straight lengths without twists and bends.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply with the requirements of the following National standard and also meet the requirements of this specification.

EN 10084-1998 : Case hardening steels
Gr:14NiCrMo13-4 :

5.0 DIMENSIONS AND TOLERANCES:**5.1 Sizes:**

The bars shall be supplied to the dimensions specified in BHEL order.

5.2 Tolerances:**5.2.1 For Forged bars:**

The tolerances shall be + 8 mm - 0 mm.

Revisions :
CI 27.6.17 of MOM of MRC-S&GPS

**APPROVED : Interplant Material
Rationalization Committee-MRC (S&GPS)**

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Dt: 15.06.2005	Dt :	Year :	BHOPAL	Corp. R&D	APRIL, 1977



5.2.2 Tolerances on rolled bars shall comply with following specifications:

EURONORM 58: Hot rolled flats for general purposes

EURONORM 59: Hot rolled square bars for general purposes

EURONORM 60: Hot rolled round bars for general purposes

5.3 Length:

Bars shall be supplied in 3 to 6 metre length or in multiples with maximum of 10% shorts down to 1 metre.

Forged bars shall be supplied in length of 1.5 to 3 metre.

6.0 MANUFACTURE:

Process used for the manufacture of the bars is left to the discretion of the manufacturer. The air or mixed air oxygen bottom blown basic converter process is not permitted.

Material shall be manufactured from killed steel.

7.0 FREEDOM FROM DEFECTS:

The bars shall be free from internal and surface defects, such as piping, segregation, etc. The bars shall be free from twists and bends. The removal of surface defects by welding is not permitted.

8.0 CHEMICAL COMPOSITION:

The melt analysis of steel and the permissible variation in the composition of the finished product from the melt analysis shall be follows:

Element	Melt analysis, percent,		Permissible variation, percent,
	Min.	Max.	
Carbon	0.11	0.17	± 0.02
Silicon	---	0.40	± 0.03
Manganese	0.30	0.60	± 0.04
Nickel	3.00	3.50	± 0.07
Chromium	0.80	1.10	± 0.05
Molybdenum	0.10	0.25	± 0.03
Sulphur	---	0.035	+ 0.005
Phosphorus	---	0.035	+ 0.005

**9.0 TEST SAMPLES :**

One sample product shall be taken from each size grouping for each melt and heat treatment batch.

10.0 HARDNESS TEST :

When tested in accordance with EN 10003-1, the maximum hardness of the test sample shall be 241 BHN in annealed condition.

11.0 ULTRASONIC TEST:

- 11.1** Each bar above 100 mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects.
The norms of acceptance shall be as per category 2 of the above standard.

- 11.2 Optional tests:** If specified in the order, each bar >40 to 100 mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects and the norms of acceptance shall be as per category 2 .

12.0 TEST CERTIFICATES:

Three copies of test certificates shall be supplied, unless otherwise stated in the order. 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 :

BHEL References:

AA 105 03; (Rev. No. 04): 3.5% Nickel-Chromium-Molybdenum case hardening steel bars annealed

BHEL order No,

Supplier's References:

Name

Identification No.

Melt No.

Details of heat treatment.

Result of Tests:

Dimensional inspection.

Results of chemical analysis, hardness and Ultrasonic tests.

**13.0 PACKING AND MARKING:**

The bars shall be suitably packed in bundles to prevent corrosion and damage during transit.

All bars 50mm and above in diameter or of equivalent cross sectional area shall be stamped with 'AA 10503' and melt number on the side near the end or on the face.

Bars below 50 mm shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

A metal label shall be securely attached to each bundle and shall bear the following information :

AA 105 03 : 3.5% Nickel-Chromium-Molybdenum Case Hardening Steel Bars -
Annealed

BHEL Order No.

Consignment/Identification No.

Melt No.

Size and Weight.

Supplier's Name.

15.0 REFERRED STANDARDS (Latest Publications Including Amendments):

- | | | |
|------------------|----------------|-----------------|
| 1. EN 10084-1998 | 2. EURONORM 58 | 3. EURONORM 59 |
| 4. EURONORM 60 | 5. EN 10003-1 | 6. AA 085 01 18 |

Note: Equivalent national or international standards are allowed with prior permission in writing.



CORPORATE PURCHASING SPECIFICATION

AA 106 20

Rev. No. 09

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BOLTING STEEL BARS FOR HIGH TEMPERATURE SERVICE - H & T (Gr.:21CrMoV5-7+QT)

1.0 GENERAL:

This specification governs the quality requirements of 21CrMoV5-7 bolting steel bars in hardened and tempered condition upto 600 mm diameter / size.

2.0 APPLICATION:

For the manufacture of steam turbine bolts, nuts, studs, spindles, bushes and other components operating in the temperature range of 300 - 540° C.

3.0 CONDITION OF DELIVERY:

Hot rolled/Forged and Hardened and Tempered.

The bars shall be supplied with ends square and true. The bars shall be supplied in straight lengths without twists and bends.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply, in general, with the requirements of the following National standard and also meets the requirements of this specification.

DIN EN 10269-1999 Gr: 21 Cr Mo V 57 :Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties.

5.0 DIMENSIONS AND TOLERANCES:

5.1 Sizes:

Bars shall be supplied to the dimensions specified in BHEL order.

5.1.1 Length:

Unless otherwise specified, hot rolled bars shall be supplied in 3 to 6 metres length or in multiples with maximum of 10 per cent, shorts down to 1 metre.

Forged bars shall be supplied in lengths of 1.5 to 3 metres.

Revisions : As per Email Dt.16.03.2011 from
Shri Vimal Kishore, BHEL Hyderabad..

APPROVED :
INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (HTM)

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HYDERABAD

Corp. R&D

December, 1977

**5.2 Tolerance:****✓5.2.1 Hot rolled bars:**

The bars shall not vary from specified diameter or distance across flats by more than $\pm 2\frac{1}{2}$ %.

5.2.2 Forged bars:

The tolerance on the forged bars shall be as follows:

<u>Diameter, mm</u>	<u>Tolerance, mm</u>
50 to 125	+ 6.0
125 to 175	+ 8.0
175 —	+ 12.5

Note: (FOR HOT ROLLED & FORGED BARS)

Insignificant surface defects in the form of dent and ripple marks are permissible provided their depth does not exceed half the tolerances on each size.

6.0 MANUFACTURE:

Steel shall be made by basic electric process and subsequently vacuum degaussed. If any other process is employed, it shall be to mutual agreement between the supplier and BHEL.

Note: Raw material like Ingots/Blooms/Billets required for forgings should be procured from BHEL approved sources alongwith test certificate.

7.0 HEAT TREATMENT:

7.1 The bars shall be heat treated as per EN10269 to get the mechanical properties specified as per clause 12.0.

7.2 Following heat treatment is suggested:

Harden at 900-950^o C, cooling in the circulated air / oil depending on Cross Section.
Temper at 680 - 720^oC, minimum 2 hours.

The duration of tempering as well as the controlled cooling rate are to be chosen to achieve minimum residual stress.

7.3 If the bars need straightening after heat treatment, the straightening operation shall be followed by stress relief annealing at 30^oC below the tempering temperature with slow cooling after the total straightening process.

8.0 FREEDOM FROM DEFECTS:

The bars shall be straight, sound and free from internal and surface defects viz., cracks, piping, scabs, laps, hairline cracks, etc. The bars shall be free from twists and bends.

9.0 FINISH:

9.1 The surface of the bars shall be smooth without any laps, rolled in scales, etc. Dents roll marks and scratches are permitted provided their depth does not exceed half the tolerance limits specified in clause 5.0.

9.2 The edges of bars shall be cut square by sawing or shearing and no crop ends shall be permissible.

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10.0 CHEMICAL COMPOSITION:

The analysis of the material and the permissible variation in the composition from the specified limits shall be as follows:

Element	Percent for bar dia upto 160mm		Percent for bar dia. 160-600mm		Permissible
	min.	max.	min.	max.	Variation, %
Carbon	0.17	0.25	0.17	0.25	± 0.02
Silicon	-	0.40	0.15	0.35	+ 0.05
Manganese	0.40	0.80	0.35	0.85	± 0.04
Chromium	1.20	1.50	0.90	1.20	± 0.05
Molybdenum	0.55	0.80	0.65	0.80	± 0.05
Vanadium	0.20	0.35	0.25	0.35	± 0.03
Sulphur	--	0.020	--	0.020	+ 0.005
Phosphorus	--	0.020	--	0.020	+ 0.005
Copper	-	0.20	--	0.20	
Tin	-	0.025	--	0.025	
Arsenic	-	0.010	--	0.010	
Antimony	-	0.010	--	0.010	
Aluminium (Total)	-	0.03	--	0.015	
Nickel	-	0.60	0.50	0.80	

11.0 TEST SAMPLES:

11.1 CHEMICAL ANALYSIS:

Each melt shall be analysed for chemical composition.

11.2 MECHANICAL TESTS:

A hardness test is to be carried out to verify the uniformity of the strength within the delivery lot (per melt and heat treatment batch). The test amount shall be 10% of the bars, but not less than 10 bars. In case order is of less than 10 bars, all bars shall be hardness tested. Mechanical properties shall be tested on hardest and softest bar.

The taking of specimens has to be carried out according to EN 10269 with the following exception:

Up to a diameter (d) or an edge length (a,b) > 160 mm, the transverse specimens can be taken (instead of longitudinal specimens).

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**12.0 MECHANICAL PROPERTIES:****12.1 Tensile:**

When tested in accordance with IS:1608, the test pieces shall show the following properties (values for transverse specimens in brackets):

Property	Bar < 160mm	Bar 160-600mm
Tensile strength, N/mm ²	700-850	700-850
0.2% Proof stress, N/mm ² , min	550	550
Elongation (1= 5d), % min.	16	16 (13)
Reduction in area, % min.	60	60 (35)
Impact energy (J) *	63	63 (20)
Hardness (HB 30)	210-250	215-260

* **Charpy Impact (ISO - V) Value :**

When tested in accordance with IS : 1757, the piece shall show a minimum average Charpy impact value over three test values as specified above. Only one test value out of the three can be below the specified value but in no case shall be less than two-thirds the minimum specified value. All the 3 test values shall, however, be reported.

The test is applicable for bars of sizes above 16 mm only.

13.0 NON-DESTRUCTIVE TEST:**13.1** Verification inspection of all bars.

13.2 100% Ultrasonic inspection of all bars above 40mm size according to EN 10308 type 1a and 1c table 1). Acceptance criteria are as follows.

- d or (a,b) = 200mm quality class 4
- d or (a,b) = 200mm quality class 3

In general, the decision limit for loss of back wall echo is 3 dB and for the real reflector length max. 10mm.

14.0 RETESTS:

As per EN10021.

15.0 TEST CERTIFICATE:

Three copies of test certificates shall be supplied unless otherwise stated on the order. In addition the supplier shall ensure to enclose one copy of test certificate alongwith their dispatch documents to facilitate quick clearance of material.

The test certificate shall bear the following information:

BHEL references:

BHEL order No.

✓ AA 106 20 , Rev.No. 08: Bolting Steel bars for HTS - H & T (Gr.:21CrMoV5-7- QT)

Supplier Referances:

Supplier's Name

Heat or Cast No.

Process of manufacture

Identification No.

Particulars of heat treatment & Batch No.

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CORPORATE PURCHASING SPECIFICATION

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Results of Tests:

Chemical analysis

Mechanical properties

Ultrasonic test

Results of dimensional inspection

Mill test certificate

The certificate must be signed by the Chief, Inspection Department / Chief Metallurgist of the supplier's plant.

16.0 PACKING AND MARKING:

Bars shall be suitably packed to prevent corrosion and damage during transportation.

Bars over 63 mm diameter shall be individually stamped / painted on one end face with cast number and AA 106 20. Bars of 63 mm diameter and less shall be bundled together and identified by means of a metal label stating the cast number and specification No. AA 106 20 attached to the bundle.

Each package shall, in addition bear the following information:

AA 106 20 : Bolting Steel bars for HTS - H & T (Gr.:21CrMoV57)

BHEL Order No.

Supplier's name and trade mark, if any.

Cast / Batch No.

Identification No.

Size and quantity supplied.

17.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1) DIN 10269

2) IS: 3739

3) IS:1608

4) IS:1757

5) EN 10228-3

6) EN10021

Note: Alternative equivalent standards are acceptable with prior agreement.

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CORPORATE PURCHASING SPECIFICATION

AA10622

Rev No. 10

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ALLOY STEEL BARS FOR HIGH TEMPERATURE BOLTS UPTO 565° C – H&T (20CrMoVTiB4 – 10)

1.0 GENERAL:

This specification governs the quality requirements of alloy steel bars suitable for machining.

2.0 APPLICATION:

Used mainly for bolts, nuts and studs etc.

3.0 CONDITION OF DELIVERY:

Hot rolled/forged bars shall be supplied in the hardened and tempered condition according to EN10269 to comply with the mechanical properties specified in the specification.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

There is no Indian standard covering this material. However, assistance has been derived from EN 10269 material grade 20CrMoVTiB4 – 10 "Steels and Nickel alloys for fasteners with specified elevated, and / or low temperature properties".

5.0 DIMENSIONS AND TOLERANCES:

5.1 Sizes:

Bars shall be supplied to the dimensions specified in BHEL order.

5.1.1 Length:

Unless otherwise specified, hot rolled bars shall be supplied in 3 to 6 meters length or in multiples with maximum of 10 per cent, shorts down to 1 meter.

Forged bars shall be supplied in lengths of 1.5 to 6 meters

5.2 Tolerances:

5.2.1 Hot rolled bars:

The bars shall not vary from specified diameter or distance across flats by more than $\pm 2\frac{1}{2}\%$.

5.2.2 Forged bars:

The tolerance on the forged bars shall be as follows:

<u>Diameter, mm</u>	<u>Tolerance, mm</u>
> 50 to 125	+ 6.0
>125 to 175	+ 8.0
>175	+ 12.5

Revisions:
As per Clause No.39.7.3 A) of MOM of MRC – FCF+HTM

APPROVED:
INTERPLANT MATERIAL RATIONALISATION
COMMITTEE – MRC (FCF+HTM)

Rev No.10	Amd No.	Reaffirmed
Dt:05-09-2014	Dt:	Year:

Prepared HPEP, Hyderabad	Issued Corp.R&D	Dt. of 1 st Issue June, 1977
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CORPORATE PURCHASING SPECIFICATION



Note: (FOR HOT ROLLED & FORGED BARS)

Insignificant surface defects in the form of dent and ripple marks are permissible provided their depth does not exceed half the tolerances on each size.

6.0 MANUFACTURE

The steel shall be made by electric furnace process and degassed (e.g. vacuum degassed). Any other process shall be subjected to the mutual agreement between BHEL and the manufacturers.

Note: The material as per this specification shall be supplied by the manufacturers who are having complete in-house steel melting, refining, hot rolling/forging/blooming/etc., heat treatment and testing facilities.

7.0 HEAT TREATMENT

Following heat treatment parameters are suggested to achieve the mechanical properties specified in Clause 11.0 of this specification.

Bars shall be annealed at 660 – 700°C followed by air cooling, hardened by heating uniformly to 970 – 990°C and quenching in air / water / oil. They shall be tempered at temperatures between 680 – 720°C.

If bars need to be straightened after heat treatment, stress relieving is mandatory after completion of the entire straightening process. Stress relieving shall be carried out at 30°C below the actual tempering temperature with a subsequent slow cooling rate.

8.0 FREEDOM FROM DEFECTS

The bars shall be straight, sound and free from internal defects. Cracks, other material separations or more severe linear inclusion lines are only acceptable when located in the dimensional tolerance areas.

9.0 CHEMICAL COMPOSITION:

The analysis of the material shall be as follows:

Element (wt%)	C	Si	Mn	Cr	Mo	V	Ti	B	S	P*	Al**
Minimum	0.17	–	0.35	0.90	0.90	0.60	0.07	0.001	–	–	0.015
Maximum	0.23	0.4	0.75	1.20	1.10	0.80	0.15	0.010	0.020	0.020	0.080

The following trace elements shall be restricted to the following maximum limits:

Copper	--	0.20
Tin	--	0.020*
Arsenic	--	0.020
Ni	--	0.20

* The elements P and Sn shall be controlled according to the formula $P+3.6XSn \leq 0.055\%$

** A maximum Al-value of 0.03% is to be aimed.

10.0 TEST SAMPLES

10.1 CHEMICAL ANALYSIS:

Each melt shall be analysed for chemical composition.

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10.2 MECHANICAL TESTS

A hardness test is to be carried out to verify the uniformity of the strength within the delivery lot (per melt and heat treatment batch). Hardness check shall be conducted on 10% of the bars or a minimum 10 numbers of bars whichever is higher. In case the lot consist of less than or equal 10 bars, then all the bars need to be checked for hardness. Mechanical properties shall be tested on hardest and softest bar.

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

11.0 MECHANICAL PROPERTIES

11.1 When tested in accordance with IS:1608, the test pieces shall show the following properties tensile properties at room temperature (EN 10269):

Properties	d ≤ 100	100 < d ≤ 250
Ultimate tensile strength	820-1000 N/mm ²	820-1000 N/mm ²
0.2% proof stress	660 N/mm ² (min.)	660 N/mm ² (min.)
Elongation on 5.65√s ₀ gauge length	15 % (min.)	15 % (min.)
Reduction in area	50% (min.)	50% (min.)
Charpy 2mm V notch (J)	40 (min.)	27 (min.)

11.2 Charpy Impact Value (V notch)

When tested in accordance with IS:1757, using a test specimen of 10 mm x 10 mm x 55 mm and having a 2 mm V notch, the materials shall show a minimum Charpy impact value (in Joules) at room temperature as mentioned in the above table. This test is applicable for Bars of sizes above 16mm only.

11.3 Hardness (Brinell) - for information only

When tested in accordance with IS: 1500, the material shall have a Brinell hardness in the range of 245 – 310 BHN.

Note: In lieu of IS:1608, IS:1757 & IS:1500, any other National or International may be used.

12.0 NON-DESTRUCTIVE TEST

12.1 Verification test of all bars.

12.2 100% Ultrasonic inspection of all bars according to EN 10308 type 1a-1c (table 1). Acceptance criteria shall be quality class 4 according to EN 10308 (table 2). In general, the decision limits for loss of back wall echo is 4 dB for all bar dimensions. Every linear or surface-like in-homogeneity larger than 10mm in any direction is not acceptable.

13.0 RETESTS

As per EN10021.

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CORPORATE PURCHASING SPECIFICATION



14.0 TEST CERTIFICATE:

Three copies of test certificates in English shall be supplied unless otherwise stated in the order.

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

The test certificate shall bear the following information:

BHEL references:

BHEL order No.

AA10622 (Rev.No.10):ALLOY STEEL BARS FOR HIGH TEMPERATURE BOLTS UPTO 565° C – H&T (20CrMoVTiB4 – 10)

Supplier References:

Supplier's Name

Heat or Cast No.

Process of manufacture

Identification No.

Particulars of heat treatment and Batch No.

Results of Tests:

Chemical analysis

Non-destructive tests

Mechanical properties

Results of dimensional inspection

The certificate must be signed by the Chief, Inspection Department / Chief Metallurgist of the supplier's plant.

15.0 PACKING AND MARKING

Bars shall be suitably packed to prevent corrosion and damage during transportation.

Bars over 63 mm diameter shall be individually stamped / painted on one end face with cast number and AA10622.

Bars of 63 mm diameter and less shall be bundled together and identified by means of a metal label stating the cast number and specification No. AA10622 attached to the bundle.

Each package shall, in addition bear the following information:

AA10622:Alloy steel bars for high temperature bolts up to 565 °C-H&T(20CrMoVTiB4 – 10)

BHEL Order No.

Cast / Batch No.

Identification No.

Weight.

Supplier's Name.

16.0 REFERRED STANDARD (Latest publications including amendments)

1) IS:1500

2) IS:1608

3) EN10021

4) EN 10204

5) EN 10308

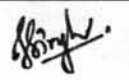
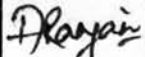
6) EN10083-1

7) IS 1757

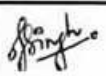
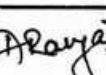
CS-923 25/8/17

हस्ताक्षर एवं दिनांक SIGN & DATE			संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10566 पृष्ठ का Page 1 of 3									
सामग्री सूची संख्या को SUPERSEDES INVENTORY NO	TLV9127/01 03/2012	ALLOY STEEL BARS $\leq$ 400 MM DIAMETER OR SIDE LENGTH FOR SERVICE TEMPERATURE $\leq$ 300 °C 1.0 GENERAL : This specification governs the quality of alloy steel Bars of grade 26NiCrMo14-6, Material No. 1.6958 as per VdTÜV-Blatt 390. As an alternative 26NiCrMoV14-5, material No 1.6957 is also acceptable in place of 26NiCrMo14-6 provided that all the requirements specified in this specification shall be fulfilled. 2.0 APPLICATION : The Bars shall be used for coupling bolts, screw, rings etc. for turbine components. 3.0 CONDITION OF DELIVERY: The bars shall be hot rolled or forged and heat treated as per VdTÜV-Blatt 390. 4.0 DIMENSIONS AND TOLERANCES Bars shall be supplied to the dimensions specified in BHEL order. 4.1 Length: Unless otherwise specified, hot rolled bars shall be supplied in length of 3 to 6 meters or in multiples with maximum of 10% shorts down to 1 meter. Forged bars shall be supplied in length of 1.5 meter to 3 meter. 4.2 Tolerance: 4.2.1 Hot Rolled Bars: The bars shall not vary from specified diameter or distance across flats by more than ± 2.5 %. 4.2.2 Forged Bars: The tolerance on the forged bars shall be as follows: <table border="1"> <thead> <tr> <th>Dia, mm</th> <th>Tolerance, mm</th> </tr> </thead> <tbody> <tr> <td>> 50 to 125</td> <td>+ 6.0</td> </tr> <tr> <td>> 125 to 175</td> <td>+ 8.0</td> </tr> <tr> <td>> 175</td> <td>+ 12.5</td> </tr> </tbody> </table> 5.0 MANUFACTURE : Steel shall be made by basic electric process and subsequently vacuum degassed. The bars shall be manufactured in accordance with VdTÜV-Blatt 390. The bars can either be rolled or forged provided that required mechanical properties are fulfilled. 6.0 HEAT TREATMENT: Hardening - 840 - 870°C /water, oil or polymer* Tempering - 530 - 620°C at least 2 hour/ cooling in air *In case of polymer the cooling rate shall be comparable to cooling in oil If bars need to be straightened after heat treatment, stress relieving is mandatory after completion of the entire straightening process. Stress relieving should be carried out at 20-50°C below the tempering treatment temperature with a subsequent slow cooling rate.					Dia, mm	Tolerance, mm	> 50 to 125	+ 6.0	> 125 to 175	+ 8.0	> 175	+ 12.5
Dia, mm	Tolerance, mm													
> 50 to 125	+ 6.0													
> 125 to 175	+ 8.0													
> 175	+ 12.5													
COPYRIGHT AND CONFIDENTIAL The information on these 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														
स्वत्वधिकार एवं गोपनीय ; इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि सम्पत्ती के हित में हानिकारक हो ना किया जाए														
हस्ताक्षर एवं दिनांक SIGN & DATE	21/7/15	TSX PSC QAX STE सहमत विभाग AGREED DEPTT.	V. SRIVASTAVA V.R. Chandra U.K. Panda ALOK KR. SINGH नाम NAME	21/7/15 21/7/15 21/7/15 21/7/15 दिनांक एवं हस्ताक्षर DATE & SIGNATURE	नाम NAME अनुवादक TRANSLATED BY निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY पर्यवेक्षणकर्ता SUPERVISED BY	DEV DUTT SINGH ASHISH RANJAN GOPAL KRISHNAN स्वीकृति : संस्थान मानक समिति APPROVED : PLANT STANDARDS COMMITTEE निर्माण PREPARED : MTE जारी : मानक विभाग ISSUED : TSX दिनांक DATE : 25/02/1991								
सामग्री सूची संख्या INVENTORY NO	P-3169	Gr No 2.60												

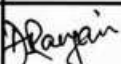
हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10566 पृष्ठ का Page 2 of 3																																								
SUPERSEDES INVENTORY NO सामग्री सूची संख्या को प्रतिस्थापित करता है	7.0 CHEMICAL COMPOSITION: Heat analysis as follows (in weight %): <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width:16.6%;">C</td> <td style="width:16.6%;">Si</td> <td style="width:16.6%;">Mn</td> <td style="width:16.6%;">P</td> <td style="width:16.6%;">S</td> <td style="width:16.6%;">Mo</td> </tr> <tr> <td>0.25 – 0.30</td> <td>0.15 – 0.30</td> <td>0.20 – 0.50</td> <td>≤ 0.010</td> <td>≤ 0.010</td> <td>0.35 – 0.55</td> </tr> <tr> <td>V</td> <td>Cr</td> <td>Ni</td> <td>Al_{total}</td> <td></td> <td></td> </tr> <tr> <td>0.08 – 0.12</td> <td>1.20 – 1.70</td> <td>3.30 – 3.80</td> <td>0.005 – 0.050</td> <td></td> <td></td> </tr> </table>			C	Si	Mn	P	S	Mo	0.25 – 0.30	0.15 – 0.30	0.20 – 0.50	≤ 0.010	≤ 0.010	0.35 – 0.55	V	Cr	Ni	Al _{total}			0.08 – 0.12	1.20 – 1.70	3.30 – 3.80	0.005 – 0.050																		
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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	8.0 MECHANICAL PROPERTIES: A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test scope shall be 10% of the bars with a minimum of 10 bars. When the lot consists of less than 10 bars all bars shall be tested. The mechanical properties shall be determined for both hardest and softest bar in accordance with ISO 6892-1 and ISO 148-1. The specimens are to be taken in a longitudinal direction (L) in accordance with EN 10083-1. For bars with diameter (d) or side length (a, b) > 100 mm, the specimens shall be taken at a distance d/3 or a/3 and b/3 from the respective surface. Transverse specimens (T) are also allowed. The following properties shall be achieved at room temperature: <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="width:20%;">Diameter (d) /side length (a)¹ (mm)</th> <th style="width:15%;">0.2 % Yield Strength N/mm²</th> <th style="width:10%;">Tensile Strength N/mm²</th> <th colspan="2" style="width:15%;">Elongation After Fracture A (%)</th> <th colspan="2" style="width:10%;">Reduction in area %</th> <th colspan="2" style="width:10%;">Impact Energy (J)²</th> <th style="width:10%;">Hardness HB30</th> </tr> <tr> <td></td> <td></td> <td></td> <td>L</td> <td>T</td> <td>L</td> <td>T</td> <td>L</td> <td>T</td> <td></td> </tr> <tr> <td>d or a ≤ 100</td> <td>885-985</td> <td>≤ 1160</td> <td>≥ 14</td> <td>-</td> <td>≥ 50</td> <td>-</td> <td>≥ 80</td> <td>-</td> <td>295-360</td> </tr> <tr> <td>100 < d or a ≤ 400</td> <td>885-985</td> <td>≤ 1160</td> <td>-</td> <td>≥ 12</td> <td>-</td> <td>≥ 40</td> <td>-</td> <td>≥ 55</td> <td>295-360</td> </tr> </table> ¹) The values of the smallest side length (a) shall be taken. ²) Average of 3 Charpy V-notch specimens. Each tested specimen shall reach at least 70% of this average value. An Impact energy test shall be performed on bars having side length ≥ 12 mm or diameter ≥ 16 mm respectively.			Diameter (d) /side length (a) ¹ (mm)	0.2 % Yield Strength N/mm ²	Tensile Strength N/mm ²	Elongation After Fracture A (%)		Reduction in area %		Impact Energy (J) ²		Hardness HB30				L	T	L	T	L	T		d or a ≤ 100	885-985	≤ 1160	≥ 14	-	≥ 50	-	≥ 80	-	295-360	100 < d or a ≤ 400	885-985	≤ 1160	-	≥ 12	-	≥ 40	-	≥ 55	295-360
Diameter (d) /side length (a) ¹ (mm)	0.2 % Yield Strength N/mm ²	Tensile Strength N/mm ²	Elongation After Fracture A (%)		Reduction in area %		Impact Energy (J) ²		Hardness HB30																																		
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100 < d or a ≤ 400	885-985	≤ 1160	-	≥ 12	-	≥ 40	-	≥ 55	295-360																																		
स्वत्वाधिकार एवं गोपनीयता ; इस दस्तावेज में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं प्रसारण के बिना भारत हेवी इलेक्ट्रिकल्स की लिमिटेड की सहमति के बिना नहीं किया जा सकता है	9.0 OUTER AND INNER QUALITY / NDE: 9.1 General: Cracks, other material separations or more severe linear inclusions lines are only acceptable when located in the dimensional tolerances areas. 9.2 Scope of Inspection: Following NDE shall be performed in delivery condition: • Material identity check for all bars • Complete Ultrasonic Inspection (UT) of all bars ≥ 30 mm diameter in accordance with EN 10308 type 1a – 1c (Table 1). 9.3 Recording level and acceptance Criteria: Following classes in accordance with EN 10308 (Table 2) shall be applied depending upon the diameter (d) or side length (a, b) • d or (a, b) ≤ 200 mm : Quality Class 4 • d or (a, b) ≥ 200 mm : Quality Class 3 The decision limit for backwall echo loss is 3 dB for all bar dimensions. No linear or planar indication larger than 10 mm in any direction is acceptable. The above Quality requirements also apply for bar diameter (d) or side length (a, b) < 30 mm. This does not need to be proved by testing.																																										
हस्ताक्षर एवं दिनांक SIGN & DATE	REV 02																																										
सामग्री सूची संख्या INVENTORY NO P-369	निर्माणकर्ता WORKED BY Devdutt Singh	जांचकर्ता CHECKED BY Ashish Ranjan	03-07-15 3.7.15																																								

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10566 पृष्ठ का Page 3 of 3	
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को प्रतिस्थापित करता है	10.0 MARKING: The marking of the material shall be such that Purchase Order Number, Size, Heat No., BHEL Specification number, material designation, Manufacturer identification are legible. 11.0 DOCUMENTATION: The supplier shall supply four copies of test certificates as per EN 10204, inspection certificate 3.1, unless otherwise stated in the order. The test certificates shall bear the following: BHEL References: - Specification no., Purchase orders No, material designation. Suppliers references: - Name, emblem, Melt no, Heat-treatment batch no. Results of Testing: - Melting process, melt analysis, - Mechanical properties, all individual values shall be reported, - Dimensional results - Complete information on all heat treatments performed, - U.T result - Confirmation of the material identity check.				
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	12.0 CLEARANCE FOR DELIVERY: The total results of the tests carried out are the deciding factor for clearance for delivery. BHEL shall evaluate the total results taking into consideration the intended use of the material and examine accordingly the permissibility of deviation (if any) from the specified properties. The clearance however does not relieve the supplier of his responsibility for the hidden non-permissible defects, which are found later.				
स्वत्वाधिकार एवं गोपनीयता ; इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं प्रकाशना के बिना इससे किसी भी तरह प्रयोग, जो कि सम्पत्ती के हित में हानिकारक हो ना किया जाए	13.0 CROSS REFERRED STANDARDS: VdTÜV-Blatt 390 ,EN 10083-1,EN 10204 , EN10308, ISO 6892-1 , ISO 148-1				
हस्ताक्षर एवं दिनांक SIGN & DATE 					
सामग्री सूची संख्या INVENTORY P-3169	REV 02	निर्माणकर्ता WORKED BY	Devdutt Singh		03.07.15
	जांचकर्ता CHECKED BY	Ashish Ranjan		3.7.15	

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10568 पृष्ठ का Page 1 of 4
SUPERVISOR'S INVENTORY NO सामग्री सूची संख्या की पंजीकृत संख्या है TLV 9170/01, 10/14	<u>HEAT RESISTANT STEEL BARS GRADE 16Mo3</u>		
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 GENERAL : This specification governs the quality of steel Bars of grade 16Mo3 according to EN10222-1, Material no. 1.5415.		
	2.0 APPLICATION : The Bars shall be used for turbine, generator and other components.		
	3.0 CONDITION OF DELIVERY: Bars shall be delivered in the heat-treated condition according to EN10222-2 Table 1 or EN10273 Table A1.		
	4.0 DIMENSION AND TOLERANCES : The dimensions shall be as per order and tolerances shall be as per EN10269.		
	5.0 MANUFACTURE : The bars shall be manufactured in accordance with EN10222. As an alternative hot rolled Bars in accordance with EN 10273 can be employed provided that the requirements of this specification will be fulfilled. The steel is to be produced by an electric process or one of the basic oxygen processes. The Steel must be fully killed.		
स्वतंत्राधिकार एवं गोपनीयता : इस दस्तावेज में दी गई सूचना भारत भारती इंटरनेशनल को स्वतंत्रता है इसका प्रकाश एवं उपयोग इस से किसी भी तरह प्रयोग, जो कि इसमें दी गई सूचना के बिना से हानिकारक हो ना किया जाए	6.0 HEAT TREATMENT: Normalizing - 890 – 950°C / Cooling in Air or Quenching - 890-960°C / water, Oil or polymer* Tempering - 620-700°C / Air or furnace <i>*In case of polymer cooling rate must be comparable to cooling with oil.</i> If bars need to be straightened after the heat treatment, a stress relieving treatment shall be performed after completion of the entire straightening process. Stress relieving is to be carried out 20-50 K below the tempering temperature with a subsequent slow cooling rate.		
हस्ताक्षर एवं दिनांक SIGN & DATE 16/2/13	TSX B. CHOUDHARY PSC V. K. CHAUHAN QAX N. K. MANWANI STE DINBEN GOND	नाम NAME अनुवादक TRANSLATED BY निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY पर्यवेक्षणकर्ता SUPERVISED BY	हस्ताक्षर एवं दिनांक SIGNATURE & DATE DEVDUTT SINGH ASHISH RANJAN GOPAL KRISHNAN 08-02-2013 8-2-13
सामग्री सूची संख्या INVENTORY NO. P-3124	सहमत विभाग AGREED DEPTT नाम NAME दिनांक एवं हस्ताक्षर DATE & SIGNATURE	स्वीकृति : संस्थान मानक समिति APPROVED : PLANT STANDARDS COMMITTEE 4r. No. 2.60 निर्माण PREPARED : MTE जारी : मानक विभाग ISSUED : STANDARDS DIVISION दिनांक DATE : 28/05/1990	
REV 04 2.6.16 C/A/T-SX (MTE)-16-16		31.5.16	

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश ; हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10568																																																				
				पृष्ठ का Page 2 of 4																																																				
सामग्री सूची संख्या और INVENTORY NO.	7.0 CHEMICAL COMPOSITION: Heat analysis according to EN10222-2 in weight %																																																							
	<table border="1"> <tr> <th>C</th> <th>Si</th> <th>Mn</th> <th>P</th> <th>S</th> <th>Mo</th> </tr> <tr> <td>0.12 – 0.20</td> <td>≤ 0.35</td> <td>0.40 – 0.90</td> <td>≤ 0.025</td> <td>≤ 0.015</td> <td>0.25 – 0.35</td> </tr> </table>					C	Si	Mn	P	S	Mo	0.12 – 0.20	≤ 0.35	0.40 – 0.90	≤ 0.025	≤ 0.015	0.25 – 0.35																																							
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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.	8.0 MECHANICAL PROPERTIES: A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test scope shall be 10% of the bars with a minimum of 10 bars. When the lot contains less than 10 bars all bars shall be tested. The mechanical properties in shall be determined for both hardest and softest bar. The specimens are to be taken in longitudinal (L) direction according to EN10083-1. For bars with diameter (d) or side lengths (a, b) > 100mm, 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 (T) are also allowed. For, d or (a, b) > 160mm the specimens must be taken in transverse direction. The following properties shall be achieved at room temperature:																																																							
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हस्ताक्षर एवं दिनांक SIGN & DATE 16/2/13	REV. 04		निर्माणकर्ता WORKED BY Devdutt Singh		08.02.13																																																			
सामग्री सूची संख्या INVENTORY NO. P-3129			जांचकर्ता CHECKED BY Ashish Ranjan		08.02.13																																																			

हस्ताक्षर एवं तिथि SIGN & DATE		संस्थान क्रय विनिर्देश ; हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10568 पृष्ठ का Page 3 of 4		
संपूर्णतः INVENTORY NO	An impact energy test shall be performed on bars having side length ≥ 12 mm or diameter ≥ 16 mm respectively					
संपूर्णतः INVENTORY NO	9.0 OUTER AND INNER QUALITY / NDE:					
संपूर्णतः INVENTORY NO	9.1 General:					
संपूर्णतः INVENTORY NO	Cracks, other material separations or more severe linear inclusions lines are only acceptable when located in the dimensional tolerances areas.					
संपूर्णतः INVENTORY NO	9.2 Scope of Inspection:					
संपूर्णतः INVENTORY NO	Following NDE shall be performed in delivery condition:					
संपूर्णतः INVENTORY NO	- Material identity check for all bars - Complete ultrasonic inspection (UT) of all bars according to EN 10308 type 1a-1c (table 1)					
संपूर्णतः INVENTORY NO	9.3 Criteria for registration and decision					
संपूर्णतः INVENTORY NO	Regarding UT inspection following quality classes in accordance with EN10308 (table 2) must be applied depending on the diameter (d) or side length (a, b).					
संपूर्णतः INVENTORY NO	- d or (a, b) ≤ 200 mm: quality class 4 - d or (a, b) > 200 mm: quality class 3					
संपूर्णतः INVENTORY NO	The decision limit for loss of back wall echo is 3 dB for all bar dimensions. No linear or planar indication larger than 10mm in any direction is acceptable.					
संपूर्णतः INVENTORY NO	This quality requirement applies also for bars with diameter d or side length (a, b) < 30 mm. This does not need to be proved by testing.					
संपूर्णतः INVENTORY NO	10.0 MARKING:					
संपूर्णतः INVENTORY NO	The marking of the material shall be such that Purchase Order Number, Size, Heat No., BHEL Specification number, material designation, Manufacturer identification are legible.					
संपूर्णतः INVENTORY NO	11.0 TEST CERTIFICATES:					
संपूर्णतः INVENTORY NO	The supplier shall supply four copies of test certificates as per EN 10204, certificate 3.1, unless otherwise stated on the order. The test certificates shall bear the following:					
संपूर्णतः INVENTORY NO	BHEL References:					
संपूर्णतः INVENTORY NO	- Specification no., Purchase orders no.					
संपूर्णतः INVENTORY NO	Suppliers references:					
संपूर्णतः INVENTORY NO	- Name, emblem, material designation, Melt no, Heat-treatment batch no.					
संपूर्णतः INVENTORY NO	REV 04		निरीक्षणकर्ता WORKED BY	Devdutt Singh		08.02.13
संपूर्णतः INVENTORY NO	जांचकर्ता CHECKED BY		Ashish Ranjan		08.02.13	

भारतीय, एच. वी. लिमिटेड SIGN & DATE			संस्थान क्रय विनिर्देश ; हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10568 पृष्ठ का Page 4 of 4	
SUPERSEDES INVENTORY NO सामग्री यू.पी. संख्या को प्रतिस्थापित करता है		Results of Testing: - Melting process, melt analysis, - Mechanical properties, all individual values shall be reported, - Dimensional results - Complete information on all heat treatments performed, - U.T result - Confirmation of the material identity check.				
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.		12.0 DEVIATION: Any deviation from this purchasing specification must be immediately reported to the BHEL. Any deviation is considered as accepted only if this has been approved or by BHEL in writing. The approval is only valid for the delivered material. In case of new deliveries out of a heat that has already been accepted for a previous order, the existing accepted non-conformance report for the previous serialization number / batch tracking identifier(s) of the heat has to be submitted together with the new non-conformance report. In case of any deviation from the specified properties, also when testing is not explicitly specified, BHEL has the right to reject the material.				
स्वयंप्रमाणित एवं गोपनीय : इस दस्तावेज में दी गई सूचना भारत भारती हीवेलीकैल्स लिमिटेड की सम्पत्ति है इसका उपयोग एवं प्रसारण एवं से किसी भी तरह उपयोग, जो कि सम्पत्ति के बिना से हीवेलीकैल्स लिमिटेड को नुकसान पहुंचा		13.0 CLEARANCE FOR DELIVERY: The total results of the tests carried out are the deciding factor for clearance for delivery. BHEL shall evaluate the total results taking into consideration the intended use of the material and examines accordingly the permissibility of deviation (if any) from the specified properties. The clearance however does not relieve the supplier of his responsibility for the hidden non-permissible defects, which are found later.				
एच. वी. संख्या INVENTORY 16/4/13		14.0 CROSS REFERRED STANDARDS: EN 10222-1, EN 10222-2, EN 10273, EN 10083-1, EN 10308, EN 10204, EN10269				
भारतीय, एच. वी. लिमिटेड INVENTORY 1-3/29	REV 04	निर्माणकर्ता WORKED BY	Devdutt Singh		08.02.13	
		जांचकर्ता CHECKED BY	Ashish Ranjan		08.02.13	



CORPORATE PURCHASING SPECIFICATION

AA 107 25

Rev. No. 07

PAGE 1 OF 2

STAINLESS STEEL BARS (AUSTENITIC, Ti STABILIZED) SOLUTION ANNEALED (ASTM A 276M, TYPE 321)

ORDERING DESCRIPTION

1.0 GENERAL :

This specification governs the quality requirements of Stainless Steel Bars (Austenitic, Ti Stabilized), Solution Annealed to the latest version of ASTM A 276M, Type 321 and comply with the following additional requirements.

2.0 APPLICATION :

For application requiring acid, corrosion and heat resistance and weldability.

3.0 CONDITION OF DELIVERY:

Cold / Hot rolled and solution annealed . Above 100 mm size, forged bars are acceptable. The ends of bars shall be square and true. The bars shall be supplied in straight lengths.

4.0 DIMENSIONS AND TOLERANCES

Bars shall be supplied to the dimensions specified on BHEL order. The tolerances on length, twist and straightness shall be as per ASTM A484M

5.0 CHEMICAL COMPOSITION :

As per ASTM A 276M, Type 321.

6.0 TEST CERTIFICATES :

Three copies of test certificates shall be supplied, unless otherwise stated on the order. In addition, the supplier shall ensure to enclose one copy of the test certificate along with their despatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information :

BHEL References :

AA 107 25-Rev. No.07 (ASTM A 276M, Type 321)
BHEL order No,

Revisions :

Cl. 32.6.5 of MOM of MRC-S&GPS

**APPROVED : Interplant Material
Rationalization Committee-MRC (S&GPS)**

Rev. No. 07

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt.: 1-07-2008

Dt :

Year: 2013

HARDWAR

Corp. R&D

JUNE, 1978

AA 107 25	CORPORATE PURCHASING SPECIFICATION	
Rev. No. 07		
PAGE 2 OF 2		

Supplier's References :

Name
Identification No.
Melt No.
Details of heat treatment.

Result of Tests:

Dimensional inspection.
Results of chemical analysis, mechanical tests

7.0 PACKING AND MARKING :

Bars shall be suitably oiled and packed in boxes to prevent corrosion and damage during transit.

Each bar and flat over 50 mm in diameter or width across flats shall be stamped with 'AA 107 25 Rev 07(ASTM A 276M, Type 321)', melt No., BHEL order No., at one end or on the end face.

Bars bar/flat upto and including 50 mm in dia./width across flats shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

A metal label shall be securely attached to each bundle and shall bear the following information :

AA107 25 Rev 07 - Solution Annealed.(ASTM A 276M, Type 321)
BHEL Order No.
Consignment/Identification No.
Melt No.
Size and Weight.
Supplier's Name.

FOR INFORMATION ONLY

CHEMICAL COMPOSITION

C	Si	Mn	Ni	Cr	S	P	Ti
≤ 0.08	≤ 1.0	≤ 2.0	9.0-12.0	17.0-19.0	≤ 0.030	≤ 0.045	5X(C+N)-0.70

Nitrogen content is to be reported for this grade.

MECHANICAL PROPERTIES

Hardness Max		0.2% PS min	UTS min	% El min	% Ra
HBS	HRC	N/mm ²	N/mm ²		
----	----	205	515	40	50

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW10661																																					
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TLV9258/10/10/15/4/11		STEEL BARS GRADE X12CrMoWVNbN10-1-1																																							
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 GENERAL: This specification governs the quality of steel bars of grade X12CrMoWVNbN10-1-1, material No. 1.4906.																																							
		2.0 APPLICATION: The bars shall be used for turbine components.																																							
		3.0 CONDITION OF DELIVERY: Rolled/Forged and quenched and tempered condition.																																							
		4.0 DIMENSION AND TOLERANCES: The dimensions shall be as per purchase order. The tolerance on the forged / rolled bars shall be as per IS: 3739, Grade 2 / EN10060. Negative tolerance is not acceptable.																																							
		5.0 MANUFACTURE:																																							
		5.1 GENERAL: Electroslag Remelted (ESR) steel shall be used. Cast ingot is to be used as starting material for the production of the bars. The bars can either be rolled or forged provided that the requested mechanical properties are fulfilled. Bars shall be delivered in quenched and tempered condition.																																							
		5.2 HEAT-TREATMENT: The hardening temperature has to be in between 1050°C and 1100°C subsequently quenched in air or liquid. After hardening the forging must be cooled down to a temperature <100°C in the center to guarantee complete transformation into martensite throughout in the whole section. A two-step tempering treatment must be performed considering the following: The first tempering step must be carried out between 570°C and 680°C. The second tempering has to be carried out between temperature 680°C and 720°C. A martensitic microstructure shall be obtained over the entire cross-section of the bar. If bars need to be straightened after the heat treatment, a stress relieving treatment shall be performed after completion of the entire straightening process. Stress relieving is to be carried out at 20-50°C below the tempering temperature with a subsequent slow cooling rate.																																							
स्वतंत्रता दिवस एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत की (एलेक्ट्रिकल लिमिटेड) की संपत्ति है। इसका प्रयोग एवं प्रसारण केवल भारत सरकार के अधिकारियों के द्वारा ही किया जा सकता है।		<table border="1"> <tr> <td>TSX</td> <td>D. GANGWAL</td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर SIGNATURE & DATE</td> </tr> <tr> <td>PSC</td> <td>G. KRISHNAN</td> <td>अनुवादक TRANSLATED BY</td> <td></td> </tr> <tr> <td>QAX</td> <td>U. K. PANDA</td> <td>निर्माणांक WORKED BY</td> <td>SUBODH RANA 28.11.18</td> </tr> <tr> <td>STE</td> <td>D. K. RAY</td> <td>जांचकर्ता CHECKED BY</td> <td>ASHISH RANJAN 28.11.18</td> </tr> <tr> <td>सहमत विभाग AGREED DEPTT</td> <td>नाम NAME</td> <td>पर्यवेक्षक SUPERVISED BY</td> <td>GOPAL KRISHNAN 28.11.18</td> </tr> <tr> <td colspan="2"> स्वीकृति APPROVED : संस्थान मानकीकरण समिति PLANT STANDARDIZATION COMMITTEE </td> <td colspan="2"> Gr. NO. 2.60 </td> </tr> <tr> <td>REV. NO.</td> <td>01</td> <td>निर्माण PREPARED : MTE</td> <td>जारी ISSUED : TSX</td> </tr> <tr> <td>Dt.</td> <td>08.12.18</td> <td colspan="2">दिनांक DATE : 28.12.2017</td> </tr> <tr> <td>CHANGE ADVICE NO.</td> <td>TSX(MTE)-18-160</td> <td colspan="2"></td> </tr> </table>				TSX	D. GANGWAL	नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE	PSC	G. KRISHNAN	अनुवादक TRANSLATED BY		QAX	U. K. PANDA	निर्माणांक WORKED BY	SUBODH RANA 28.11.18	STE	D. K. RAY	जांचकर्ता CHECKED BY	ASHISH RANJAN 28.11.18	सहमत विभाग AGREED DEPTT	नाम NAME	पर्यवेक्षक SUPERVISED BY	GOPAL KRISHNAN 28.11.18	स्वीकृति APPROVED : संस्थान मानकीकरण समिति PLANT STANDARDIZATION COMMITTEE		Gr. NO. 2.60		REV. NO.	01	निर्माण PREPARED : MTE	जारी ISSUED : TSX	Dt.	08.12.18	दिनांक DATE : 28.12.2017		CHANGE ADVICE NO.	TSX(MTE)-18-160		
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The content of trace elements such as Cu, As, Sb, Sn and Ti shall be given for information in the certificate.																																									
6.2 MECHANICAL PROPERTIES:																																									
The specimens are to be taken in longitudinal (L) direction according to EN10083-1. For bars with diameter (d) or side length (a, b) > 100mm, the specimens shall be taken at a distance d/3 for round bars and a/3, b/3 from the surface for rectangular bars. Transverse specimens (T) are also allowed. A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test amount shall be 10% of the bars with a minimum of 10 bars. When the lot contains less than 10 bars, all bars shall be tested. The mechanical properties shall be tested on both the softest and hardest bars.																																									
<u>If unmachined parts (e.g. valve stem) are to be manufactured from forged bar, which is forged to different diameters, the following requirements shall be met:</u>																																									
For a ratio of up to 1.25 (according to EN10269, clause 10.1.2) between the diameter of the taper shank and the shaft section of valve stem, the testing of mechanical properties is to be done only on bigger diameter. In case of a ratio of diameter > 1.25, mechanical properties shall be tested on all diameters. The following Mechanical properties shall be achieved at room temperature																																									
<table border="1"> <tr> <th rowspan="2">Diameter (d) Side length (a¹) (mm)</th> <th rowspan="2">0.2% Proof Strength (N/mm²)</th> <th rowspan="2">Tensile Strength (N/mm²)</th> <th colspan="2">Elongation l₀ = 5d (%)</th> <th colspan="2">Reduction in area (%)</th> <th colspan="2">Impact Energy J</th> <th rowspan="2">Hardness HB30</th> </tr> <tr> <th>L</th> <th>T</th> <th>L</th> <th>T</th> <th>L</th> <th>T</th> </tr> <tr> <td>d, a ≤ 150</td> <td>750 – 830*</td> <td>≤ 1000</td> <td>≥ 14</td> <td>-</td> <td>≥ 50</td> <td>-</td> <td>≥ 40²⁾</td> <td>-</td> <td>265 – 310</td> </tr> <tr> <td>150 < d, a</td> <td>700 – 800</td> <td>≤ 1000</td> <td>-</td> <td>≥ 13</td> <td>-</td> <td>≥ 40</td> <td>-</td> <td>≥ 24²⁾</td> <td>260 – 310</td> </tr> </table>						Diameter (d) Side length (a ¹) (mm)	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation l ₀ = 5d (%)		Reduction in area (%)		Impact Energy J		Hardness HB30	L	T	L	T	L	T	d, a ≤ 150	750 – 830*	≤ 1000	≥ 14	-	≥ 50	-	≥ 40 ²⁾	-	265 – 310	150 < d, a	700 – 800	≤ 1000	-	≥ 13	-	≥ 40	-	≥ 24 ²⁾	260 – 310
Diameter (d) Side length (a ¹) (mm)	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation l ₀ = 5d (%)		Reduction in area (%)				Impact Energy J		Hardness HB30																														
			L	T	L	T	L	T																																	
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¹⁾ The values of the smallest side length (a) shall be achieved.																																									
²⁾ Minimum value from 3 Charpy V-notch specimens																																									
* Taken from TLV9258 12																																									
6.3 OUTER AND INNER QUALITY / NON DESTRUCTIVE TESTING:																																									
6.3.1 SURFACE CONDITION:																																									
Cracks, other material separation or more severe linear inclusions lines are not acceptable.																																									
SIGNATURE SIGN & DATE	REV. NO. 01		निर्माणकर्ता WORKED BY	ASHISH RANJAN	28.11.18																																				
मापदंडी सूची संख्या INVENTORY	R4093		जांचकर्ता CHECKED BY	GOPAL KRISHNAN	28.11.18																																				

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार)		HW10661	
		PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		पृष्ठ Page 3	का of 4
सुपरसेडस INVENTORY NO.	6.3.2 SCOPE OF INSPECTION: Following NDE shall be performed in delivery condition: - Material verification inspection of all bars - 100% U.T of all bars with diameter d, $a \geq 30$ mm according to EN10308 type 1a - 1c (Table 1)				
सामग्री भूषण की अधिकृत प्रमाण है	6.4 CRITERIA FOR REGISTRATION AND DECISION: The acceptance norms for UT inspection shall be as per quality classes with EN10308 (Table 2) shall be applied depending on the diameter (d) or side length (a, b): - d or (a, b) ≤ 200 mm: Quality Class 4 - d or (a, b) > 200mm: Quality Class 3 The decision limit for loss of back of echo is 3 dB for all bar dimensions. Any linear or planar indication larger than 10mm in any direction is not acceptable. This quality requirement applies also for bars having diameter d < 30 mm, although it is not necessary to prove by testing.				
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.	7.0 Test Certificates: The supplier shall supply four copies of test certificates as per EN 10204, certificate 3.1, unless otherwise stated on the order. The test certificates shall bear the following: BHEL References: - Specification no., Purchase orders no. - Suppliers references: Name, emblem, material designation, melt no, Heat-treatment batch no. Results of Testing documentation: - Melting process, melt analysis, - Details of Heat-treatment performed, - Mechanical properties, including hardness test results, all individual values shall be reported - U.T result - Result of verification test				
	8.0 Deviations: Any deviation from this delivery specification has to be reported to BHEL for review. Any deviation is accepted only if this has been approved by BHEL in written form.				
स्वत्वधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती एलेक्ट्रिकल लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण के बिना भारत भारती एलेक्ट्रिकल लिमिटेड की लिखित अनुमति के बिना न किया जाए।	9.0 Clearance for Delivery: The total results of the tests carried out are the deciding factor for clearance for delivery. Vendor will be responsible for any deviation observed with respect to ordering specification during further manufacturing at BHEL.				
दिनांक एवं हस्ताक्षर SIGN & DATE	10.0 Packing and Marking: Bars shall be suitably packed to prevent corrosion and damage during transit. Marking of the materials shall be such that heat number, steel grade/specification, size and manufacturer name/identification are legible.				
सामग्री भूषण INVENTORY	REV. NO. 01	निर्माणकर्ता WORKED BY ASHISH RANJAN	जांचकर्ता CHECKED BY GOPAL KRISHNAN	28.11.18	18.11.18

SIGN & DATE 	संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW10661 पृष्ठ का Page 4 of 4																
	SUPERSEDES INVENTORY NO. भारतीय नौकी संख्या को अधिगणित करता है																		
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 Process Qualification: 11.1 General Product and process qualification procedures are required for first order. The product and process qualification is required for each of the manufacturer's fabrication facility. Depending on the complexity of the product and / or process and experience from the first orders, requirement of additional process qualification in subsequent orders may be requested by BHEL. Prior to the start of manufacture, the manufacturer has to submit a manufacturing and testing plan to BHEL in which the quality assured process workflow, i.e. the sequence of process activities (manufacturing, testing and inspection steps) are specified in chronological order. BHEL must be informed for any change in manufacturing and testing processes. Depending on the type and scope and thus the significance of any given change, BHEL will decide whether it is necessary to requalify the product and/or process. Subcontracting of process steps to sub suppliers is only acceptable after written approval from BHEL. 11.2 The following additional tests have to be performed during qualification: 11.2.1 <u>Tensile tests at elevated temperature</u> In accordance with ISO 6892-2 a tensile test (in the same direction as at room temperature) has to be performed at 600°C. Following properties must be achieved: <table border="1"> <thead> <tr> <th>Diameter (d)/Side length (a¹) (mm)</th> <th>0.2% Proof Strength (N/mm²)</th> <th>Tensile Strength (N/mm²)</th> <th>Elongation l₀ = 5d (%)</th> <th>Reduction in area (%)</th> </tr> </thead> <tbody> <tr> <td>d, a ≤ 150*</td> <td>≥ 405MPa</td> <td>≥ 420 MPa</td> <td>≥ 18%</td> <td>≥ 65%</td> </tr> <tr> <td>150 < d, a</td> <td>≥ 365MPa</td> <td>≥ 415 MPa</td> <td>≥ 18%</td> <td>≥ 65%</td> </tr> </tbody> </table> * Taken from TLV9258 12					Diameter (d)/Side length (a ¹) (mm)	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation l ₀ = 5d (%)	Reduction in area (%)	d, a ≤ 150*	≥ 405MPa	≥ 420 MPa	≥ 18%	≥ 65%	150 < d, a	≥ 365MPa	≥ 415 MPa	≥ 18%	≥ 65%
Diameter (d)/Side length (a ¹) (mm)	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation l ₀ = 5d (%)	Reduction in area (%)															
d, a ≤ 150*	≥ 405MPa	≥ 420 MPa	≥ 18%	≥ 65%															
150 < d, a	≥ 365MPa	≥ 415 MPa	≥ 18%	≥ 65%															
11.2.2 <u>Creep Rupture Tests:</u> Creep rupture tests have to be performed at 600 °C. The creep rupture strength required by BHEL for 10,000 hours has to be verified with agreed test parameters. The number of tests as well as test parameters has to be agreed by BHEL. 11.2.3 <u>Microstructure Examination</u> The homogeneity of the microstructure has to be checked and documented by microsection. The microstructure must be uniform and free from porosity, excessive segregation and other inhomogeneities. Delta ferrite content ≥ 5% is not acceptable. The inclusion content has to be determined in accordance with ASTM E 45. The grain size must be measured after all heat treatments have been performed in accordance with ASTM E 112 or ISO 643. Grain size 4 or finer must be achieved. A deviation from the average grain size of more than 2 grain sizes is not permissible.																			
12.0 <u>Cross Referred Standards:</u> IS: 3739, EN10060, EN10083, EN10269, EN10308, ISO 6892 -5, EN10204, ASTM E45, ASTM E112, ISO 643																			
SIGN & DATE 	REV. NO. 01	निर्माणकर्ता WORKED BY ASHISH RANJAN	जांचकर्ता CHECKED BY GOPAL KRISHNAN	28.11.18 28.11.18															
भारतीय नौकी संख्या INVENTORY P-4093																			



संस्थान क्रय विनिर्देश (हीप : हरिद्वार)

HW10662

**PLANT PURCHASE SPECIFICATION
(HEEP: HARIDWAR)**

पृष्ठ का

Page 2 of 4

6.0 PROPERTIES AND TESTS:

6.1 CHEMICAL COMPOSITION:

Heat analysis is weight % in accordance with EN10222-2 except for the Al-content.

C	Si	Mn	P	S	Cr	Mo
0.08 – 0.12	≤ 0.50	0.30 – 0.60	≤ 0.025	≤ 0.015	8.00 – 9.50	0.85 – 1.05
Ni	Nb	V	N	Al		
≤ 0.40	0.06 – 0.10	0.18 – 0.25	0.030 – 0.070	≤ 0.020		

6.2 MECHANICAL PROPERTIES:

A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test amount shall be 10% of the bars with a minimum of 10 bars. When the lot contains less than 10 bars, all bars shall be tested. The mechanical properties shall be tested in accordance with ISO 6982 -1 and ISO 148 -1 on both the softest and hardest bars.

The specimens are to be taken in a longitudinal direction (L) in accordance with EN10083-1. For bars with diameter (d) or side lengths (a,b) > 100mm, the specimens shall be taken at a distance d/3 or a/3 and b/3 from the respective surfaces. Transverse specimens (T) are also allowed in place of longitudinal specimens.

Impact energy test shall be performed on bars having side length ≥ 12mm or diameter ≥ 16mm respectively.

The following Mechanical properties shall be achieved at room temperature

Diameter (d)/ Side length (a) ¹ (mm)	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation after fracture		Impact Energy J		Hardness HB30
			L	T	L	T	
d ≤ 225 a ≤ 180	≥ 450	620 - 850	≥ 20	≥ 18	≥ 68 ²⁾	≥ 68 ²⁾	195 - 265
225 < d ≤ 600 180 < a ≤ 400	≥ 430	600 - 830	≥ 20	≥ 18	≥ 68 ²⁾	≥ 68 ²⁾	195 - 265

¹⁾ The values of the smallest side length (a) shall be reached.

²⁾ Average from 3 Charpy V-notch specimen longitudinal or transverse minimum value = 48J

6.3 OUTER AND INNER QUALITY / NON DESTRUCTIVE TESTING:

6.3.1 SURFACE CONDITION:

Cracks, other material separation or more severe linear inclusions lines are not acceptable.

6.3.2 SCOPE OF INSPECTION:

Following NDE shall be performed in delivery condition:

- Material verification inspection of all bars
- 100% U.T of all bars with diameter/thickness d, a ≥ 30 mm according to EN10308 type 1a - 1c (Table 1)

REV. NO.

02

निर्माणकर्ता
WORKED BY

ASHISH
RANJAN

Arjan

17.11.18

जांचकर्ता
CHECKED BY

GOPAL
KRISHNAN

Gopal

17.11.18



संस्थान क्रय विनिर्देश (हीप : हरिद्वार)

HW10662

PLANT PURCHASE SPECIFICATION
(HEEP: HARIDWAR)

पृष्ठ का
Page 3 of 4

6.3.3 CRITERIA FOR REGISTRATION AND DECISION:

The acceptance norms for UT inspection shall be as per quality classes with EN10308 (Table 2) applied depending on the diameter (d) or side length (a, b):

- d or (a, b) $\leq$ 200 mm: Quality Class 4
- d or (a, b) > 200mm: Quality Class 3

The decision limit for loss of back of echo is 3 dB for all bar dimensions. Any linear or planar indication larger than 10mm in any direction is not acceptable.

This quality requirement applies also for bars having diameter d < 30mm, although it is not necessary to prove by testing.

7.0 Test Certificates:

The supplier shall supply four copies of test certificates as per EN 10204, certificate 3.1, unless otherwise stated on the order. The test certificates shall bear the following:

BHEL References:

- Specification no., Purchase orders no.
- Suppliers references: Name, emblem, material designation, melt no, Heat-treatment batch no.

Results of Testing:

- Melting process, melt analysis,
- Details of Heat-treatment performed,
- Mechanical properties, including hardness test results, all individual values shall be reported
- U.T result
- Result of verification test

8.0 Deviations:

Any deviation from this delivery specification has to be reported to BHEL for review. Any deviation is accepted only if this has been approved by BHEL in written form.

9.0 Clearance for Delivery:

The total results of the tests carried out are the deciding factor for clearance for delivery. Vendor will be responsible for any deviation observed with respect to ordering specification during further manufacturing at BHEL.

10.0 Packing and Marking:

Bars shall be suitably packed to prevent corrosion and damage during transit.

Marking of the materials shall be such that heat number, steel grade/specification, diameter and manufacturer name/identification are legible.

11.0 Process Qualification:

11.1 General

Product and process qualification procedures are required for first order. The product and process qualification is required for each of the manufacturer's fabrication facility.

हस्ताक्षर एवं तारीख
SIGN & DATE

SUPERSEDES
INVENTORY NO.

मागरी सूची संख्या को
अधिकारित करना है

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स्वाधिकार एवं गोपनीयता

यह दस्तावेज या इसमें सूचित जानकारी किसी भी रूप में बिना लिखित अनुमति के प्रसारित नहीं की जा सकती है। इसका उपयोग केवल उद्देश्य के लिए ही किया जाना है।

हस्ताक्षर एवं तारीख
SIGN & DATE

मागरी सूची संख्या
INVENTORY

REV. NO.

02

निर्माणकर्ता
WORKED BY

ASHISH
RANJAN

जांचकर्ता
CHECKED BY

GOPAL
KRISHNAN

17.11.18

17.11.18



PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)

Depending on the complexity of the product and / or process and experience from the first orders, requirement of additional process qualification in subsequent orders may be requested by BHEL.

Prior to the start of manufacture, the manufacturer has to submit a manufacturing and testing plan to BHEL in which the quality assured process workflow, i.e. the sequence of process activities (manufacturing, testing and inspection steps) are specified in chronological order.

BHEL must be informed for any change in manufacturing and testing processes. Depending on the type and scope and thus the significance of any given change, BHEL will decide whether it is necessary to requalify the product and/or process.

Subcontracting of process steps to sub suppliers is only acceptable after written approval from BHEL.

11.2 The following additional tests (in addition to tests specified at clause 6.0) have to be performed during qualification:

11.2.1 Tensile tests at elevated temperature

In accordance with ISO 6892-2, a tensile test in longitudinal direction has to be performed at 600°C.

Following properties must be achieved:

0.2% Proof Stress $\geq 215\text{MPa}$

Tensile Strength ≥ 255 MPa.

Elongation (A5) $\geq 22\%$ Reduction in area $\geq 66\%$

11.2.2 Creep Rupture Tests:

Creep rupture tests have to be performed at 600 °C. The creep rupture strength required by BHEL for 10,000 hours has to be verified with agreed test parameters. The number of tests as well as test parameters has to be agreed by BHEL.

11.2.3 Microstructure Examination

The homogeneity of the microstructure has to be checked and documented by microsection. The microstructure must be uniform and free from porosity, excessive segregation and other inhomogeneities.

Delta ferrite content $\geq 5\%$ is not acceptable. The inclusion content has to be determined in accordance with ASTM E 45.

The grain size must be measured after all heat treatments have been performed in accordance with ASTM E 112 or ISO 643. Grain size 4 or finer must be achieved. A deviation from the average grain size of more than 2 grain sizes is not permissible.

12.0 Cross Referred Standards:

EN10222-2, IS: 3739-2, EN10060, EN10083-1, ISO 6892-1, ISO 148-1, ISO 6282-2 EN10308, EN10204, ASTM E45, ASTM E112, ISO 643

SIGN & DATE

SUPERSEDES
INVENTORY NO.

सामग्री मुभी संख्या की
अधिकारित कागजात है

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स्वत्वाधिकार एवं गोपनीय

SIGN & DATE

INVENTORY

निर्माणकर्ता
WORKED BY

**ASHISH
RANJAN**

जांचकर्ता
CHECKED BY

**GOPAL
KRISHNAN**

REV. NO.

02

17-11-18

17.11.18

हस्ताक्षर एवं दिनांक SIGN & DATE			संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10673 पृष्ठ का Page 1 of 3																																																																		
सामग्री सूची संख्या को INVENTORY NO. TLV918601\DE\G	HEAT RESISTANT STEEL BARS GRADE 21CrMoV 5-7+QT (Heat Treated Round Bars ≤ dia. 250 mm or Side Length)																																																																					
1.0 GENERAL: This specification governs the quality of alloy steel Bars of grade 21CrMoV5-7+QT, Material no. 1.7709 as per EN10269. 2.0 APPLICATION: The Bars shall be used for turbine, generator and other components. 3.0 CONDITION OF DELIVERY: The bars can either be rolled or forged provided that required mechanical properties are fulfilled. Bars shall be delivered in the quench and tempered condition according to EN 10269 table B.1. 4.0 DIMENSIONS AND TOLERANCES Bars shall be supplied to the dimensions specified in BHEL order. Unless otherwise specified, hot rolled bars shall be supplied in length of 3 to 6 meters or in multiples with maximum of 10 % shorts down to 1 meter. Forged bars shall be supplied in length of 1.5 meter to 3 meters. The tolerance of the bar shall be as per IS:3739, Grade 2 / EN 10060. Negative tolerance is not acceptable. 5.0 MANUFACTURE: 5.1 GENERAL: The bars can either be rolled or forged provided that required mechanical properties are fulfilled. 5.2 HEAT TREATMENT: Bars shall be supplied in quenched and tempered condition (QT1). Quench hardening : 890 - 950°C /air, oil or polymer* Tempering : 700 - 730°C at least 2 hour *In case of polymer the cooling rate shall be comparable to cooling in oil If bars need to be straightened after the heat treatment, a stress relieving treatment shall be performed after completion of the entire straightening process. Stress relieving is to be carried out at 20 - 50°C below the tempering temperature with a subsequent slow cooling rate.																																																																						
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हस्ताक्षर एवं दिनांक SIGN & DATE 30/05/20	सामग्री सूची संख्या INVENTORY NO. P-3/44	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">TSX</td> <td style="width:15%;">Brajesh</td> <td style="width:15%;">23/05/2020</td> <td style="width:20%;"></td> <td style="width:20%;">नाम NAME</td> <td style="width:25%;">हस्ताक्षर एवं दिनांक SIGNATURE & DATE</td> </tr> <tr> <td>PSC</td> <td>TSG Krishnan</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>QAX</td> <td>U.K. Pandey</td> <td></td> <td>अनुवादक TRANSLATED BY</td> <td></td> <td></td> </tr> <tr> <td>STE</td> <td>D.K. Ranjan</td> <td></td> <td>निर्माणकर्ता WORKED BY</td> <td>SUBODH RANA</td> <td>18-05-20</td> </tr> <tr> <td></td> <td></td> <td></td> <td>जांचकर्ता CHECKED BY</td> <td>ASHISH RANJAN</td> <td>18/5/20</td> </tr> <tr> <td></td> <td></td> <td></td> <td>पर्यवेक्षणकर्ता SUPERVISED BY</td> <td>GOPAL KRISHNAN</td> <td>18/5/20</td> </tr> <tr> <td>सहमत विभाग AGREED DEPTT</td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर DATE & SIGNATURE</td> <td colspan="3"></td> </tr> <tr> <td colspan="3" style="text-align: center;"> SUPERSEDES </td> <td colspan="3"> स्वीकृति : संस्थान मानक समिति APPROVED : PLANT STANDARDS COMMITTEE </td> </tr> <tr> <td>REV</td> <td>03</td> <td></td> <td colspan="3">Gr No</td> </tr> <tr> <td>DL</td> <td>23-05-20</td> <td></td> <td colspan="3">2.60</td> </tr> <tr> <td>Change Advice number</td> <td colspan="2">TSX(MTE)-19-117</td> <td>निर्माण PREPARED : MTE</td> <td>जारी : मानक विभाग ISSUED : STANDARDS DIVISION</td> <td>दिनांक DATE : 23.07.1990</td> </tr> </table>			TSX	Brajesh	23/05/2020		नाम NAME	हस्ताक्षर एवं दिनांक SIGNATURE & DATE	PSC	TSG Krishnan					QAX	U.K. Pandey		अनुवादक TRANSLATED BY			STE	D.K. Ranjan		निर्माणकर्ता WORKED BY	SUBODH RANA	18-05-20				जांचकर्ता CHECKED BY	ASHISH RANJAN	18/5/20				पर्यवेक्षणकर्ता SUPERVISED BY	GOPAL KRISHNAN	18/5/20	सहमत विभाग AGREED DEPTT	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE				SUPERSEDES			स्वीकृति : संस्थान मानक समिति APPROVED : PLANT STANDARDS COMMITTEE			REV	03		Gr No			DL	23-05-20		2.60			Change Advice number	TSX(MTE)-19-117		निर्माण PREPARED : MTE	जारी : मानक विभाग ISSUED : STANDARDS DIVISION	दिनांक DATE : 23.07.1990
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संस्थान क्रय विनिर्देश (हीप - हरिद्वार)
PLANT PURCHASE SPECIFICATION
(HEEP - HARIDWAR)

HW 10673

पृष्ठ का
Page 2 of 3

7.0 PROPERTIES AND TEST:

7.1 CHEMICAL COMPOSITION:

Heat analysis according to EN10269 in weight % except phosphorus and sulphur.

C	Si	Mn	P	S	Mo
0.17 – 0.25	≤ 0.40	0.40 – 0.80	≤ 0.020	≤ 0.020	0.55 – 0.80
V	Cr	Ni*	Al _{total}		
0.20 – 0.35	1.20 – 1.50	≤ 0.60	≤ 0.030		

* For dimensions 160-250 mm, the content of Ni must be at least 0.35 %

7.2 MECHANICAL PROPERTIES:

A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test scope shall be 10 % of the bars with a minimum of 10 bars. When the lot consists of less than 10 bars, all bars shall be tested. The mechanical properties shall be determined for both hardest and softest bar.

The specimens are to be taken in a longitudinal direction (L) in accordance with 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. Transverse specimens (T) are also allowed.

The following properties shall be achieved at room temperature:

Diameter (d) / Side length (a) ¹ (mm)	0.2 % Yield Strength N/mm ²	Tensile Strength N/mm ²	Elongation After Fracture A (%)		Reduction in area %		Impact Energy (J) ²		Hardn ess HB30
			L	T	L	T	L	T	
d, a ≤ 160	≥ 550	700-850	≥ 16	≥ 16	≥ 60	≥ 60	≥ 63	≥ 63	215-260
160 < d, a ≤ 250	≥ 550	700-850	≥ 16	≥ 13	≥ 60	≥ 35	≥ 63	≥ 40	215-260

1) The value of smallest side length (a) shall be obtained.

2) Average of 3 Charpy V-notch specimens. Each tested specimen shall reach at least 70% of this average value. An Impact energy test shall be performed on bars having side length ≥ 12 mm or diameter ≥ 16 mm respectively.

7.3 OUTER AND INNER QUALITY / NDE:

7.3.1 General:

Cracks, other material separations or more severe linear inclusions lines are not acceptable.

7.3.2 Scope of Inspection:

Following NDE shall be performed in delivery condition:

- Visual Inspection
- Material identity check for all bars
- Complete ultrasonic inspection (UT) of all bars ≥ 30 mm according to EN 10308 type 1a – 1c (Table 1).

REV 03

निर्माणकर्ता
WORKED BY

Subodh
Rana

18.05-20

जांचकर्ता
CHECKED BY

Ashish
Ranjan

18/5/20

हस्ताक्षर एवं दिनांक SIGN & DATE	SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को अधिकारित करता है	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.	स्वतंत्राधिकार एवं गोपनीयता : यह दस्तावेज मे. वी. भारत भारत हीवी इलेक्ट्रिकल लि. की संपत्ति है। इसका प्रयोग एवं प्रसारण बिना मे. वी. भारत भारत हीवी इलेक्ट्रिकल लि. की लिखित अनुमति के बिना न किया जाए।	हस्ताक्षर एवं दिनांक SIGN & DATE P. 3144 30/05/20	 संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10673 पृष्ठ का Page 3 of 3
					7.4 Recording level and acceptance criteria: Regarding UT inspection following quality classes in accordance with EN 10308 (Table 2) must be applied corresponding to the diameters or side length a, b: - d or (a, b) ≤ 200 mm : quality class 4 - d or (a, b) > 200 mm : quality class 3 The decision limit for backwall eco loss is 3 dB for all bar dimensions. No linear or planer indication larger than 10 mm in any direction is acceptable. This quality requirement applies also for bars with diameter d or side length (a, b) < 30 mm. This does not need to be proved by testing. 8.0 MARKING: The marking of the material shall be such that Purchase Order Number, Size, Heat No., BHEL Specification number, material designation, Manufacturer identification are legible. 9.0 DOCUMENTATION: The supplier shall supply four copies of test certificates as per EN 10204, inspection certificate 3.1, unless otherwise stated in the order. The test certificates shall bear the following: BHEL References: - Specification no., Purchase orders no., material designation Suppliers references: - Name, emblem, Melt no, Heat-treatment batch no. Results of Testing: - Melting process, melt analysis, - Mechanical properties, all individual values shall be reported, - Dimensional results - Complete information on all heat treatments performed, - U.T result - Confirmation of the material identity check. - Visual inspection 10.0 CLEARANCE FOR DELIVERY: The total results of the tests carried out are the deciding factor for clearance for delivery. In case of any deviation from the ordering specification, vendor to inform BHEL with all test results. BHEL shall evaluate the total results taking into consideration the intended use of the material and examines accordingly the permissibility of deviation (if any) from the specified properties. Deviation shall be considered accepted only on written approval from BHEL. The clearance however does not relieve the supplier of his responsibility for the hidden non-permissible defects, which are found later. 11.0 CROSS REFERRED STANDARDS: EN10269, IS 7339, EN10060, EN 10083-1, EN10308, EN 10204	
					REV 03 निर्माणकर्ता WORKED BY Subodh Rana जांचकर्ता CHECKED BY Ashish Ranjan 18-05-20	

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW10674																										
				पृष्ठ का Page 1 of 3																										
सुपरसेडस INVENTORY NO.	नामावली सूची संख्या को अधिकारित करता है TLV9151/02, Rev D	STEEL BARS GRADE 25CrMo4 + QT																												
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.		1.0 GENERAL: This specification governs the quality of steel bars of grade 25CrMo4 +QT, material No. 1.7218.																												
		2.0 APPLICATION: The bars shall be used for turbine components.																												
		3.0 CONDITION OF DELIVERY: Rolled/Forged and quenched and tempered condition.																												
		4.0 DIMENSION AND TOLERANCES: The dimensions shall be as per purchase order. The tolerance on the forged / rolled bars shall be as per IS: 3739, Grade 2 / EN10060. Negative tolerance is not acceptable.																												
		5.0 MANUFACTURE:																												
स्वाभाविक एवं गोपनीय इस प्रवेश में दी गई गुणवत्ता भारत हीवी एलेक्ट्रिकल लिमिटेड की सम्पत्ति है इसका प्रयोग एवं प्रकाशन रूप में किसी भी तरह प्रयोग जो कि संभवती के बिना से हानिकारक हो न किया जाए।		5.1 GENERAL: As per EN10269 Table B.1. The bars can either be rolled or forged provided that the requested mechanical properties are fulfilled. Bars shall be delivered in quenched and tempered condition.																												
		5.2 HEAT-TREATMENT: Hardening: 840 - 880°C /Water, oil or polymer* Tempering: 540 - 680°C Following deviation is also acceptable Quench Hardening: upto 950°C / Air, oil or polymer* Tempering: upto 710°C *In case of polymer quenching the cooling rate shall be comparable to cooling with oil If bars need to be straightened after the heat treatment, a stress relieving treatment shall be performed after completion of the entire straightening process. Stress relieving is to be carried out at 20-50°C below the tempering temperature with a subsequent slow cooling rate.																												
		6.0 PROPERTIES AND TESTS:																												
		6.1 Heat analysis in weight % as per EN10269 except P and S. Exact figures are to be taken from standard.																												
		<table border="1"> <thead> <tr> <th>C</th> <th>Si</th> <th>Mn</th> <th>P</th> <th>S</th> <th>Cr</th> <th>Mo</th> </tr> </thead> <tbody> <tr> <td>0.22 - 0.29</td> <td>≤ 0.40</td> <td>0.60 - 0.90</td> <td>≤ 0.020</td> <td>≤ 0.020</td> <td>0.90 - 1.20</td> <td>0.15 - 0.30</td> </tr> </tbody> </table>				C	Si	Mn	P	S	Cr	Mo	0.22 - 0.29	≤ 0.40	0.60 - 0.90	≤ 0.020	≤ 0.020	0.90 - 1.20	0.15 - 0.30											
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				Gr. NO. 2.60																										

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार)				HW10674																						
		PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)				पृष्ठ का Page 2 of 3																						
नामावली सूची संख्या INVENTORY NO.	SUPERSEDES INVENTORY NO.	6.2 MECHANICAL PROPERTIES: A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test amount shall be 10% of the bars with a minimum of 10 bars. When the lot contains less than 10 bars, all bars shall be tested. The mechanical properties shall be tested on both the softest and hardest bars. The specimens are to be taken in longitudinal (L) direction according to EN10083-1. For bars with diameter (d) or side length (a, b) > 100mm, the specimens shall be taken at a distance d/3 for round bars and a/3, b/3 from the surface for rectangular bars. In this case, transverse specimens (T) are also allowed. The following Mechanical properties shall be achieved at room temperature <table border="1"> <thead> <tr> <th>Diameter (d) Side length (a¹) (mm)</th> <th>0.2% Proof Strength (N/mm²)</th> <th>Tensile Strength (N/mm²)</th> <th>Elongation l₀ = 5d (%)</th> <th>Reduction in area (%)</th> <th>Impact Energy J</th> <th>Hardness HB30</th> </tr> </thead> <tbody> <tr> <td>d, a ≤ 100</td> <td>≥ 440</td> <td>600 - 750</td> <td>≥ 18</td> <td>≥ 60</td> <td>≥ 60²⁾</td> <td>185 - 230</td> </tr> <tr> <td>100 < d, a ≤ 150</td> <td>≥ 420</td> <td>600 - 750</td> <td>≥ 18</td> <td>≥ 60</td> <td>≥ 45²⁾</td> <td>185 - 230</td> </tr> </tbody> </table> ¹⁾ The values of the smallest side length (a) shall be achieved. ²⁾ Average of 3 Charpy V-notch specimens						Diameter (d) Side length (a ¹) (mm)	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation l ₀ = 5d (%)	Reduction in area (%)	Impact Energy J	Hardness HB30	d, a ≤ 100	≥ 440	600 - 750	≥ 18	≥ 60	≥ 60 ²⁾	185 - 230	100 < d, a ≤ 150	≥ 420	600 - 750	≥ 18	≥ 60	≥ 45 ²⁾	185 - 230
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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.		6.3 OUTER AND INNER QUALITY / NON DESTRUCTIVE TESTING: 6.3.1 SURFACE CONDITION: Cracks, other material separation or more severe linear inclusions lines are not acceptable.																										
		6.3.2 SCOPE OF INSPECTION: Following NDE shall be performed in delivery condition: - Material verification inspection of all bars - 100% U.T of all bars according to EN10308 type 1a - 1c (Table 1)																										
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती एलेक्ट्रिकल्स लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण अन्य से किसी भी तरह प्रयोग को किसी भी हानिकारक हो न सके,		6.3.3 CRITERIA FOR REGISTRATION AND DECISION: The acceptance norms for UT inspection shall be quality class 4 as per EN10308 (Table 2). The decision limit for loss of back of echo is 3 dB for all bar dimensions. Any linear or planar indication larger than 10 mm in any direction is not acceptable.																										
		7.0 Test Certificates: The supplier shall supply four copies of test certificates as per EN 10204, certificate 3.1, unless otherwise stated on the order. The test certificates shall bear the following: BHEL References: - Specification no., Purchase orders no. - Suppliers references: Name, emblem, material designation, melt no, Heat-treatment batch no.																										
नामावली सूची संख्या INVENTORY	REV. NO. 02			निर्माणकर्ता WORKED BY	SUBODH RANA		28.01.19																					
				जांचकर्ता CHECKED BY	ASHISH RANJAN		28.01.19																					

दिनांक एवं हस्ताक्षर SIGN & DATE			संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW10674 पृष्ठ का Page 3 of 3	
सामग्री सूची संख्या की अधिकतम संख्या है SUPERSEDES INVENTORY NO		Results of Testing documentation: - Melting process, melt analysis, - Details of Heat-treatment performed, - Mechanical properties, including hardness test results, all individual values shall be reported - U.T result - Result of verification test				
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		8.0 Deviations: Any deviation from this delivery specification has to be reported to BHEL for review. Any deviation is accepted only if this has been approved by BHEL in written form. 9.0 Clearance for Delivery: The total results of the tests carried out are the deciding factor for clearance for delivery. Vendor will be responsible for any deviation observed with respect to ordering specification during further manufacturing at BHEL. 10.0 Packing and Marking: Bars shall be suitably packed to prevent corrosion and damage during transit. Marking of the materials shall be such that heat number, steel grade/specification, size and manufacturer-name/identification are legible. 11.0 Cross Referred Standards: IS: 3739, EN10060, EN10083, EN10269, EN10308, EN10204				
स्वतंत्र अधिकार एवं गोपनीय इस दस्तावेज में दी गई जानकारी भारत भारती लिमिटेड की संपत्ति है इसका प्रयोग एवं प्रसारण के बिना भारत भारती लिमिटेड की लिखित अनुमति के बिना नहीं किया जा सकता						
दिनांक एवं हस्ताक्षर SIGN & DATE						
सामग्री सूची संख्या INVENTORY	REV. NO. 02		निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	SUBODH RANA ASHISH RANJAN	 	28.1.19 28.01.19



संस्थान क्रय विनिर्देश (हीप - हार्डवेयर)

HW 10683

पृष्ठ का
Page 1 Of 5

PLANT PURCHASE SPECIFICATION (HEEP - HARDWARE)

STEEL BARS GRADE X22CrMoV 12-1

1.0 GENERAL:

This specification governs the quality of steel Bars of grade X22CrMoV12-1 according to EN10269 material no. 1.4923.

2.0 APPLICATION:

The Bars shall be used for bolts and coupling bolts of governing components and other turbine components.

3.0 COMPLIANCE WITH NATIONAL / INTERNATIONAL STANDARD:

Based on TLV 9248 / 07, July'2012.

4.0 CONDITION OF DELIVERY:

The bars shall be supplied in quenched and tempered condition (QT1) according to EN10269 table B.1.

5.0 DIMENSION AND TOLERANCES:

Bars shall be supplied to the dimensions specified in BHEL order.

5.1 Length: Unless otherwise specified, hot rolled bars shall be supplied in length of 3 to 6 meters or in multiples with maximum of 10% shorts down to 1 meter.

Forged bars shall be supplied in length of 1.5 meter to 3 meters.

5.2 Tolerance:

5.2.1 Hot Rolled Bars:

The bars shall not vary from specified diameter or distance across flats by more than ± 2.5 %.

5.2.2 Forged Bars:

The tolerance on the forged bars shall be as follows:

Dia. mm	Tolerance. mm
> 50 to 125	+ 6.0
> 125 to 175	+ 8.0
> 175	+ 12.5

Note: (for hot rolled and forged bars)

Insignificant surface defects in the form of dent and ripple marks are permissible provided their depth does not exceed half the tolerance on each side.

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स्वाधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की संपत्ति है। इसका प्रयोग एवं आश्रय के बिना किसी भी तरह से प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किता जाए।

हस्ताक्षर एवं दिनांक

सामग्री सूची संख्या

TSX	B. CHAUDHARY	<i>[Signature]</i>	नाम	दिनांक एवं हस्ताक्षर
MEM-- PSC	VK Chaudhary	<i>[Signature]</i>	NAME	SIGNATURE & DATE
STE	D K Ray	<i>[Signature]</i>	अनुवादक	TRANSLATED BY
QAX	S. AGARWAL	<i>[Signature]</i>	निर्माणकर्ता	WORKED BY
			जांचकर्ता	CHECKED BY
सहमत विभाग	नाम	दिनांक एवं हस्ताक्षर	पर्यवेक्षणकर्ता	SUPERVISED BY
AGREED DEPTT	NAME	DATE & SIGNATURE	T S GOPALKRISHNAN	
			स्वीकृति	संस्थान मानक समिति
			APPROVED :	PLANT STANDARDS COMMITTEE
REV. NO. 03	SUPERSEDES		निर्माण	जारी : मानक विभाग
DI. 21.03.2013			PREPARED : MTE	ISSUED : STANDARDS DIVISION
				दिनांक : 26.07.2007



संस्थान क्रय विनिर्देश (हीप - हर्द्वार)
PLANT PURCHASE SPECIFICATION
(HEEP - HARDWAR)

HW 10683

पृष्ठ का

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SUPERSEDES
INVENTORY NO

सामग्री सूची संख्या
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स्वाधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत भारी इलेक्ट्रिकल्स की सम्पत्ति है। इसका प्रयोग अन्य उद्देश्य के लिए बिना भारत भारी इलेक्ट्रिकल्स की लिखित अनुमति के नहीं किया जा सकता।

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6.0 MANUFACTURE:

The bars shall either be rolled or forged for diameter $\leq 160\text{mm}$ provided that the requested mechanical properties are fulfilled. Bars of diameter greater than 160mm shall be forged.

The steel shall be made as per EN10269.

7.0 HEAT-TREATMENT:

Bars shall be delivered in quenched and tempered condition (QT1) in accordance with EN10269, Table B1.

Quench Hardening: 1020 - 1070° C / air, oil, polymer*, water

Tempering: 680 - 740°C (preferably 710 - 740°C), min. 2 hours

*with a center cooling rate comparable to oil

If bars need to be straightened after heat treatment, stress relieving is mandatory after completion of entire straightening process. The stress relieving shall be carried out at 20-50°C below the tempering temperature with a subsequent slow cooling rate.

8.0 FREEDOM FROM DEFECTS:

The bars shall be free from cracks, laminations, segregation, inclusions and other harmful defects.

9.0 CHEMICAL COMPOSITION:

Heat analysis in weight % in accordance with EN10269.

Element	C	Si	Mn	P	S	Ni	Cr	Mo	V
Min.	0.18	--	0.40	--	--	0.30	11.0	0.80	0.25
Max.	0.24	0.50	0.90	0.025	0.015	0.80	12.5	1.20	0.35

10.0 MECHANICAL PROPERTIES:

A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test amount shall be 10% of the bars with a minimum of 10 bars. When the lot contains less than 10 bars, all bars shall be tested. The mechanical properties shall be tested on softest and hardest bars. The specimens are to be taken in longitudinal direction according to EN10083 -1 after all heat treatments performed.

For bars with diameter (d) or side lengths (a, b) $> 100\text{mm}$, the specimen shall be taken at a distance $d/3$ or $(a/3, b/3)$ from the respective surfaces. In this case, transverse specimens are also allowed.

An impact test shall be performed on bars having side length $\geq 12\text{ mm}$ or diameter $\geq 16\text{mm}$ respectively.

REV. 03

निर्माणकर्ता

PANKAJ

Worked by

AGARWAL

जांचकर्ता

ASHISH RANJAN

Checked by

Pankaj 21/3/13

Ashish Ranjan 21/3/13



संस्थान क्रय विनिर्देश (हीप - हार्डवार)

HW 10683

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The following Mechanical properties shall be achieved at room temperature

0.2% yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	%Elongation (l ₀ =5d)		%Reduction in area		Impact energy (J) **		Hardness HB30
		Long.	Trans.	Long.	Trans.	Long.	Trans.	
≥ 600	800-950	≥ 14	≥ 11	≥ 40	≥ 25	≥ 27	≥ 15	245-290

** Average of 3 Charpy V-notch specimens, Minimum Value: Longitudinal = 19J, Transverse = 15J

11.0 OUTER AND INNER QUALITY / NDE:

11.1 SURFACE CONDITION: Cracks and other material separation or more severe linear inclusions lines are only acceptable when located in the dimensional tolerances area.

11.2 SCOPE OF INSPECTION:

Following NDE shall be performed in delivery condition:

- Material identity check on all bars
- Complete ultrasonic inspection (UT) of all bars ≥ 30 mm thickness/diameter according to EN 10308 type 1a-1c (Table 1)

11.3 Criteria for registration and decision

Regarding the UT inspection, the following quality classes in accordance with EN10308 (Table 2) shall be applied depending on the diameter (d) or side length (a,b):

- d or (a,b) ≤ 200 mm: quality class 4
- d or (a,b) > 200 mm: quality class 3

The decision limit for backwall echo loss is 3dB for all bar dimensions. No linear or planar indication larger than 10mm in any direction is acceptable.

This quality requirement applies also for bars with diameter d or side length (a,b) < 30 mm. This does not need to be proved by testing.

12.0 PROCESS QUALIFICATION:

12.1 General

Product and process qualification procedures must be conducted for first order. The scope of such product and process qualification (stipulation of additional detailed requirements) has to be defined in coordination and agreement with the BHEL directly after receipt of the order. Such product and process qualification is required for each of the manufacturer's fabrication sites involved.

Depending on the complexity of the product and/or process and the experience from the first order, additional product and process qualification procedures may have to be implemented for subsequent orders.

REV. 03

निर्माणकर्ता Worked by	PANKAJ AGARWAL	Pankaj	21/3/13
जांचकर्ता Checked by	ASHISH RANJAN	A.Ranjana	21/3/13

SIGN & DATE

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स्वत्वधिकार एवं गोपनीय

इस प्रलेख में दी गई जानकारी भारत भारी इलेक्ट्रिकल्स लि. की संपत्ति है। इसका प्रयोग को अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो बि. एच. ई. लि. में हितकारी हो, न किया जाए।

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सामग्री सूची संख्या
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P-2185



PLANT PURCHASE SPECIFICATION

(HEEP - HARDWAR)

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इस प्रलेख में दी गई सूचना भारत हेतु इन्फॉर्मेटिव लक्ष्य की सम्पत्ति है इसका प्रारक्षण एवं अप्रत्यक्ष रूप से विपरी भी तरह प्रयोग, जो कि व्यक्ति को हित में हासिलकर हो न किया जाए

हस्तक्षर एवं दिनांक

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सामग्री सूची संख्या

INVENTORY NO.

Prior to the start of manufacturing, the manufacturer has to submit a manufacturing and testing plan to BHEL in which the quality assured process workflow, i.e. the sequence of process activities (manufacturing, testing and inspection steps) are specified in chronological order. The internal and external codes, standards, drawings, specifications and records applied to each sub process step must be noted along with the information about the equipment and test and inspection scopes used and, where related, any related subcontracting.

BHEL may inspect/review supplier internal documents also.

If any change in the manufacturing and testing process is required, prior approval from BHEL is to be taken. Depending on the type and scope and thus the significance of any given change, BHEL will decide whether it is necessary to requalify the product and/or process.

Subcontracting of process steps to sub suppliers is only allowable given express written agreement and approval by the purchaser.

12.2 The following additional tests have to be performed during qualification:

12.2.1 Tensile tests at elevated temperature

In accordance with EN 10002-5 a tensile test (in the same direction as at room temperature) has to be performed at 600°C.

The following properties must be achieved:

0.2% Yield Strength $\geq$ 205MPa,

Tensile Strength ≥ 300 MPa,

Elongation (%) $\geq$ 20,

Reduction in area (%) ≥ 65

12.2.2 Microstructure Examination

The homogeneity of the microstructure has to be checked and documented by micro section. The microstructure must be uniform and free from porosity, excessive segregation and other inhomogeneities.

A Delta ferrite content $< 5\%$ is acceptable.

The inclusion content has to be determined in accordance with ASTM E45.

The grain size must be measured after all heat treatments have been performed.

In accordance with ASTM E 112 or ISO 643 grain size 4 or finer must be achieved. A deviation from the average grain size of more than 2 grain sizes is not permissible.

13.0 MARKING:

The marking of the materials shall be such that heat no., steel quality & manufacturer name / identifications are legible.

REV. 03

निर्माणकर्ता

Worked by

PANKAJ

AGARWAL

जांचकर्ता

ASHISH RANJAN

Pankaj

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Arupai

21/3/13



संस्थान क्रय विनिर्देश (हीप - हार्डवेयर)
PLANT PURCHASE SPECIFICATION
(HEEP - HARDWAR)

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को अधिकारित करता है । INVENTORY NO

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स्वत्वाधिकार एवं गोपनीय

इस प्रारूप में दी गई सूचना भारत भारी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं प्रसारण केवल ही भेल द्वारा ही किया जा सकता है अन्यथा इसका प्रयोग करने वाले को भारी इलेक्ट्रिकल्स से नुकसान हो सकता है।

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14.0 TEST CERTIFICATES:

The supplier shall supply four copies of test certificates as per EN 10204, certificate 3.1 B, unless otherwise stated on the order. The test certificates shall bear the following:

BHEL References:

- Specification no., Purchase orders no.

Supplier's references:

- Name, emblem, material designation, melt no, Heat-treatment batch no.

Results of Testing:

- Melting process, melt analysis,
- Dimension reports
- Mechanical properties, all individual values shall be reported
- Heat-treatment details,
- U.T result
- Confirmation of the material identity check

15.0 CLEARANCE FOR DELIVERY:

The total results of the tests carried out are the deciding factor for clearance for delivery. BHEL shall evaluate the total results taking into consideration the intended use of the material and examines accordingly the permissibility of deviation (if any) from the specified properties.

The clearance however does not relieve the supplier of his responsibility for the hidden non-permissible defects, which are found later.

16.0 CROSS REFERRED STANDARDS:

EN 10083-1, EN10204, EN10269, EN10308, EN10002-5, ASTM E45, ASTM E112, ISO 643.

REV. 03

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21/3/13

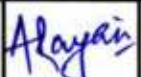
जांचकर्ता
Checked by

ASHISH RANJAN

Ashish

21/3/13

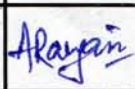
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सुपरसेड्स INVENTORY मशीन नं. एवं संख्या TLV9165/01, Apr'08	HEAT RESISTANT STEEL BARS GRADE 10CrMo9-10																										
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	1.0 GENERAL: This specification governs the requirement of hot rolled or forged steel bars of grade 10CrMo9-10 according to EN10273, material no 1.7380																										
	2.0 APPLICATION: The Bars shall be used for manufacture of bolts, bushes and similar type of components.																										
	3.0 CONDITION OF DELIVERY: The bars shall be supplied in heat-treated condition.																										
	4.0 DIMENSION AND TOLERANCES: The dimensions shall be as per purchase order. The tolerance on the forged / rolled bars shall be as per IS: 3739, Grade 2 / EN10060. Negative tolerance is not acceptable.																										
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REV.NO. 04- Dt. 07-10-2018 CHANGE ADVICE NO. MTE-TSX-18-109		जारी ISSUED : TSX दिनांक DATE : 25-01-12																									

निर्माण करने वाला SIGN & DATE SUPERSEDES INVENTORY NO मशीन नंबर और अवधि वन है		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW10685 पृष्ठ का Page 2 of 3																																					
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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.		<table border="1"> <thead> <tr> <th>Diameter (d) (mm)</th> <th>Yield Strength (N/mm²)</th> <th>Tensile Strength (N/mm²)</th> <th>Elongation l₀ = 5d (%)</th> <th>Impact Energy J</th> <th>Hardness HB30</th> </tr> </thead> <tbody> <tr> <td>d ≤ 16</td> <td>≥ 310</td> <td>480 - 630</td> <td>≥ 18</td> <td>≥ 40¹</td> <td>155 - 205</td> </tr> <tr> <td>16 < d ≤ 40</td> <td>≥ 300</td> <td>480 - 630</td> <td>≥ 18</td> <td>≥ 40¹</td> <td>155 - 205</td> </tr> <tr> <td>40 < d ≤ 60</td> <td>≥ 290</td> <td>480 - 630</td> <td>≥ 18</td> <td>≥ 40¹</td> <td>155 - 205</td> </tr> <tr> <td>60 < d ≤ 100</td> <td>≥ 270</td> <td>470 - 620</td> <td>≥ 17</td> <td>≥ 40¹</td> <td>150 - 200</td> </tr> <tr> <td>d > 100</td> <td>≥ 250</td> <td>460 - 610</td> <td>≥ 17</td> <td>≥ 40¹</td> <td>145 - 195</td> </tr> </tbody> </table>				Diameter (d) (mm)	Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation l ₀ = 5d (%)	Impact Energy J	Hardness HB30	d ≤ 16	≥ 310	480 - 630	≥ 18	≥ 40 ¹	155 - 205	16 < d ≤ 40	≥ 300	480 - 630	≥ 18	≥ 40 ¹	155 - 205	40 < d ≤ 60	≥ 290	480 - 630	≥ 18	≥ 40 ¹	155 - 205	60 < d ≤ 100	≥ 270	470 - 620	≥ 17	≥ 40 ¹	150 - 200	d > 100	≥ 250	460 - 610	≥ 17	≥ 40 ¹	145 - 195
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8.0 OUTER AND INNER QUALITY / NON DESTRUCTIVE TESTING:																																									
8.1 SURFACE CONDITION: Cracks, other material separation or more severe linear inclusions lines are not acceptable.																																									
8.2 SCOPE OF INSPECTION: Following NDE shall be performed in delivery condition: - Verification inspection of all bars - 100% U.T of all bars with diameter d ≥ 30 according to EN10308 type 1a - 1c (table 1)																																									
8.3 CRITERIA FOR REGISTRATION AND DECISION: Acceptance quality class according to EN10308 (table 2), depending on diameter • d ≤ 200 mm: quality class 4 • d > 200 mm: quality class 3 The decision limit for back wall echo is 3 dB. Any linear or surface in-homogeneity larger than 10 mm in any direction is not acceptable. This quality requirement applies also for bars having d < 30mm, although it is not necessary to prove by testing.																																									
निर्माण करने वाला SIGN & DATE 05/10/18	REV. NO. 04-	निर्माणकर्ता WORKED BY S. RANA			05.10.2018																																				
		जांचकर्ता CHECKED BY A. RANJAN			05.10.2018																																				
मशीन नंबर और INVENTORY P-2229																																									

SIGNATURE SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW10685	
				पृष्ठ Page 3	का of 3
SUPERSEDES INVENTORY NO	9.0 MARKING: The marking of the materials shall be such that heat no., steel grade/specification and manufacturer name / identifications are legible.				
मशीन की सूची में mentioned in the list	10.0 TEST CERTIFICATES: The supplier shall supply four copies of test certificates as per EN 10204, certificate 3.1 B, unless otherwise stated on the order. The test certificates shall bear the following: - BHEL References: - Specification no., Purchase orders no. - Suppliers references: Name, emblem, material designation, melt no, Heat-treatment batch no. - Melting process, melt analysis - Details of Heat-treatment performed, Results of Testing: - Mechanical properties including hardness results, all individual values shall be reported - U.T result - Confirmation of the verification inspection				
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 CLEARANCE FOR DELIVERY: The total results of the tests carried out are the deciding factor for clearance for delivery. BHEL shall evaluate the total results taking into consideration the intended use of the material and examines accordingly the permissibility of deviation (if any) from the specified properties. The clearance however does not relieve the supplier of his responsibility for the hidden non-permissible defects, which are found later.				
	12.0 CROSS REFERRED STANDARDS: EN10273, IS: 3739, EN10060, EN 10308, EN10204				
स्वयंसाधक एवं सौजन्य स्वयंसाधक एवं सौजन्य इस प्रमाण पत्र में दी गई जानकारी केवल सूचना के लिए है। इसका उपयोग किसी भी प्रकार से नहीं किया जाना चाहिए। This information is for your reference only. It must not be used directly or indirectly in any way detrimental to the interest of the company.	दिनांक एवं तिथि SIGN & DATE 				
मशीन की सूची में INVENTORY P-2229	REV. NO. 04-		निर्माणकर्ता WORKED BY S. RANA		05.10.2018
			जांचकर्ता CHECKED BY A. RANJAN		05.10.2018

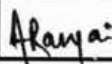
दिनांक एवं हस्ताक्षर SIGN & DATE				संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW10760 पृष्ठ का Page 1 of 3																	
सुपरसेड्स INVENTORY NO.		TLV9239 02, April'05		STEEL BARS OF GRADE X5CrNiCuNb16-4																			
मातृगी मूची संख्या की अधिकतम करता है		TLV9239 02, April'05		1.0 GENERAL: The specification governs the quality of steel bars of material grade X5CrNiCuNb16-4 (Material no. 1.4542).																			
				2.0 APPLICATION: For turbine components.																			
				3.0 CONDITION OF DELIVERY: Rolled/Forged and heat treated																			
				4.0 DIMENSION AND TOLERANCES: The dimensions shall be as per purchase order. The tolerance on the forged/rolled bars shall be as per IS: 3739, Grade 2 / EN10060. Negative tolerance is not acceptable.																			
				5.0 MANUFACTURING: Steel shall be produced by remelting of self-consuming electrodes (e.g. Electro slag-remelted (ESR) or a consumable electrode vacuum melting (CEVM).																			
				6.0 HEAT TREATMENT: The bars shall be heat treated to get desired mechanical properties as per Clause 8.0. Solution annealing: ≥ 60 minutes at 1020-1050°C, air cooling to bring below 30°C. Intermediate annealing: ≥ 60 minutes at 820-850°C, air cooling to bring below 30°C. Precipitation Hardening: ≥ 120 minutes at 530-560°C. The duration of precipitation hardening, as well as the controlled cooling rate, are to be chosen to achieve minimum residual stress. If the bars are to be straightened after heat treatment, stress relieving is mandatory after completion of overall straightening process. Stress relieving operation is to be performed at 10-20°C below the precipitation hardening temperature, followed by slow cooling rate.																			
				7.0 CHEMICAL COMPOSITION Heat analysis in weight %shall be as follows (Modified compared to EN10088-3):																			
		<table><tr><td>C</td><td>≤ 0.05</td><td>Si</td><td>0.10 – 0.35</td><td>Mn</td><td>0.30 – 0.60</td></tr><tr><td>P</td><td>≤ 0.025</td><td>S</td><td>≤ 0.005</td><td>Cr</td><td>15.0 – 16.0</td></tr><tr><td>Ni</td><td>4.2 – 5.0</td><td>Cu</td><td>3.0- 3.7</td><td>Nb</td><td>0.20-0.35</td></tr></table>		C	≤ 0.05	Si	0.10 – 0.35	Mn	0.30 – 0.60	P	≤ 0.025	S	≤ 0.005	Cr	15.0 – 16.0	Ni	4.2 – 5.0	Cu	3.0- 3.7	Nb	0.20-0.35		
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Ni	4.2 – 5.0	Cu	3.0- 3.7	Nb	0.20-0.35																		
		Slight deviation in chemical composition is permissible only after agreement with BHEL, provided service properties are not affected.																					
दिनांक एवं हस्ताक्षर SIGN & DATE		TSX PSC QAX STE		D. GANGWAL G. KRISHNAN U. K. PANDA D. K. RAY		नाम NAME																	
मातृगी मूची संख्या INVENTORY NO.		AGREED DEPTT.		नाम NAME		DATE & SIGNATURE																	
				स्वीकृति APPROVED : PLANT STANDARDIZATION COMMITTEE		Gr. NO. 2.60																	
		REV.NO. Dt. CHANGE ADVICE NO.		00 09.09.18		निर्माण PREPARED : MTE																	
				जाड़ी ISSUED : TSX		दिनांक DATE : 06.09.2018																	

चिह्नक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार)		HW10760													
		PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		पृष्ठ का Page 2 of 3													
सुपेसेड INVENTORY NO.	8.0 MECHANICAL PROPERTIES The specimens are to be taken in longitudinal (L) direction according to EN10083-1. For bars with diameter (d) or side length (a, b) > 100mm, the specimens shall be taken at a distance d/3 for round bars and a/3, b/3 from the surface for rectangular bars. In this case, transverse specimens (T) are also allowed. A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test amount shall be 10% of the bars with a minimum of 10 bars. When the lot contains less than 10 bars, all bars shall be tested. The mechanical properties shall be tested on both the softest and hardest bars. <u>If raw parts are to be manufactured from forged bar, which is forged to different diameters, the following requirements shall be met:</u> For a ratio of up to 1.25 (according to EN10269, clause 10.1.2) between the diameter of the taper shank and the shaft section of valve stem, the testing of mechanical properties is to be done only on bigger diameter In case of a ratio of diameter > 1.25, mechanical properties shall be tested on all diameters. The following mechanical properties shall be achieved at room temperature.																
नमूने की सूची संख्या को अधिकृत करना है	<table border="1"> <thead> <tr> <th>0.2% Proof stress (N/mm²)</th> <th>Tensile strength (N/mm²)</th> <th>Elongation (l₀=5d₀) (%)</th> <th>Reduction in area (%)</th> <th>Impact values (Joule)</th> <th>Brinell hardness (HBW)</th> </tr> </thead> <tbody> <tr> <td>930-1000</td> <td>≤ 1040</td> <td>≥ 13</td> <td>≥ 50</td> <td>≥ 100*</td> <td>295-335</td> </tr> </tbody> </table> * Average of 3 ISO-V specimens. Minimum value for two specimens as per EN10021, where the lowest value shall be at least 70 J.					0.2% Proof stress (N/mm ²)	Tensile strength (N/mm ²)	Elongation (l ₀ =5d ₀) (%)	Reduction in area (%)	Impact values (Joule)	Brinell hardness (HBW)	930-1000	≤ 1040	≥ 13	≥ 50	≥ 100*	295-335
	0.2% Proof stress (N/mm ²)	Tensile strength (N/mm ²)	Elongation (l ₀ =5d ₀) (%)	Reduction in area (%)	Impact values (Joule)	Brinell hardness (HBW)											
930-1000	≤ 1040	≥ 13	≥ 50	≥ 100*	295-335												
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	9.0 MICROSTRUCTURE The microstructure must be uniform and free from extensive segregation and other inhomogeneities. The following properties shall be achieved: - Grain size 4 or finer per ASTM E 112 or ISO 643. A deviation from the average grain size of more than 2 grain sizes is not permissible. - Delta ferrite content: < 1% (Determined in a manner consistent with the evaluation technique described in ASTM E45 Method A, "Worst field method" at V=100:1, specimen orientation: longitudinal). The distribution and size of delta ferrite must be such that it does not result in indication in magnetic particle testing of the ready-machined surface. Use of other test methods (e.g. AMS 2315) may be approved by the purchaser after the supplier had made comparative examinations with the given examination method and if a calibration curve exists. - Inclusion content in a manner consistent with ASTM E45/Method A "Thin series" inclusions: Type A, C max 1, Type B, D max 1.5 "Heavy series" inclusions: Type A, C: max 0.5 Type B, D: max 1 - Inclusions, that exceed the size given in ASTM E45 have to be given in the Test Certificate. Of the globular inclusion type (type D) 4 bigger inclusions up to 50µm are allowed on the area of 320 mm².																
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत हीवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है। इसका प्रयोग एवं अवलोकन केवल सूचित उद्देश्य के लिए ही किया जाना है। बिना अनुमति के इस सूचना को किसी भी प्रकार से प्रसारित, प्रकाशित, या किसी भी प्रकार से प्रतिलिपि बनाना या किसी भी प्रकार से प्रसारित करना गैर कानूनी है।	निम्नलिखित पर हस्ताक्षर SIGN & DATE																
नमूने की सूची संख्या INVENTORY NO.	REV. 00	निर्माणकर्ता WORKED BY	S.RANA		06.09.2018												
		जांचकर्ता CHECKED BY	A. RANJAN		06.09.2018												

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार)		HW10760		
		PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		पृष्ठ का Page 3 of 3		
SUPERSEDES INVENTORY	10.0 NON DESTRUCTIVE TESTING 10.1 Surface condition: Cracks, other material separation or more severe linear inclusions lines are only acceptable when located in the dimensional tolerances area. 10.2 Scope of inspection Following NDE shall be performed in delivery condition: - Visual inspection - Verification inspection of all bars - 100 % U.T. of all bars with diameter $30 \leq d \leq 500$ mm according to EN 10308 type 1a – 1c (table 1) 10.3 Criteria for registration and decision: For ultrasonic inspection following quality classes according to EN 10308 (table 2) shall be applied depending upon the diameter (d) or side length (a, b): - d or (a, b) ≤ 200 mm: Quality class 4 The decision limit for loss of back wall echo is 3 dB for all bar dimensions. Any linear or surface like inhomogeneity larger than 10mm in any direction is not acceptable. This quality requirement applies also for bars having diameter <30mm, although it to not necessary to prove by testing. Regarding forged bars with two different diameters, a 45° - transducer shall be used for sectional variations over the entire 360°. Defects that will be cut during final machining shall be evaluated individually. 11.0 TEST CERTIFICATES The supplier shall supply four copies of the test certificate 3.1 as per EN10204 unless and otherwise stated on the order. The test certificate shall bear the following information's: BHEL REFERENCE • Specification no. • Order no. SUPPLIER'S REFERENCE • Name, emblem, material designation, melt no. Heat treatment batch no. TEST RESULTS: • Melt analysis, details of steel melting process, heat number • Mechanical properties, all individual values shall be reported • Details of heat treatment performed • Dimension Report • U.T. result • Confirmation of the verification inspection 12.0 MARKING The marking of the materials shall be such that heat no, steel grade, specification no., manufacturer identifications are legible. 13.0 CROSS REFERRED STANDARDS IS 3739, EN 10060, EN 10088-3, EN10269, EN 10021, ASTM E 112, ISO 643, ASTM E45, AMS 2315, EN 10308-1, EN10204					
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		स्वत्वाधिकार एवं गोपनीय इस प्रलेख में की गई सूचना भारत भारती एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है, इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि संपत्ती के हित में हानिकारक हो न किया जाए।				
दिनांक एवं हस्ताक्षर SIGN & DATE						
नामची सूची संख्या INVENTORY NO.	REV. 00		निर्माणकर्ता WORKED BY	S.RANA		06.09.2018
			जांचकर्ता CHECKED BY	A. RANJAN		06.09.2018

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (डीप - हार्डवार) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)	HW 10784 पृष्ठ का Page 1 of 4																																								
सामग्री सूची संख्या को INVENTORY NO. TLV9384/01	दिनांक एवं हस्ताक्षर SIGN & DATE Nov. 2002	AUSTENITIC ALLOY STEEL BAR (ROUNDS & FLATS) (X 40 MnCrN19K)																																									
1. GENERAL: This specification governs the requirements of cold drawn steel bars of grade X40MnCrN19K (Material No.: 1.3813) round and flats.																																											
2. APPLICATION: The steel bar shall be used for manufacture of tension bolts, press fingers etc.																																											
3. DIMENSIONS & TOLERANCE: 3.1 The dimensions of the bar shall be stated on the order. 3.2 The tolerances shall be as per Annexure - I.																																											
4. MANUFACTURE: The bars can either be rolled or forged provided that the required mechanical properties in cold drawn condition are fulfilled.																																											
5. CHEMICAL COMPOSITION: The material shall conform to the chemical composition shall be as follows:																																											
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Carbon</th> <th>Silicon</th> <th>Manganese</th> <th>Chromium</th> <th>Nitrogen</th> <th>Sulphur</th> <th>Phosphorus</th> </tr> <tr> <td>0.30-0.50</td> <td>≤ 0.50</td> <td>18.0-20.0</td> <td>3.00-5.00</td> <td>0.080-0.120</td> <td>≤ 0.015</td> <td>≤ 0.050</td> </tr> </table>				Carbon	Silicon	Manganese	Chromium	Nitrogen	Sulphur	Phosphorus	0.30-0.50	≤ 0.50	18.0-20.0	3.00-5.00	0.080-0.120	≤ 0.015	≤ 0.050																										
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6. MECHANICAL PROPERTIES: A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test amount shall be 10% of the bars with a minimum of 10 bars. When the lot consists of less than 10 bars all bars shall be tested. The mechanical properties are to be determined on both the hardest and softest bar for each melt and heat treatment batch. The specimen is to be taken in longitudinal direction from centre of the bars. 0.2% Proof stress and tensile strength shall be determined on each and every cross-section.																																											
सामग्री सूची संख्या INVENTORY NO. P-2230	दिनांक एवं हस्ताक्षर SIGN & DATE 21.5.10	दिनांक एवं हस्ताक्षर SIGNATURE & DATE <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:20%;">TSX</td> <td style="width:20%;">B. CHOUDHARY</td> <td style="width:20%;">[Signature]</td> <td style="width:20%;">20/05/10</td> <td style="width:20%;">अनुवादक</td> <td style="width:20%;">TRANSLATED BY</td> <td style="width:20%;"></td> <td style="width:20%;"></td> </tr> <tr> <td>IPSC</td> <td>V. K. Chauhan</td> <td>[Signature]</td> <td>21/5/10</td> <td>निर्माणकर्ता</td> <td>WORKED BY</td> <td>SKumar</td> <td>[Signature] 5/5/10</td> </tr> <tr> <td>STE</td> <td>D. K. Ravi</td> <td>[Signature]</td> <td>19.05/10</td> <td>जांचकर्ता</td> <td>CHECKED BY</td> <td>Ashish</td> <td>[Signature] 5/5/10</td> </tr> <tr> <td>QAX</td> <td>N. K. Manwani</td> <td>[Signature]</td> <td>10.5.10</td> <td>पर्यवेक्षणकर्ता</td> <td>SUPERVISED BY</td> <td>JP MEENA</td> <td>[Signature] 18/5/10</td> </tr> <tr> <td>सहमत विभाग AGREED DEPT.</td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर DATE & SIGNATURE</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		TSX	B. CHOUDHARY	[Signature]	20/05/10	अनुवादक	TRANSLATED BY			IPSC	V. K. Chauhan	[Signature]	21/5/10	निर्माणकर्ता	WORKED BY	SKumar	[Signature] 5/5/10	STE	D. K. Ravi	[Signature]	19.05/10	जांचकर्ता	CHECKED BY	Ashish	[Signature] 5/5/10	QAX	N. K. Manwani	[Signature]	10.5.10	पर्यवेक्षणकर्ता	SUPERVISED BY	JP MEENA	[Signature] 18/5/10	सहमत विभाग AGREED DEPT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE					
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स्वीकृति : संस्थान मानक समिति APPROVED : PLANT STANDARDS COMMITTEE Rev 03 REAFFIRMED 19.12.10																																											
सामग्री सूची संख्या INVENTORY NO. P-2230		दिनांक एवं हस्ताक्षर SIGNATURE & DATE 21.5.10	दिनांक एवं हस्ताक्षर SIGNATURE & DATE 24.3.81																																								

शमी घुडी संख्या INVENTORY NO. P-2230	हस्ताक्षर एवं तिथि SIGN & DATE 21-5-10	स्वत्वधिकार एवं गोपनीय इस प्रलेख में की गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	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	शमी घुडी संख्या को अधिकृतित करता है SUPERSEDES INVENTORY NO.	निष्ठा एवं हस्ताक्षर SIGN & DATE	संस्थान क्रय विनिर्देश (हीप - हार्डवयर) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)	HW 10784 पृष्ठ का Page 2 of 4												
Following properties shall be achieved at room temperature: <table border="0"> <tr> <td>0.2 % Proof Stress:</td> <td>≥ 500 N/mm²</td> </tr> <tr> <td>Tensile Strength:</td> <td>850 – 1250 N/mm²</td> </tr> <tr> <td>Elongation (l₀=5d) (%):</td> <td>≥ 20%</td> </tr> <tr> <td>Reduction in area:</td> <td>≥ 35%</td> </tr> <tr> <td>Impact Energy (J):</td> <td>≥ 90 *</td> </tr> <tr> <td>Hardness (HB30):</td> <td>260 - 360</td> </tr> </table> *Average of 3 Charpy V-notch specimens								0.2 % Proof Stress:	≥ 500 N/mm ²	Tensile Strength:	850 – 1250 N/mm ²	Elongation (l ₀ =5d) (%):	≥ 20%	Reduction in area:	≥ 35%	Impact Energy (J):	≥ 90 *	Hardness (HB30):	260 - 360
0.2 % Proof Stress:	≥ 500 N/mm ²																		
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Reduction in area:	≥ 35%																		
Impact Energy (J):	≥ 90 *																		
Hardness (HB30):	260 - 360																		
7. NON DESTRUCTIVE TEST:																			
7.1 Scope of inspection: Following NDT shall be performed in delivery condition for all bars • Verification Test • Complete ultrasonic inspection (UT) according to EN 10308 type 1a-1c (table1) • Liquid penetrate test according to EN 10228-2 or according to any other technique that guarantees achieving the requested registration and decision criteria																			
7.2 Criteria for Registration and decision.																			
7.2.1 UT Inspection Regarding UT inspection quality class 3 according to EN 10308 (table 3) shall be the acceptable norms. The decision limit for loss of back wall echo is 3 dB for all bar dimensions. Any linear or surface- like in homogeneity larger than 10mm in any direction is not accepted.																			
7.2.2 Surface crack inspection Quality class 4 according to EN 10228-2 (table 1) shall be applied.																			
8.0 TEST CERTIFICATES: The supplier shall furnish four copies of test certificates unless and otherwise stated on the order:																			
8.1 BHEL'S Reference Purchase Order Specification Number																			
8.2 Supplier's Reference: Name or emblem of the supplier Material Designation Melt No. Steel melting process Complete detail of heat – treatment																			
8.3 Results of Testing																			
8.3.1 Chemical Analysis																			
8.3.2 Mechanical Properties. All individual values are to be given.																			
8.3.3 Type and results of non-destructive testing and final surface inspection.																			
8.3.4 Verification test Confirmation																			
Rev 03																			
निर्माणकर्ता WORKED BY SKumar		जांचकर्ता CHECKED BY JPMena		17/5/10		17/5/10													

निम्नक एवं हस्ताक्षर SIGN & DATE:				संस्थान क्रय विनिर्देश (हीप - हार्डवेयर) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)		HW 10784 पृष्ठ का Page 3 of 4	
श्रमपत्री सूची संख्या INVENTORY NO		सुपरसेडिज INVENTORY NO		8.4 <u>Dimensional Results:</u> 8.4.1 Diameter, Length, Straightness of rounds. Length, Width, Height, Straightness, and Twist of flats. 8.4.2 100% dimensional checking by supplier and reporting 10% for actual dimension in TC.			
श्रमपत्री सूची संख्या को अधिकतम बना दें		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.		9. CLEARANCE FOR DELIVERY: The total results of all the tests carried out are decisive for clearance for delivery. BHEL evaluates the total results taking into consideration the intended use of material and examines accordingly the permissibility of deviation (if any) from the specified properties. The clearance, however, does not relieve the supplier of his responsibilities for the hidden/ unreported non-permissible defects which are found at latter.			
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।		10.0 PACKING AND MARKING: 10.1 All bars shall be marked with the supplier's identification, material designation and melt number. The marking shall be clearly punched and bordered with oil paint. 10.2 The bars shall be suitably packed and protected against corrosion and damage during transportation.		11.0 CROSS REFERRED STANDARD: EN 10228 -2, EN 10308			
श्रमपत्री सूची संख्या INVENTORY P-2230		हस्ताक्षर एवं दिनांक SIGN & DATE 21/5/10		Rev 03			
				निर्माणकर्ता WORKED BY SKumar		 5.5.10	
				जांचकर्ता CHECKED BY Ashish		 5.5.10	



संस्थान क्रय विनिर्देश (हीप - हार्डवेयर)
PLANT PURCHASE SPECIFICATION
(HEEP - HARDWAR)

HW 10784

पृष्ठ का

Page 4 of 4

Annexure-I

I. FOR ROUND BARS:

1. Tolerance on round bars shall be as follows:

DIAMETER (MM)	PERMISSIBLE TOLERANCE
UPTO 1.6	-0.050
1.7 to 3.0	-0.060
3.2 to 6.0	-0.075
6.3 to 10.0	-0.090
10.3 to 18.0	-0.110
18.3 to 30.0	-0.130
32.0 to 50.0	-0.160
52.0 to 80.0	-0.190
85.0 to 120.0	-0.220

2. TOLERANCE ON STRAIGHTNESS: ± 0.50 mm/ Meter

II. FOR FLAT BARS :

1. Tolerance on flat bars shall be as follows: :

SIZE (mm)	WIDTH (mm)	HEIGHT (mm)	LENGTH (mm)
42X25	25 ± 0.5	42 ± 1	630(+10,-0)

2. TOLERANCE ON STRAIGHTNESS : ± 0.25 mm/ Meter

3. TWISTING TOLERANCE : ± 0.25 mm/ Meter

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स्वत्वाधिकार एवं गोपनीय

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

निर्माण एवं संशोधन
SIGN & DATE

सामग्री सूची संख्या
INVENTORY

21-5-10

P-2230

Rev 03

निर्माणकर्ता
WORKED BY

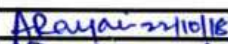
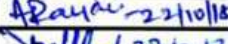
SKumar

5.5.10

जांचकर्ता
CHECKED BY

Ashish

5.5.10

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW18813																														
				पृष्ठ का Page 1 of 3																														
सुपरसेड्स INVENTORY NO.	TLV9123 43, March 12	STEEL BARS GRADE 26NiCrMoV14-5																																
1.0 GENERAL: This specification governs the quality of steel Bars of grade 26NiCrMoV14-5, material number 1.6957 as per EN10269. As an alternate 26NiCrMo14-6, material number 1.6958 can also be used instead of 26NiCrMoV14-5 provided that the requirements of this specification is fulfilled.																																		
2.0 APPLICATION: The Bars shall be used for coupling bolts of turbine and generator.																																		
3.0 CONDITION OF DELIVERY: Rolled / forged and heat treated.																																		
4.0 DIMENSION AND TOLERANCES: The dimensions shall be as per purchase order. The tolerance on the forged / rolled bars shall be as per IS: 3739, Grade 2 / EN10060. Negative tolerance is not acceptable.																																		
5.0 MANUFACTURE: Degassed, e.g. vacuum degassed steel shall be used. The bars can either be rolled or forged provided that the requested mechanical properties are fulfilled.																																		
6.0 HEAT-TREATMENT: Hardening: 840 - 870°C/Water, oil or polymer* Tempering: 530 - 620°C at least 2 hours / air *In case of polymer the cooling rate shall be comparable to cooling with oil. If bars need to be straightened after the heat treatment, a stress relieving treatment shall be performed after completion of the entire straightening process. Stress relieving is to be carried out at 20-50°C below the tempering temperature with a subsequent slow cooling rate.																																		
7.0 CHEMICAL COMPOSITION: Heat analysis is weight %																																		
<table border="1"> <thead> <tr> <th>C</th> <th>Si</th> <th>Mn</th> <th>P</th> <th>S</th> <th>Cr</th> <th>Mo</th> </tr> </thead> <tbody> <tr> <td>0.22 - 0.32</td> <td>≤ 0.30</td> <td>0.15 - 0.40</td> <td>≤ 0.010</td> <td>≤ 0.010</td> <td>1.20 - 1.80</td> <td>0.25 - 0.45</td> </tr> <tr> <th>Ni</th> <th>V</th> <td colspan="5"></td> </tr> <tr> <td>3.40 - 4.00</td> <td>0.05 - 0.15</td> <td colspan="5"></td> </tr> </tbody> </table>							C	Si	Mn	P	S	Cr	Mo	0.22 - 0.32	≤ 0.30	0.15 - 0.40	≤ 0.010	≤ 0.010	1.20 - 1.80	0.25 - 0.45	Ni	V						3.40 - 4.00	0.05 - 0.15					
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3.40 - 4.00	0.05 - 0.15																																	
दिनांक एवं हस्ताक्षर SIGN & DATE	TSX PSC QAX STE	D. GARGWAR G. KRISHNAN U. K. PANDA D K RAY	अनुवादक TRANSLATED BY निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY पर्यवेक्षककर्ता SUPERVISED BY	नाम NAME ASHISH RANJAN ASHISH RANJAN GOPAL KRISHNAN	दिनांक एवं हस्ताक्षर SIGNATURE & DATE   																													
सुपरसेड्स INVENTORY NO.	P-4097	स्वीकृति संस्थान मानकीकरण समिति APPROVED : PLANT STANDARDIZATION COMMITTEE निर्माण PREPARED : MTE जारी ISSUED : TSX दिनांक DATE : 25.04.2011																																
ग्र. नं. Gr. NO.		2.60																																
CHANGE ADVICE NO.		TSX(MTE)-18-123																																

दिनांक एवं समय SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार)		HW18813															
		PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		पृष्ठ का Page 2 of 3															
सुपरसेडस INVENTORY NO	8.0 MECHANICAL PROPERTIES: A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test amount shall be 10% of the bars with a minimum of 10 bars. When the lot contains less than 10 bars, all bars shall be tested. The mechanical properties shall be tested as per ISO 6892-1 and ISO 148-1 on both the softest and hardest bars. The specimens are to be taken in a longitudinal direction in accordance with EN10083-1. For bars with diameter (d), the specimens shall be taken at a distance d/3 from the surface. Transverse specimens are also allowed. Impact energy test shall be performed on bars having diameter $\geq 16\text{mm}$. The following Mechanical properties shall be achieved at room temperature																		
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.	<table border="1"> <thead> <tr> <th>Diameter (d) (mm)</th> <th>0.2% Proof Strength (N/mm²)</th> <th>Tensile Strength (N/mm²)</th> <th>Elongation after fracture (%)</th> <th>Reduction in area (%)</th> <th>Impact Energy¹⁾ J</th> <th>Hardness HB30</th> </tr> </thead> <tbody> <tr> <td>≤ 150</td> <td>985 - 1085</td> <td>≤ 1270</td> <td>≥ 14</td> <td>≥ 40</td> <td>≥ 70</td> <td>330-390</td> </tr> </tbody> </table>					Diameter (d) (mm)	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation after fracture (%)	Reduction in area (%)	Impact Energy ¹⁾ J	Hardness HB30	≤ 150	985 - 1085	≤ 1270	≥ 14	≥ 40	≥ 70	330-390
	Diameter (d) (mm)	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation after fracture (%)	Reduction in area (%)	Impact Energy ¹⁾ J	Hardness HB30												
≤ 150	985 - 1085	≤ 1270	≥ 14	≥ 40	≥ 70	330-390													
¹⁾ Average of 3 Charpy V-notch specimen. Each tested specimen shall reach at least 70% of this average value																			
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण के बिना की जाये नहीं। इस दस्तावेज को किसी भी प्रकार से प्रसारित करना या इसका उपयोग करना, जो कि कंपनी के हित में हानिकारक हो, न किया जाये।	9.0 OUTER AND INNER QUALITY / NON DESTRUCTIVE TESTING: 9.1 SURFACE CONDITION: Cracks, other material separation or more severe linear inclusions lines are not acceptable. 9.2 SCOPE OF INSPECTION: Following NDE shall be performed in delivery condition: - Material identity check of all bars - 100% U.T of all bars with diameter d, a $\geq 30\text{ mm}$ according to EN10308 type 1a - 1c (table 1) 9.3 CRITERIA FOR REGISTRATION AND DECISION: Acceptance Quality Class 4 according to EN10308 (table 2). The decision limit for loss of back of echo is 3 dB for all bar dimensions. Any linear or surface like in-homogeneity larger than 10mm in any direction is not acceptable. This quality requirement applies also for bars having diameter d < 30mm, although it is not necessary to prove by testing.																		
	10.0 MARKING: The marking of the materials shall be such that heat number, steel grade/specification & manufacturer name / identifications are legible.																		
दिनांक एवं समय SIGN & DATE	REV. NO. 01	निर्माणकर्ता WORKED BY ASHISH RANJAN		22.10.2018															
जांचकर्ता INVENTORY P-4047	जांचकर्ता CHECKED BY GOPAL KRISHNAN		22.10.2018																

ANNEXURE-IV

(Quality Plans)

1. QA/CF/QP/367/OT, rev 00 (For Specification HW10683).
2. QA/CF/QP/369, rev 01 (For Specification HW10661).
3. QA/CF/QP/332, rev 03 (For Specification HW10662).
4. QA/CF/QP/368/OT, rev 00 (For Specification HW10673).
5. QA/CF/QP/412, rev 00 (For Specification HW18813).

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN					TO BE FILLED BY BHEL			TO BE FILLED BY BHEL				
BHEL	VENDOR'S NAME	ITEM	STEEL BARS		QP NO.	QA/CF/QP/367/OT									
				REV	00										
		DRG. NO.		AS PER PO											
		SPEC.		HW10683 (X22CrMoV121)											
		REV		03		Page 1 of 1									
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS	
									M	B	N				
1	2	3		4	5	6	7	8	9	D	10			11	

1	MELTING	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW10683	HW10683	TC	P	V		.
2	REFINING	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW10683	HW10683	TC	P	V		
3	HOT FORGING / ROLLING					AS PER VENDOR'S PRACTICE		IR	P	-		
4	HEAT TREATMENT	TIME & TEMPERATURE	MAJOR	HT GRAPH	100%	HW10683	HW10683	TC	P	V		
5	STRAIGHTENING & STRESS RELIEVING	STRAIGHTNESS, TIME & TEMPERATURE	MAJOR	STARIGHTNESS HT GRAPH	100%	HW10683	HW10683	TC	P	V		TO BE PERFORMED IF REQUIRED
6	HARDNESS TEST	HARDNESS	MAJOR	HARDNESS	AS PER SPEC	HW10683	HW10683	TC	P	W	-	
7	PRODUCT AND PROCESS QUALIFICATION AS PER CLAUSE 12 OF SPECIFICATION HW10683											
7.1	MECHANICAL TESTING	TENSILE TEST AT ELEVATED TEMPERATURE FOR PROCESS QUALIFICATION	MAJOR	MECHANICAL TEST	ON BARS WITH MAX. & MIN HARDNESS PER HEAT PER HT BATCH	HW10683	HW10683	TC	P	W		
7.2	METALLOGRAPHIC TESTING	MICROSTRUCTURE DELTA FERRITE INCLUSION CONTENT GRAIN SIZE	MAJOR	METALLOGRAP HIC	ONE/HEAT/ HT BATCH	HW10683	HW10683	TC	P	W		
8	MECHANICAL TESTING	UTS, 0.2% PROOF STRESS, % ELONGATION % REDUCTION IN AREA IMPACT	MAJOR	MECHANICAL TEST	ON BARS WITH MAX. & MIN HARDNESS PER HEAT PER HT BATCH	HW10683	HW10683	TC	P	W	-	
9	MATERIAL IDENTITY CHECK	CHEMISTRY	MAJOR	PMI	100%	HW10683	HW10683	TC	P	W*		*RANDOM 10%

MANUFACTURER/SUBCONTRACTOR		LEGEND:	FOR CUSTOMER USE	APPROVED BY
		! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.		
		M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN						TO BE FILLED BY BHEL			TO BE FILLED BY BHEL						
BHEL	VENDOR'S NAME		ITEM	STEEL BARS		QP NO.	QA/CF/QP/367/OT											
					REV	00												
			DRG. NO.		AS PER PO													
			SPEC.		HW10683 (X22CrMoV121)													
			REV		03		Page 2 of 1											
SL. NO.	COMPONENT & OPERATIONS		CHARACTERISTICS		CLASS	TYPE OF CHECK		QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS		FORMAT OF RECORDS		AGENCY			REMARKS	
											M		B	N				
1	2		3		4	5		6	7	8		9	D	10			11	

10	NDT	INTERNAL DEFECTS	MAJOR	UT	100%	HW10683	HW10683	TC	P	W *		*RANDOM 10%
11	VISUAL & DIMENSIONAL CHECK	VISUAL & DIMENSION	MAJOR	VISUAL & MEASURE	10%	HW10683 & PURCHASE ORDER	HW10683 & PURCHASE ORDER	TC	P	W *	-	*RANDOM 10%
12	IDENTIFICATION MARKING & PACKING		MAJOR	VISUAL	100%	HW10683	HW10683	TC	P	V		

MANUFACTURER/SUBCONTRACTOR		LEGEND:	FOR CUSTOMER USE	APPROVED BY
		! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.		
		M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN					TO BE FILLED BY BHEL		TO BE FILLED BY BHEL				
BHEL	VENDOR'S NAME	ITEM	STEEL BARS (X12CrMoWVNbN10-1-1)	QP NO.	QA/CF/QP/369									
				REV	01									
		DRG. NO.	AS PER PO											
		SPEC.	HW10661											
		REV	AS PER PO			Page 1 of 2								
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS
										M	B	N		
1	2	3		4	5	6	7	8	9	D	10			11

1	MELTING IN EAF	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW10661	HW10661	TC	√	P	V	-	
2	REFINING	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW10661	HW10661	TC	√	P	V	-	ESR STEEL SHALL BE USED
3	HOT FORGING / ROLLING					AS PER VENDOR'S PRACTICE		IR		P	-	-	
4	HEAT TREATMENT	TIME & TEMPERATURE	MAJOR	HT GRAPH	100%	HW10661	HW10661	TC	√	P	V	-	
5	STRAIGHTENING & STRESS RELIEVING	STRAIGHTNESS, TIME & TEMPERATURE	MAJOR	STARIGHTNESS , HT GRAPH	100%	HW10661	HW10661	TC	√	P	V	-	TO BE PERFORMED IF REQUIRED
6	HARDNESS TEST	HARDNESS	MAJOR	HARDNESS	AS PER SPEC	HW10661	HW10661	TC	√	P	W	-	
7	PROCESS QUALIFICATION (FOR FIRST ORDER) AS PER CLAUSE 11.0 OF SPECIFICATION HW10661												
7.1	MECHANICAL TESTING	TENSILE TEST AT ELEVATED TEMPERATURE (LONGITUDINAL)	MAJOR	MECHANICAL TEST	1 SAMPLE PER PO (PREFERABLY ON THE LARGEST SIZE)	HW10661	HW10661	TC	√	P	W	-	
7.2	METALLOGRAPHIC TESTING	MICROSTRUCTURE DELTA FERRITE INCLUSION CONTENT GRAIN SIZE	MAJOR	METALLOGRAP HIC	1 SAMPLE PER PO	HW10661	HW10661	TC	√	P	W	-	
7.3	CREEP RUPTURE TEST	CREEP	MAJOR	CREEP	1 SAMPLE PER PO	HW10661	HW10661	TC	√	P	V	-	
8	MECHANICAL TESTING	TENSILE & IMPACT (LONGITUDINAL)	MAJOR	MECHANICAL TEST	ON BARS WITH MAX. & MIN HARDNESS PER HEAT PER HT BATCH	HW10661	HW10661	TC	√	P	W	-	

MANUFACTURER/SUBCONTRACTOR		LEGEND:	FOR CUSTOMER USE	APPROVED BY
		! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.		
		M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN						TO BE FILLED BY BHEL		TO BE FILLED BY BHEL			
BHEL	VENDOR'S NAME	ITEM	STEEL BARS (X12CrMoWVNbN10-1-1)		QP NO.	QA/CF/QP/369								
				REV	01									
		DRG. NO.		AS PER PO										
		SPEC.		HW10661										
		REV		AS PER PO										
		Page 2 of 2												
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS
										M	B	N		
1	2	3		4	5	6	7	8	9	D	10			11

9	NDT	INTERNAL DEFECTS	MAJOR	UT	100%	HW10661	HW10661	TC	√	P	W*	-	*10%
10	VERIFICATION INSPECTION	CHEMICAL	MAJOR	PMI	100%	HW10661	HW10661	TC	√	P	W*	-	*10%
11	VISUAL & DIMENSIONAL CHECK	VISUAL & DIMENSION	MAJOR	VISUAL & MEASURE	100%	HW10661 & PURCHASE ORDER	HW10661 & PURCHASE ORDER	TC	√	P	W*	-	*10%
12	IDENTIFICATION MARKING & PAINTING PACKING	MARKING COLOUR CODE	MAJOR	VISUAL	100%	HW10661	HW10661	TC	√	P	V	-	

		LEGEND: ! RECORDS IDENTIFIED WITH ‘TICK’ SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE ‘P’ PERFORM ‘W’ WITNESS AND ‘V’ VERIFICATION	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR		ALL ‘W’ INDICATED IN COLUMN ‘N’ SHALL BE ‘CHP’ OF CUSTOMER		APPROVED BY

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN				TO BE FILLED BY BHEL		TO BE FILLED BY BHEL			
BHEL	VENDOR'S NAME	ITEM	STEEL BARS	QP NO.	QA/CF/QP/332							
				REV	03							
		SPEC NO	HW10662 (X10CrMoVNb9-1)									
		SIZE	AS PER PO									
				Page 1 of 1								
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY			REMARKS
									M	B	N	
1	2	3	4	5	6	7	8	9	D	10		11

1	MELTING IN EAF	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW10662	HW10662	TC	√	P	V	-	
2	REFINING	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW10662	HW10662	TC	√	P	V	-	
3	HOT FORGING / ROLLING					AS PER VENDOR'S PRACTICE		IR		2	-	-	
4	HEAT TREATMENT	TIME & TEMPERATURE	MAJOR	HT GRAPH	100%	HW10662	HW10662	TC	√	P	V	-	
5	STRAIGHTENING & STRESS RELIEVING	STRAIGHTNESS, TIME & TEMPERATURE	MAJOR	STARIGHTNESS , HT GRAPH	100%	HW10662	HW10662	TC	√	P	V	-	TO BE PERFORMED IF REQUIRED
6	HARDNESS TEST	HARDNESS	MAJOR	HARDNESS	AS PER SPEC	HW10662	HW10662	TC	√	P	W	-	
7	PRODUCT AND PROCESS QUALIFICATION FOR FIRST ORDER AND (OR) FOR EACH OF THE MNAUFACTURER'S FABRICATION FACILITY AS PER CLAUSE NO 11 OF HW10662												
7.1	MECHANICAL TESTING	TENSILE TEST AT ELEVATED TEMPERATURE (LONGITUDINAL)	MAJOR	MECHANICAL TEST	1 SAMPLE PER PURCHASE ORDER (PREFERABLY ON THE LARGEST SIZE)	HW10662	HW10662	TC	√	P	W	-	
7.2	CREEP RUPTURE TEST	CREEP	MAJOR	CREEP	1 SAMPLE PER PO	HW10662	HW10662	TC	√	P	W	-	
7.3	METALLOGRAPHIC TESTING	MICROSTRUCTURE DELTA FERRITE INCLUSION CONTENT GRAIN SIZE	MAJOR	METALLOGRAP HIC	ONE/HEAT/ HT BATCH	HW10662	HW10662	TC	√	P	W	-	

[Type here]

		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' UNDER COULMN "D" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR		ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		APPROVED BY

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN				TO BE FILLED BY BHEL		TO BE FILLED BY BHEL				
BHEL	VENDOR'S NAME	ITEM	STEEL BARS	QP NO.	QA/CF/QP/332								
				REV	03								
		SPEC NO	HW10662 (X10CrMoVNb9-1)										
		SIZE	AS PER PO										
			Page 2 of 1										
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS
										M	B	N	
1	2	3	4	5	6	7	8	9	D	10			11

8	MECHANICAL TESTING	TENSILE & IMPACT (LONGITUDINAL)	MAJOR	MECHANICAL TEST	ON BARS WITH MAX. & MIN HARDNESS PER HEAT PER HT BATCH	HW10662	HW10662	TC	√	P	W	-	
9	NDT	INTERNAL DEFECTS	MAJOR	UT	100%	HW10662	HW10662	TC	√	P	W*	-	*10%
10	VERIFICATION INSPECTION	SPECTRO PMI	MAJOR	CHEMICAL	1 SAMPLE 100%	HW10662	HW10662	TC	√	P	W*	-	*10% PMI
10	VISUAL & DIMENSIONAL CHECK	VISUAL & DIMENSION	MAJOR	VISUAL & MEASURE	10%	HW10662 & PURCHASE ORDER	HW10662 & PURCHASE ORDER	TC	√	P	W*	-	*10%
11	IDENTIFICATION MARKING & PAINTING PACKING	MARKING COLOUR CODE	MAJOR	VISUAL	100%	HW10662	HW10662	TC	√	P	V	-	

[Type here]

		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' UNDER COULMN "D" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR				APPROVED BY

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN				TO BE FILLED BY BHEL		TO BE FILLED BY BHEL				
BHEL	VENDOR'S NAME	ITEM	STEEL BARS		QP NO.	QA/CF/QP/368/OT							
				REV	00								
		DRG. NO.		AS PER PO									
		SPEC.		HW10673 (21CrMoV5-7)									
REV		02		Page 1 of 1									
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY		REMARKS
										M	B	N	
1	2	3		4	5	6	7	8	9	D	10		11

1	MELTING	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW10673	HW10673	TC	P	V		.
2	REFINING	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW10673	HW10673	TC	P	V		
3	HOT FORGING / ROLLING					AS PER VENDOR'S PRACTICE		IR	P	-		
4	HEAT TREATMENT	TIME & TEMPERATURE	MAJOR	HT GRAPH	100%	HW10673	HW10673	TC	P	V		
5	STRAIGHTENING & STRESS RELIEVING	STRAIGHTNESS, TIME & TEMPERATURE	MAJOR	STARIGHTNESS HT GRAPH	100%	HW10673	HW10673	TC	P	V		TO BE PERFORMED IF REQUIRED
6	HARDNESS TEST	HARDNESS	MAJOR	HARDNESS	AS PER SPEC	HW10673	HW10673	TC	P	W	-	
7	MECHANICAL TESTING	UTS, 0.2% PROOF STRESS, % ELONGATION % REDUCTION IN AREA IMPACT	MAJOR	MECHANICAL TEST	ON BARS WITH MAX. & MIN HARDNESS PER HEAT PER HT BATCH	HW10673	HW10673	TC	P	W	-	
8	MATERIAL IDENTITY CHECK	CHEMISTRY	MAJOR	SPECTRO	100%	HW10673	HW10673	TC	P	W*		*RANDOM 10%
9	NDT	INTERNAL DEFECTS	MAJOR	UT	100%	HW10673	HW10673	TC	P	W*		*RANDOM 10%
10	VISUAL & DIMENSIONAL CHECK	VISUAL & DIMENSION	MAJOR	VISUAL & MEASURE	10%	HW10673 & PURCHASE ORDER	HW10673 & PURCHASE ORDER	TC	P	W*	-	*RANDOM 10%
11	IDENTIFICATION MARKING & PACKING		MAJOR	VISUAL	100%	HW10673	HW10673	TC	P	V		

MANUFACTURER/SUBCONTRACTOR		LEGEND:	FOR CUSTOMER USE	APPROVED BY
		! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.		
		M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN					TO BE FILLED BY BHEL			TO BE FILLED BY BHEL		
BHEL	VENDOR'S NAME	ITEM	STEEL BARS	QP NO.	QA/CF/QP/412								
				REV	00								
		DRG. NO.	AS PER PO										
		SPEC.	HW18813 (26NiCrMoV14-5)										
		REV	AS PER PO		Page 1 of 1								
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY			REMARKS	
									M	B	N		
1	2	3	4	5	6	7	8	9	D	10		11	

1	MELTING	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW18813	HW18813	TC	P	V		.
2	REFINING & VACUUM DEGASSING	CHEMICAL COMPOSITION	MAJOR	SPECTRO ANALYSIS	EACH HEAT	HW18813	HW18813	TC	P	V		
3	HOT FORGING / ROLLING					AS PER VENDOR'S PRACTICE		IR	P	-		
4	HEAT TREATMENT	TIME & TEMPERATURE	MAJOR	HT GRAPH	100%	HW18813	HW18813	TC	P	V		
5	STRAIGHTENING & STRESS RELIEVING	STRAIGHTNESS, TIME & TEMPERATURE	MAJOR	STARIGHTNESS, HT GRAPH	100%	HW18813	HW18813	TC	P	V		TO BE PERFORMED IF REQUIRED
6	HARDNESS TEST	HARDNESS	MAJOR	HARDNESS	AS PER SPEC	HW18813	HW18813	TC	P	W	-	
7	MECHANICAL TESTING	UTS, 0.2% PROOF STRESS, % ELONGATION % REDUCTION IN AREA IMPACT	MAJOR	MECHANICAL TEST	ON BARS WITH MAX. & MIN HARDNESS PER HEAT PER HT BATCH	HW18813	HW18813	TC	P	W	-	
8	MATERIAL IDENTITY CHECK	CHEMISTRY	MAJOR	SPECTRO PMI	1 SAMPLE 100%	HW18813	HW18813	TC	P	W*		*10%
9	NDT	INTERNAL DEFECTS	MAJOR	UT	100%	HW18813	HW18813	TC	P	W*		*10%

MANUFACTURER/SUBCONTRACTOR		LEGEND:	FOR CUSTOMER USE	APPROVED BY
		! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.		
		M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN					TO BE FILLED BY BHEL			TO BE FILLED BY BHEL		
BHEL	VENDOR'S NAME	ITEM	STEEL BARS	QP NO.	QA/CF/QP/412								
				REV	00								
		DRG. NO.	AS PER PO										
		SPEC.	HW18813 (26NiCrMoV14-5)										
		REV	AS PER PO			Page 2 of 1							
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	D	10			11
10	VISUAL & DIMENSIONAL CHECK	VISUAL & DIMENSION	MAJOR	VISUAL & MEASURE	10%	HW18813 & PURCHASE ORDER	HW18813 & PURCHASE ORDER	TC	P	W	-		
11	IDENTIFICATION MARKING & PACKING		MAJOR	VISUAL	100%	HW18813	HW18813	TC	P	V			

		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR		ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		APPROVED BY

ANNEXURE-V
(Risk Purchase Clause)

Risk Purchase Clause

In case of abnormal delays (beyond the maximum late delivery period as per Penalty clause) in supplies / defective supplies or non-fulfilment of any other terms and conditions given in Purchase Order, BHEL may cancel the Purchase Order in full or part thereof, and may also make the purchase of such material from elsewhere / alternative source at the risk and cost of the supplier. BHEL will take all reasonable steps to get the material from alternate source at optimum cost. If bidder does not agree to the above Risk Purchase Clause, BHEL reserves the right to reject the offer. In case for compelling reasons BHEL accepts the offer without acceptance of this clause by the bidder and in the eventuality of Risk Purchase, appropriate action will be taken as per BHEL extant rules. This will be without prejudice to any other right of BHEL under the contract.

Risk & Cost Clause, in line with Conditions of Contract may be invoked in any of the following cases:

1. Contractor/ supplier's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor/ supplier including unexecuted portion of work/ supply does not appear to be executable within balance available period (#) considering its performance of execution.
2. Withdrawal from or abandonment of the work by contractor before completion of the work as per contract.
3. Non completion of work/ Non-supply by the Contractor/ supplier within scheduled completion/delivery period as per Contract or as extended from time to time, for the reason attributable to the contractor/ supplier.
4. Termination of Contract on account of any other reason (s) attributable to Contractor/ Supplier.
5. Assignment, transfer, subletting of Contract without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.
6. Non-compliance to any contractual condition or any other default attributable to Contractor/ Supplier.

#In-case inputs from BHEL/Customer are likely to be delayed or are actually delayed, this delay may also be taken into account while considering balance period available for execution of Contract.

Risk and Cost against Balance Work:

Risk & Cost Amount= $[(A-B) + (A \times H/100)]$

Where,

A= Value of Balance scope of Work/ Supply (*) as per rates of new contract

B= Value of Balance scope of Work/ Supply (*) as per rates of old contract being paid to the contractor/ supplier at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

***(Balance scope of work/ supply)**

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work/ Supply for calculating risk & cost amount.

Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities.

Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions.

However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose.

NOTE: In case portion of work is being withdrawn, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work/supply' for calculating Risk & Cost amount.

LD against delay in executed work/supply in case of Termination of Contract

LD against delay in executed work/supply shall be calculated in line with LD clause of the contract for the delay attributable to contractor/ supplier. For this purpose, contract value shall be taken as Executed Value of work/supply for the purpose of limiting maximum LD value.

Method for calculation of "LD against delay in executed work/supply" is given below.

- i. Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor/ supplier= T1
- ii. Let the value of executed work/supply till the time of termination of contract= X
- iii. Let the Total Executable Value of work/supply for which inputs/fronTS were made available to contractor/ supplier and were planned for execution till termination of contract = Y
- iv. Delay in executed work/supply attributable to contractor/supplier i.e.
$$T2 = \left(1 - \frac{X}{Y}\right) \times T1$$
- v. LD shall be calculated in line with LD clause of the Contract for the delay attributable to contractor/ supplier taking "X" as Contract Value and "T2" as delay attributable to contractor/ supplier.

Note: In case portion of work/supply is withdrawn, no LD shall be applicable for portion of work/supply withdrawn.

ANNEXURE- VI

Certificate by Chartered Accountant on letter head

This is to Certify that M/s
(hereinafter referred to as 'company') having its registered office atis
registered under MSMED Act 2006, (Entrepreneur Memorandum No (Part- II)
.....dtd:.....,
Category:.....(Micro/Small).(copy enclosed).

Further verified from the Books of Accounts that the investment of the company as
on dateas per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No. S.O.1722(E) dated October 5, 2006:
Rs.....Lacs
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED act, 2006:
Rs.....Lacs

(Strike off whichever is not applicable)

The above investment of RsLacs is within permissible limit of Rs..... Lacs for
.....micro / small (Strike off which is not applicable) Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro / Small) **(Strike off whichever is not applicable)** and the date of graduation of such enterprises from its original category is
(dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprises from
its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification
dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name-

Membership Number-

Seal of Chartered Accountant

ANNEXURE-VII
(Order dated 15.06.2017)

No. P-45021/2/2017-B.E.-II
Government of India
Ministry of Commerce and Industry
Department of Industrial Policy and Promotion

Dated 15th June, 2017
Udyog Bhawan, New Delhi

To

All Central Ministries/Departments/CPSUs/All concerned

ORDER

Subject: Public Procurement (Preference to Make in India), Order 2017

Whereas it is the policy of the Government of India to encourage 'Make in India' and promote manufacturing and production of goods and services in India with a view to enhancing income and employment, and

Whereas procurement by the Government is substantial in amount and can contribute towards this policy objective, and

Whereas local content can be increased through partnerships, cooperation with local companies, establishing production units in India or Joint Ventures (JV) with Indian suppliers, increasing the participation of local employees in services and training them,

Now therefore the following Order is issued :

1. This Order is issued pursuant to Rule 153 (iii) of the General Financial Rules 2017.
2. **Definitions:** For the purposes of this Order:

'Local content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

'Local supplier' means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed under this Order or by the competent Ministries / Departments in pursuance of this order.

'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

'margin of purchase preference' means the maximum extent to which the price quoted by a local supplier may be above the L1 for the purpose of purchase preference.

'Nodal Ministry' means the Ministry or Department identified pursuant to this order in respect of a particular item of goods or services.

.....Contd. p.2/-

'Procuring entity' means a Ministry or department or attached or subordinate office of, or autonomous body controlled by, the Government of India and includes Government companies as defined in the Companies Act.

3. **Requirement of Purchase Preference:** Subject to the provisions of this Order and to any specific instructions issued by the Nodal Ministry or in pursuance of this Order, purchase preference shall be given to local suppliers in all procurements undertaken by procuring entities in the manner specified hereunder:
- a. In procurement of goods in respect of which the Nodal Ministry has communicated that there is sufficient local capacity and local competition, and where the estimated value of procurement is Rs. 50 lakhs or less, only local suppliers shall be eligible. If the estimated value of procurement of such goods is more than Rs. 50 lakhs, the provisions of sub-paragraph b or c, as the case may be, shall apply.
 - b. In the procurements of goods which are not covered by paragraph 3a and which are divisible in nature, the following procedure shall be followed:
 - i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract for full quantity will be awarded to L1.
 - ii. If L1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L1 price for the remaining 50% quantity subject to the local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such local supplier subject to matching the L1 price. In case such lowest eligible local supplier fails to match the L1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on local suppliers, then such balance quantity may also be ordered on the L1 bidder.
 - c. In procurements of goods not covered by sub-paragraph 3a and which are not divisible, and in procurement of services where the bid is evaluated on price alone, the following procedure shall be followed:
 - i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.
 - ii. If L1 is not from a local supplier, the lowest bidder among the local suppliers, will be invited to match the L1 price subject to local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such local supplier subject to matching the L1 price.
 - iii. In case such lowest eligible local supplier fails to match the L1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the local suppliers within the margin of purchase preference matches the L1 price, then the contract may be awarded to the L1 bidder.

.....Contd. p.3/-

4. **Exemption of small purchases:** Notwithstanding anything contained in paragraph 3, procurements where the estimated value to be procured is less than Rs. 5 lakhs shall be exempt from this Order. However, it shall be ensured by procuring entities that procurement is not split for the purpose of avoiding the provisions of this Order.
5. **Minimum local content:** The minimum local content shall ordinarily be 50%. The Nodal Ministry may prescribe a higher or lower percentage in respect of any particular item and may also prescribe the manner of calculation of local content.
6. **Margin of Purchase Preference:** The margin of purchase preference shall be 20% .
7. **Requirement for specification in advance:** The minimum local content, the margin of purchase preference and the procedure for preference to Make in India shall be specified in the notice inviting tenders or other form of procurement solicitation and shall not be varied during a particular procurement transaction.
8. **Government E-marketplace:** In respect of procurement through the Government E-marketplace (GeM) shall, as far as possible, specifically mark the items which meet the minimum local content while registering the item for display, and shall, wherever feasible, make provision for automated comparison with purchase preference and without purchase preference and for obtaining consent of the local supplier in those cases where purchase preference is to be exercised.
9. **Verification of local content:**
 - a. The local supplier at the time of tender, bidding or solicitation shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.
 - b. In cases of procurement for a value in excess of Rs. 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
 - c. Decisions on complaints relating to implementation of this Order shall be taken by the competent authority which is empowered to look into procurement-related complaints relating to the procuring entity.
 - d. Nodal Ministries may constitute committees with internal and external experts for independent verification of self-declarations and auditor's/ accountant's certificates on random basis and in the case of complaints.
 - e. Nodal Ministries and procuring entities may prescribe fees for such complaints.
 - f. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.
 - g. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the

duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph 9h below.

- h. The Department of Expenditure shall issue suitable instructions for the effective and smooth operation of this process, so that:
 - i. The fact and duration of debarment for violation of this Order by any procuring entity are promptly brought to the notice of the Member-Convenor of the Standing Committee and the Department of Expenditure through the concerned Ministry /Department or in some other manner;
 - ii. on a periodical basis such cases are consolidated and a centralized list or decentralized lists of such suppliers with the period of debarment is maintained and displayed on website(s);
 - iii. in respect of procuring entities other than the one which has carried out the debarment, the debarment takes effect prospectively from the date of uploading on the website(s) in the such a manner that ongoing procurements are not disrupted.

10. Specifications in Tenders and other procurement solicitations:

- a. Every procuring entity shall ensure that the eligibility conditions in respect of previous experience fixed in any tender or solicitation do not require proof of supply in other countries or proof of exports.
- b. Procuring entities shall endeavour to see that eligibility conditions, including on matters like turnover, production capability and financial strength do not result in unreasonable exclusion of local suppliers who would otherwise be eligible, beyond what is essential for ensuring quality or creditworthiness of the supplier.
- c. Procuring entities shall, within 2 months of the issue of this Order review all existing eligibility norms and conditions with reference to sub-paragraphs 'a' and 'b' above.
- d. If a Nodal Ministry is satisfied that Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, it may, if it deems appropriate, restrict or exclude bidders from that country from eligibility for procurement of that item and/ or other items relating to that Nodal Ministry. A copy of every instruction or decision taken in this regard shall be sent to the Chairman of the Standing Committee.
- e. For the purpose of sub-paragraph 10 d above, a supplier or bidder shall be considered to be from a country if (i) the entity is incorporated in that country, or ii) a majority of its shareholding or effective control of the entity is exercised from that country; or (iii) more than 50% of the value of the item being supplied has been added in that country. Indian suppliers shall mean those entities which meet any of these tests with respect to India."

11. **Assessment of supply base by Nodal Ministries:** The Nodal Ministry shall keep in view the domestic manufacturing / supply base and assess the available capacity and the extent of local competition while identifying items and prescribing minimum local content or the manner of its calculation, with a view to avoiding cost increase from the operation of this Order.
12. **Increase in minimum local content:** The Nodal Ministry may annually review the local content requirements with a view to increasing them, subject to availability of sufficient local competition with adequate quality.
13. **Manufacture under license/ technology collaboration agreements with phased indigenization:** While notifying the minimum local content, Nodal Ministries may make special provisions for exempting suppliers from meeting the stipulated local content if the product is being manufactured in India under a license from a foreign manufacturer who holds intellectual property rights and where there is a technology collaboration agreement / transfer of technology agreement for indigenous manufacture of a product developed abroad with clear phasing of increase in local content.
14. **Powers to grant exemption and to reduce minimum local content:** Ministries /Departments of Government of India and the Boards of Directors of Government companies or autonomous bodies may, by written order,
 - a. reduce the minimum local content below the prescribed level;
 - b. reduce the margin of purchase preference below 20% ;
 - c. exempt any particular item or procuring or supplying entities or class or classes of items or procuring or supplying entities from the operation of this Order or any part of the Order.

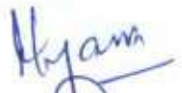
A copy of every such order shall be marked to the Member-Convenor of the Standing Committee constituted under this Order.

15. **Directions to Government companies:** In respect of Government companies and other procuring entities not governed by the General Financial Rules, the administrative Ministry or Department shall issue policy directions requiring compliance with this Order.
16. **Standing Committee:** A standing committee is hereby constituted with the following membership:

Secretary, Department of Industrial Policy and Promotion—Chairman
Secretary, Commerce—Member
Secretary, Ministry of Electronics and Information Technology—Member
Joint Secretary (Public Procurement), Department of Expenditure—Member
Joint Secretary (DIPP)—Member-Convenor

The Secretary of the Department concerned with a particular item shall be a member in respect of issues relating to such item. The Chairman of the Committee may co-opt technical experts as relevant to any issue or class of issues under its consideration.

17. **Functions of the Standing Committee:** The Standing Committee shall meet as often as necessary but not less than once in six months. The Committee
- shall oversee the implementation of this order and issues arising therefrom, and make recommendations to Nodal Ministries and procuring entities.
 - shall annually assess and periodically monitor compliance with this Order
 - shall identify Nodal Ministries and the allocation of items among them for issue of notifications on minimum local content
 - may require furnishing of details or returns regarding compliance with this Order and related matters
 - may, during the annual review or otherwise, assess issues, if any, where it is felt that the manner of implementation of the order results in any restrictive practices, cartelization or increase in public expenditure and suggest remedial measures
 - may examine cases covered by paragraph 13 above relating to manufacture under license/ technology transfer agreements with a view to satisfying itself that adequate mechanisms exist for enforcement of such agreements and for attaining the underlying objective of progressive indigenization
 - may consider any other issue relating to this Order which may arise.
18. **Removal of difficulties:** Ministries /Departments and the Boards of Directors of Government companies may issue such clarifications and instructions as may be necessary for the removal of any difficulties arising in the implementation of this Order.
19. **Ministries having existing policies:** Where any Ministry or Department has its own policy for preference to local content approved by the Cabinet after 1st January 2015, such policies will prevail over the provisions of this Order. All other existing orders on preference to local content shall be reviewed by the Nodal Ministries and revised as needed to conform to this Order, within two months of the issue of this Order.
20. **Transitional provision:** This Order shall not apply to any tender or procurement for which notice inviting tender or other form of procurement solicitation has been issued before the issue of this Order.



(B. S. Nayak)

Under Secretary to Government of India
Ph. 23061257

ANNEXURE-VIII
(Order dated 28.05.2018)

No. P-45021/2/2017-PP (BE-II)
Government of India
Ministry of Commerce and Industry
Department of Industrial Policy and Promotion
(Public Procurement Section)

Dated 28th May, 2018
Udyog Bhawan, New Delhi

To
All Central Ministries/Departments/CPSUs/All concerned

ORDER

Subject: Public Procurement (Preference to Make in India), Order 2017 – Revision; regarding.

Department of Industrial Policy and Promotion, in partial modification of Order No.P-45021/2/2017-B.E.-II dated 15.6.2017, hereby issues the revised ‘Public Procurement (Preference to Make in India), Order 2017’ with immediate effect:-

Whereas it is the policy of the Government of India to encourage ‘Make in India’ and promote manufacturing and production of goods and services in India with a view to enhancing income and employment, and

Whereas procurement by the Government is substantial in amount and can contribute towards this policy objective, and

Whereas local content can be increased through partnerships, cooperation with local companies, establishing production units in India or Joint Ventures (JV) with Indian suppliers, increasing the participation of local employees in services and training them,

Now therefore the following Order is issued :

1. This Order is issued pursuant to Rule 153 (iii) of the General Financial Rules 2017.
2. **Definitions:** For the purposes of this Order:

‘Local content’ means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

‘Local supplier’ means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed under this Order or by the competent Ministries / Departments in pursuance of this order.

‘L1’ means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

‘margin of purchase preference’ means the maximum extent to which the price quoted by a local supplier may be above the L1 for the purpose of purchase preference.

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'Nodal Ministry' means the Ministry or Department identified pursuant to this order in respect of a particular item of goods or services or works.

'Procuring entity' means a Ministry or department or attached or subordinate office of, or autonomous body controlled by, the Government of India and includes Government companies as defined in the Companies Act.

'Works' means all works as per Rule 130 of GFR- 2017, and will also include *'turnkey works'*.

3. Requirement of Purchase Preference : Subject to the provisions of this Order and to any specific instructions issued by the Nodal Ministry or in pursuance of this Order, purchase preference shall be given to local suppliers in all procurements undertaken by procuring entities in the manner specified hereunder"

- a. "In procurement of goods, services or works in respect of which the Nodal Ministry has communicated that there is sufficient local capacity and local competition, and where the estimated value of procurement is Rs. 50 lakhs or less, only local suppliers shall be eligible. If the estimated value of procurement of such goods or services or works is more than Rs. 50 lakhs, the provisions of sub-paragraph b or c, as the case may be, shall apply";
- b. "In the procurements of goods or works which are not covered by paragraph 3a and which are divisible in nature, the following procedure shall be followed";
 - i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract for full quantity will be awarded to L1.
 - ii. If L1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L1 price for the remaining 50% quantity subject to the local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such local supplier subject to matching the L1 price. In case such lowest eligible local supplier fails to match the L1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on local suppliers, then such balance quantity may also be ordered on the L1 bidder.
- c. "In procurements of goods or works not covered by sub-paragraph 3a and which are not divisible, and in procurement of services where the bid is evaluated on price alone, the following procedure shall be followed":-
 - i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.

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- ii. If L1 is not from a local supplier, the lowest bidder among the local suppliers, will be invited to match the L1 price subject to local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such local supplier subject to matching the L1 price.
 - iii. In case such lowest eligible local supplier fails to match the L1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the local suppliers within the margin of purchase preference matches the L1 price, then the contract may be awarded to the L1 bidder.
4. **Exemption of small purchases:** Notwithstanding anything contained in paragraph 3, procurements where the estimated value to be procured is less than Rs. 5 lakhs shall be exempt from this Order. However, it shall be ensured by procuring entities that procurement is not split for the purpose of avoiding the provisions of this Order.
5. **Minimum local content:** The minimum local content shall ordinarily be 50%. The Nodal Ministry may prescribe a higher or lower percentage in respect of any particular item and may also prescribe the manner of calculation of local content.
6. **Margin of Purchase Preference:** The margin of purchase preference shall be 20% .
7. **Requirement for specification in advance:** The minimum local content, the margin of purchase preference and the procedure for preference to Make in India shall be specified in the notice inviting tenders or other form of procurement solicitation and shall not be varied during a particular procurement transaction.
8. **Government E-marketplace:** In respect of procurement through the Government E-marketplace (GeM) shall, as far as possible, specifically mark the items which meet the minimum local content while registering the item for display, and shall, wherever feasible, make provision for automated comparison with purchase preference and without purchase preference and for obtaining consent of the local supplier in those cases where purchase preference is to be exercised.
9. **Verification of local content:**
- a. The local supplier at the time of tender, bidding or solicitation shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.
 - b. In cases of procurement for a value in excess of Rs. 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
 - c. Decisions on complaints relating to implementation of this Order shall be taken by the competent authority which is empowered to look into procurement-related complaints relating to the procuring entity.

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- d. Nodal Ministries may constitute committees with internal and external experts for independent verification of self-declarations and auditor's/ accountant's certificates on random basis and in the case of complaints.
- e. Nodal Ministries and procuring entities may prescribe fees for such complaints.
- f. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.
- g. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph 9h below.
- h. The Department of Expenditure shall issue suitable instructions for the effective and smooth operation of this process, so that:
 - i. The fact and duration of debarment for violation of this Order by any procuring entity are promptly brought to the notice of the Member-Convenor of the Standing Committee and the Department of Expenditure through the concerned Ministry /Department or in some other manner;
 - ii. on a periodical basis such cases are consolidated and a centralized list or decentralized lists of such suppliers with the period of debarment is maintained and displayed on website(s);
 - iii. in respect of procuring entities other than the one which has carried out the debarment, the debarment takes effect prospectively from the date of uploading on the website(s) in the such a manner that ongoing procurements are not disrupted.

10. Specifications in Tenders and other procurement solicitations:

- a. Every procuring entity shall ensure that the eligibility conditions in respect of previous experience fixed in any tender or solicitation do not require proof of supply in other countries or proof of exports.
- b. Procuring entities shall endeavour to see that eligibility conditions, including on matters like turnover, production capability and financial strength do not result in unreasonable exclusion of local suppliers who would otherwise be eligible, beyond what is essential for ensuring quality or creditworthiness of the supplier.
- c. Procuring entities shall, within 2 months of the issue of this Order review all existing eligibility norms and conditions with reference to sub-paragraphs 'a' and 'b' above.
- d. If a Nodal Ministry is satisfied that Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, it may, if it deems appropriate, restrict or exclude bidders from that country from eligibility for procurement of that item and/ or other items relating to that Nodal Ministry. A copy of every instruction or decision taken in this regard shall be sent to the Chairman of the Standing Committee.

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- e. For the purpose of sub-paragraph 10 d above, a supplier or bidder shall be considered to be from a country if (i) the entity is incorporated in that country, or ii) a majority of its shareholding or effective control of the entity is exercised from that country; or (iii) more than 50% of the value of the item being supplied has been added in that country. Indian suppliers shall mean those entities which meet any of these tests with respect to India."

11. **Assessment of supply base by Nodal Ministries:** The Nodal Ministry shall keep in view the domestic manufacturing / supply base and assess the available capacity and the extent of local competition while identifying items and prescribing minimum local content or the manner of its calculation, with a view to avoiding cost increase from the operation of this Order.
12. **Increase in minimum local content:** The Nodal Ministry may annually review the local content requirements with a view to increasing them, subject to availability of sufficient local competition with adequate quality.
13. **Manufacture under license/ technology collaboration agreements with phased indigenization:** While notifying the minimum local content, Nodal Ministries may make special provisions for exempting suppliers from meeting the stipulated local content if the product is being manufactured in India under a license from a foreign manufacturer who holds intellectual property rights and where there is a technology collaboration agreement / transfer of technology agreement for indigenous manufacture of a product developed abroad with clear phasing of increase in local content.
14. **Powers to grant exemption and to reduce minimum local content:** Ministries /Departments of Government of India and the Boards of Directors of Government companies or autonomous bodies may, by written order,
- a. reduce the minimum local content below the prescribed level;
 - b. reduce the margin of purchase preference below 20% ;
 - c. exempt any particular item or procuring or supplying entities or class or classes of items or procuring or supplying entities from the operation of this Order or any part of the Order.

A copy of every such order shall be marked to the Member-Convenor of the Standing Committee constituted under this Order.

15. **Directions to Government companies:** In respect of Government companies and other procuring entities not governed by the General Financial Rules, the administrative Ministry or Department shall issue policy directions requiring compliance with this Order.
16. **Standing Committee:** A standing committee is hereby constituted with the following membership:

Secretary, Department of Industrial Policy and Promotion—Chairman
Secretary, Commerce—Member
Secretary, Ministry of Electronics and Information Technology—Member
Joint Secretary (Public Procurement), Department of Expenditure—Member
Joint Secretary (DIPP)—Member-Convenor

The Secretary of the Department concerned with a particular item shall be a member in respect of issues relating to such item. The Chairman of the Committee may co-opt technical experts as relevant to any issue or class of issues under its consideration.

17. **Functions of the Standing Committee:** The Standing Committee shall meet as often as necessary but not less than once in six months. The Committee
- shall oversee the implementation of this order and issues arising therefrom, and make recommendations to Nodal Ministries and procuring entities.
 - shall annually assess and periodically monitor compliance with this Order
 - shall identify Nodal Ministries and the allocation of items among them for issue of notifications on minimum local content
 - may require furnishing of details or returns regarding compliance with this Order and related matters
 - may, during the annual review or otherwise, assess issues, if any, where it is felt that the manner of implementation of the order results in any restrictive practices, cartelization or increase in public expenditure and suggest remedial measures
 - may examine cases covered by paragraph 13 above relating to manufacture under license/ technology transfer agreements with a view to satisfying itself that adequate mechanisms exist for enforcement of such agreements and for attaining the underlying objective of progressive indigenization
 - may consider any other issue relating to this Order which may arise.
18. **Removal of difficulties:** Ministries /Departments and the Boards of Directors of Government companies may issue such clarifications and instructions as may be necessary for the removal of any difficulties arising in the implementation of this Order.
19. **Ministries having existing policies:** Where any Ministry or Department has its own policy for preference to local content approved by the Cabinet after 1st January 2015, such policies will prevail over the provisions of this Order. All other existing orders on preference to local content shall be reviewed by the Nodal Ministries and revised as needed to conform to this Order, within two months of the issue of this Order.
20. **Transitional provision:** This Order shall not apply to any tender or procurement for which notice inviting tender or other form of procurement solicitation has been issued before the issue of this Order.



(B. S. Nayak)
Under Secretary to Government of India
Ph. 23061257

ANNEXURE-IX
(Order dated 29.05.2019)

No. P-45021/2/2017-PP (BE-II)
Government of India
Ministry of Commerce and Industry
Department for Promotion of Industry and Internal Trade
(Public Procurement Section)

Udyog Bhawan, New Delhi
Dated: 29th May, 2019

To

All Central Ministries/Departments/CPSUs/All concerned

ORDER

Subject: Public Procurement (Preference to Make in India), Order 2017 – Revision; regarding.

Department for Promotion of Industry and Internal Trade, in partial modification [Paras 3(a) and 14 modified and Para 10A added] of Order No.P-45021/2/2017-B.E.-II dated 15.6.2017 as amended by Order No.P-45021/2/2017-B.E.-II dated 28.05.2018, hereby issues the revised 'Public Procurement (Preference to Make in India), Order 2017" with immediate effect:-

Whereas it is the policy of the Government of India to encourage 'Make in India' and promote manufacturing and production of goods and services in India with a view to enhancing income and employment, and

Whereas procurement by the Government is substantial in amount and can contribute towards this policy objective, and

Whereas local content can be increased through partnerships, cooperation with local companies, establishing production units in India or Joint Ventures (JV) with Indian suppliers, increasing the participation of local employees in services and training them,

Now therefore the following Order is issued :

1. This Order is issued pursuant to Rule 153 (iii) of the General Financial Rules 2017.
2. **Definitions:** For the purposes of this Order:

'Local content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

'Local supplier' means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed under this Order or by the competent Ministries / Departments in pursuance of this order.

'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

'margin of purchase preference' means the maximum extent to which the price quoted by a local supplier may be above the L1 for the purpose of purchase preference.

'Nodal Ministry' means the Ministry or Department identified pursuant to this order in respect of a particular item of goods or services or works.

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'Procuring entity' means a Ministry or department or attached or subordinate office of, or autonomous body controlled by, the Government of India and includes Government companies as defined in the Companies Act.

'Works' means all works as per Rule 130 of GFR- 2017, and will also include 'turnkey works'.

- 3. Requirement of Purchase Preference :** Subject to the provisions of this Order and to any specific instructions issued by the Nodal Ministry or in pursuance of this Order, purchase preference shall be given to local suppliers in all procurements undertaken by procuring entities in the manner specified hereunder

- a. In procurement of all goods, services or works in respect of which the estimated value of procurement is less than INR 50 Lakhs, only local suppliers shall be eligible to bid. However, in procurement of all goods, services or works, in respect of which the Nodal Ministry / Department has communicated that there is sufficient local capacity and local competition, only local suppliers shall be eligible to bid irrespective of purchase value.

Provided that for any particular item, the Nodal Ministry / Department may also prescribe an upper threshold limit, below which procurement shall be made only from local suppliers.

Further provided that in any particular case of procurement, if the procuring authority is of the view that the goods, services or works of required quality / specifications etc. may not be available in the country, or sufficient capacity or competition does not exist domestically, and it is necessary to undertake global competitive bidding, the procuring authority may allow the same after recording reasons. In such cases, the provisions of sub-paragraph b or c, as the case may be, shall apply;

- b. In the procurements of goods or works which are not covered by paragraph 3a and which are divisible in nature, the following procedure shall be followed;
- i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract for full quantity will be awarded to L1.
 - ii. If L1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L1 price for the remaining 50% quantity subject to the local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such local supplier subject to matching the L1 price. In case such lowest eligible local supplier fails to match the L1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on local suppliers, then such balance quantity may also be ordered on the L1 bidder.
- c. In procurements of goods or works not covered by sub-paragraph 3a and which are not divisible, and in procurement of services where the bid is evaluated on price alone, the following procedure shall be followed:-
- i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.

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- ii. If L1 is not from a local supplier, the lowest bidder among the local suppliers, will be invited to match the L1 price subject to local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such local supplier subject to matching the L1 price.
 - iii. In case such lowest eligible local supplier fails to match the L1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the local suppliers within the margin of purchase preference matches the L1 price, then the contract may be awarded to the L1 bidder.
4. **Exemption of small purchases:** Notwithstanding anything contained in paragraph 3, procurements where the estimated value to be procured is less than Rs. 5 lakhs shall be exempt from this Order. However, it shall be ensured by procuring entities that procurement is not split for the purpose of avoiding the provisions of this Order.
5. **Minimum local content:** The minimum local content shall ordinarily be 50%. The Nodal Ministry may prescribe a higher or lower percentage in respect of any particular item and may also prescribe the manner of calculation of local content.
6. **Margin of Purchase Preference:** The margin of purchase preference shall be 20%.
7. **Requirement for specification in advance:** The minimum local content, the margin of purchase preference and the procedure for preference to Make in India shall be specified in the notice inviting tenders or other form of procurement solicitation and shall not be varied during a particular procurement transaction.
8. **Government E-marketplace:** In respect of procurement through the Government E-marketplace (GeM) shall, as far as possible, specifically mark the items which meet the minimum local content while registering the item for display, and shall, wherever feasible, make provision for automated comparison with purchase preference and without purchase preference and for obtaining consent of the local supplier in those cases where purchase preference is to be exercised.
9. **Verification of local content:**
- a. The local supplier at the time of tender, bidding or solicitation shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.
 - b. In cases of procurement for a value in excess of Rs. 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
 - c. Decisions on complaints relating to implementation of this Order shall be taken by the competent authority which is empowered to look into procurement-related complaints relating to the procuring entity.
 - d. Nodal Ministries may constitute committees with internal and external experts for independent verification of self-declarations and auditor's/ accountant's certificates on random basis and in the case of complaints.

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- e. Nodal Ministries and procuring entities may prescribe fees for such complaints.
- f. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.
- g. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph 9h below.
- h. The Department of Expenditure shall issue suitable instructions for the effective and smooth operation of this process, so that:
 - i. The fact and duration of debarment for violation of this Order by any procuring entity are promptly brought to the notice of the Member-Convenor of the Standing Committee and the Department of Expenditure through the concerned Ministry /Department or in some other manner;
 - ii. on a periodical basis such cases are consolidated and a centralized list or decentralized lists of such suppliers with the period of debarment is maintained and displayed on website(s);
 - iii. in respect of procuring entities other than the one which has carried out the debarment, the debarment takes effect prospectively from the date of uploading on the website(s) in the such a manner that ongoing procurements are not disrupted.

10. Specifications in Tenders and other procurement solicitations:

- a. Every procuring entity shall ensure that the eligibility conditions in respect of previous experience fixed in any tender or solicitation do not require proof of supply in other countries or proof of exports.
- b. Procuring entities shall endeavour to see that eligibility conditions, including on matters like turnover, production capability and financial strength do not result in unreasonable exclusion of local suppliers who would otherwise be eligible, beyond what is essential for ensuring quality or creditworthiness of the supplier.
- c. Procuring entities shall, within 2 months of the issue of this Order review all existing eligibility norms and conditions with reference to sub-paragraphs 'a' and 'b' above.
- d. If a Nodal Ministry is satisfied that Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, it may, if it deems appropriate, restrict or exclude bidders from that country from eligibility for procurement of that item and/ or other items relating to that Nodal Ministry. A copy of every instruction or decision taken in this regard shall be sent to the Chairman of the Standing Committee.

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- e. For the purpose of sub-paragraph 10 d above, a supplier or bidder shall be considered to be from a country if (i) the entity is incorporated in that country, or ii) a majority of its shareholding or effective control of the entity is exercised from that country; or (iii) more than 50% of the value of the item being supplied has been added in that country. Indian suppliers shall mean those entities which meet any of these tests with respect to India."

10A. Action for non-compliance of the Provisions of the Order: In case restrictive or discriminatory conditions against domestic suppliers are included in bid documents, an inquiry shall be conducted by the Administrative Department undertaking the procurement (including procurement by any entity under its administrative control) to fix responsibility for the same. Thereafter, appropriate action, administrative or otherwise, shall be taken against erring officials of procurement entities under relevant provisions. Intimation on all such actions shall be sent to the Standing Committee.

- 11. **Assessment of supply base by Nodal Ministries:** The Nodal Ministry shall keep in view the domestic manufacturing / supply base and assess the available capacity and the extent of local competition while identifying items and prescribing minimum local content or the manner of its calculation, with a view to avoiding cost increase from the operation of this Order.
- 12. **Increase in minimum local content:** The Nodal Ministry may annually review the local content requirements with a view to increasing them, subject to availability of sufficient local competition with adequate quality.
- 13. **Manufacture under license/ technology collaboration agreements with phased indigenization:** While notifying the minimum local content, Nodal Ministries may make special provisions for exempting suppliers from meeting the stipulated local content if the product is being manufactured in India under a license from a foreign manufacturer who holds intellectual property rights and where there is a technology collaboration agreement / transfer of technology agreement for indigenous manufacture of a product developed abroad with clear phasing of increase in local content.
- 14. **Powers to grant exemption and to reduce minimum local content:** The administrative Department undertaking the procurement (including procurement by any entity under its administrative control), with the approval of their Minister-in-charge, may by written order, for reasons to be recorded in writing,
 - a. reduce the minimum local content below the prescribed level; or
 - b. reduce the margin of purchase preference below 20%; or
 - c. exempt any particular item or supplying entities or class or classes of items or procuring or supplying entities from the operation of this Order or any part of the Order.

A copy of every such order shall be provided to the Standing Committee and concerned Nodal Ministry / Department. The Nodal Ministry / Department concerned will continue to have the power to vary its notification on Minimum Local Content.

- 15. **Directions to Government companies:** In respect of Government companies and other procuring entities not governed by the General Financial Rules, the administrative Ministry or Department shall issue policy directions requiring compliance with this Order.

16. **Standing Committee:** A standing committee is hereby constituted with the following membership:

Secretary, Department for Promotion of Industry and Internal Trade—Chairman
Secretary, Commerce—Member
Secretary, Ministry of Electronics and Information Technology—Member
Joint Secretary (Public Procurement), Department of Expenditure—Member
Joint Secretary (DPIIT)—Member-Convenor

The Secretary of the Department concerned with a particular item shall be a member in respect of issues relating to such item. The Chairman of the Committee may co-opt technical experts as relevant to any issue or class of issues under its consideration.

17. **Functions of the Standing Committee:** The Standing Committee shall meet as often as necessary, but not less than once in six months. The Committee

- a. shall oversee the implementation of this order and issues arising therefrom, and make recommendations to Nodal Ministries and procuring entities.
- b. shall annually assess and periodically monitor compliance with this Order
- c. shall identify Nodal Ministries and the allocation of items among them for issue of notifications on minimum local content
- d. may require furnishing of details or returns regarding compliance with this Order and related matters
- e. may, during the annual review or otherwise, assess issues, if any, where it is felt that the manner of implementation of the order results in any restrictive practices, cartelization or increase in public expenditure and suggest remedial measures
- f. may examine cases covered by paragraph 13 above relating to manufacture under license/ technology transfer agreements with a view to satisfying itself that adequate mechanisms exist for enforcement of such agreements and for attaining the underlying objective of progressive indigenization
- g. may consider any other issue relating to this Order which may arise.

18. **Removal of difficulties:** Ministries /Departments and the Boards of Directors of Government companies may issue such clarifications and instructions as may be necessary for the removal of any difficulties arising in the implementation of this Order.

19. **Ministries having existing policies:** Where any Ministry or Department has its own policy for preference to local content approved by the Cabinet after 1st January 2015, such policies will prevail over the provisions of this Order. All other existing orders on preference to local content shall be reviewed by the Nodal Ministries and revised as needed to conform to this Order, within two months of the issue of this Order.

20. **Transitional provision:** This Order shall not apply to any tender or procurement for which notice inviting tender or other form of procurement solicitation has been issued before the issue of this Order.


29/5/2019
(Arun Mahendru Baraj)

Senior Development Officer
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