

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

Sub: Requirement of Forgings for Joint Flange

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

Bids are invited for following items through GeM Portal- <https://gem.gov.in>

Item Description	Material Code	Drawing No.	Total Qty. (Nos.)	Qty. (No)	Delivery Requirement	Delivery period (Days from PO date)
FORGING FOR JOINT FLANGE AS PER DRAWING 41074258998 Rev 01 & MATERIAL SPEC AA19341 Rev 08	W95310742093	41074258998 Rev 01	48	Lot 1- 8 Nos Lot 2- 8 Nos Lot 3- 8 Nos Lot 4- 8 Nos Lot 5- 8 Nos Lot 6- 8 Nos	Lot 1-30/01/2027 Lot 2-30/03/2027 Lot 3-30/05/2027 Lot 4-30/07/2027 Lot 5-30/09/2027 Lot 6-30/11/2027	Lot 1-90 Days Lot 2-150 Days Lot 3-210 Days Lot 4-270 Days Lot 5-330 Days Lot 6-390 Days

Remarks-

1. Delivery period mentioned in enquiry is indicative, bidders to quote their best possible delivery.
2. Item to be supplied as per drawing & Specification/Testing standard (drawings, standard & Specification attached).
3. **Bidders to mention HSN codes against their quoted items of the tender** and also to check applicability of Ministry of Steel Notification no. **G.S.R. 904(E) dt. 17.12.2025** as Affidavit of Self-Certification for Compliance with Melt & Pour Requirements (Appendix-A) and/or Domestic Value Addition Requirements (Appendix-A & Appendix-B) may be asked at later stage if applicable.
4. **Breach of Contract:**
In case of breach of contract, wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is at least 10% of the contract value, the same be encashed. In case the value of the security instruments available is less than 10% of the contract value, the balance amount be recovered from other financial remedies (i.e. available bills of the contractor, retention amount, etc. with BHEL) or legal remedies be pursued. The balance scope shall be got done independently without Risk & Cost of the failed supplier/ contractor. Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract. Accordingly, recovery of an amount equivalent to 10% of the contract value may be made in case of breach of contract.
5. Payment terms shall be as follows:
The payment shall be made within no. of days as defined in the below table from appointed day:

Type of Bidder	Payment Terms (Number of days)
Micro & Small Enterprises (MSEs)	45 days
Medium Enterprises	60 days
Non MSME	90 days

Appointed day means

- The day of *material entry in HEEP (i.e. CISF Stamp date)*, subject to submission of non-discrepant documents by vendor as per Purchase Order.
- Or
- Where there is any objection regarding acceptance of goods, the same shall be informed to supplier within fifteen days from the day of the delivery of good. Appointed day will be the day on which such objection is removed by the supplier.
- For BOIs, the appointed day means the date of receipt of material at respective project Site (i.e. MRC date).

Payment shall be made within 45/ 60/ 90 days (as applicable for MSE, Medium and Non-MSME bidders respectively) from the material entry date in BHEL, subject to submission of non-discrepant documents by the vendor, uploading of all documents on BHEL's SUVIDHA portal at the time of dispatch, and the acceptance of material by BHEL after receipt.

Note: This is in supersession of 10 days' time as provided in Clause 12 of GeM GTC and also 45 days from CRAC as provided in the standard format of GeM Bid under Payment Timelines.

Note: Benefits of MSE (Price preference, Payment preference etc.) will be given only to those MSE Vendors who are manufacturers of offered items against the NIT. No MSE benefits shall be provided to Agents / Stockists / Dealers / Traders etc. for the items offered but not manufactured by themselves

6. Vendor should raise inspection call for BHEL / TPI inspection at least 4 days in advance to the planned date of inspection. If customer inspection is envisaged at vendor's works, vendor should give inspection call at least 7 days in advance to the planned date of inspection.
7. For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local Supplier/ Non-local supplier and purchase preference to Class I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 19.07.2024 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.
8. Test certificate and Guarantee certificate are required.
9. Rest terms and conditions shall be as per latest GeM GTC/ Buyer added bid specific ATC.
10. The bids received from same IP address shall be outrightly rejected and shall not be considered for further evaluation.

- 11.** If a re-visit of BHEL appointed TPIA is required at vendor's works due to:
- (a) Complete material not being offered during inspection (whilst physical visit of Inspection Engineer at Supplier's work) with respect to offered quantity mentioned in raised inspection call.
 - (b) Lapses on account of supplier has led to rejection of offered material (as per approved QAP/Technical specification/other pertinent requirement while carrying out inspection) Additional visit charges to be paid by BHEL to TPIAs shall be deducted from supplier's bills as penalty.
- 12.** No deviation Certificate to be submitted as attached. Any deviation w.r.t. the tender (technical or commercial) must be explicitly mentioned along with the offer.
- 13.** *"For goods / works / services on Indian Suppliers / Contractors: Irrespective of the value of the invoice amount, the supplier/ contractor should necessarily upload the invoice details on BHEL SUVIDHA portal at <https://suvidha.bhel.in/suvidha/>, prior to despatch/raising invoice. All documents as per contract checklist, along with additional documents (if any), must be uploaded on the portal. It is mandatory that tax invoices with a net amount (including taxes) exceeding Rs five lakhs uploaded on the portal are digitally signed using a Class 3 Digital Signature Certificate (DSC) issued by a licensed Certifying Authority. Submission of invoice document in hard copy is allowed for invoices with a net amount (including taxes) equal to and upto Rs five lakhs in case the requirement for digitally signed invoice is not explicitly mentioned in the contract checklist.*

The Invoice will not be accepted in absence of the above."

- 14. Environmental compliance for transportation vehicles** – In case of award of contract against this NIT, it is to be ensured by seller that all vehicles deployed for transportation of material to BHEL premises/ project sites comply with the applicable emission norms prescribed by the Central/State Pollution Control Authorities and other statutory authorities.

The vehicles shall possess a valid Pollution Under Control (PUC) Certificate throughout the period of transportation. BHEL reserves the right to verify the validity of the PUC certificate at the time of entry of the vehicle into the premises. Non-compliance may result in denial of entry of the vehicle and any consequential delay shall be to the seller's account.

15. Declaration by bidder regarding Conflict of interest

The bidder notes that a conflict of interest would said to have occurred in the tender process and execution of the resultant contract, in case of any of the following situations:

- i) If its personnel have a close personal, financial, or business relationship with any personnel of BHEL who are directly or indirectly related to the procurement or execution process of the contract, which can affect the decision of BHEL directly or indirectly;
- ii) The bidder (or his allied firm) provided services for the need assessment/ procurement planning of the Tender process in which it is participating;
- iii) Procurement of goods directly from the manufacturers/ suppliers shall be preferred. However, if the OEM/ Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both. In case bids are received from both the manufacturer/ supplier and the agent, bid received from the agent shall be ignored. However, this shall not debar more than one Authorized distributor (with/ or

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without the OEM) from quoting equipment manufactured by an Original Equipment Manufacturer (OEM) in procurements under a Proprietary Article Certificate.

iv) A bidder participates in more than one bid in this tender process. Participation in any capacity by a Bidder (including the participation of a Bidder as a partner/ JV member or sub-contractor in another bid or vice-versa) in more than one bid shall result in the disqualification of all bids in which he is a party. However, this does not limit the participation of an entity as a sub-contractor in more than one bid if he is not bidding independently in his own name or as a member of a JV.

The Bidder declares that they have read and understood the above aspects, and the bidder confirms that such conflict of interest does not exist and undertakes that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s), in this regard. This applies in particular to

prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, the same will be considered as a violation of the tender conditions, and suitable action shall be taken by BHEL as per extant policies/ guidelines.

Signature with stamp

Name of Authorized Person:

Designation:

Name of Firm:

Date:

Pre- Qualification Requirements

PQR Clause	PQR	Vendor's response																								
1	Experience Requirement Vendor must have experience of manufacturing and supplying forgings of carbon steel or alloy steel grades in heat treated condition. Vendor must have manufactured and supplied at least 1 forging in above material grade in last 7 years as on date of issue of enquiry. In support of above, the vendor has to furnish details of forgings supplies in the following format. <table border="1"> <thead> <tr> <th rowspan="2">PO number</th> <th rowspan="2">Material Grade</th> <th colspan="2">Dimension (in mm)</th> <th rowspan="2">Date of Supply</th> </tr> <tr> <th>OD</th> <th>ID</th> <th>Height</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> In support of experience, vendor to submit following document for at least one forging from the above table: - Copy of purchase order and its correlated test certificates (duly signed by Third party inspection agency / Customer). Test certificates shall cover chemical composition, heat treatment, mechanical properties, dimensional report, non-destructive test report etc. - Invoice / dispatch document.	PO number	Material Grade	Dimension (in mm)		Date of Supply	OD	ID	Height																	
PO number	Material Grade			Dimension (in mm)			Date of Supply																			
		OD	ID	Height																						
2	Manufacturing & Testing facility a Vendor should have in-house forging and heat treatment facility to manufacture forgings of above material grade and enquiry drawing dimension. Outsourcing of forging and heat treatment is not acceptable. Vendor to confirm. Details of in-house manufacturing facilities for forging and heat treatment are to be submitted with offer. b <u>Raw material source:</u> Vendor to submit confirmation and details as per Option 1 or Option 2, as applicable: <u>Option 1:</u> Raw material for forging shall be sourced from BHEL approved source listed below. Vendor to confirm (tick mark applicable). <table border="1"> <tbody> <tr> <td>☐ CFFP BHEL</td> <td>☐ Mahindra Sanyo</td> <td>☐ Arcvac</td> <td>☐ MIDHANI</td> <td>☐ Skyway Steel</td> <td>☐ Laxcon</td> <td>☐ Goradia</td> <td>☐ RMG Alloy</td> </tr> <tr> <td>☐ Saarloha Special Quality Steel</td> <td>☐ Starwire India</td> <td>☐ SAIL</td> <td>☐ Jallaxmi Casting</td> <td>☐ Parbhat Heavy</td> <td>☐ Sunflag Iron</td> <td>☐ ISMT</td> <td>☐ Saurabh Metal</td> </tr> <tr> <td>☐ Mahendra Sponge</td> <td>☐ RINL</td> <td>☐ Sunflag Iron</td> <td>☐ Aroara Iron</td> <td>☐ Welspun Speciality</td> <td>☐ KISCO</td> <td>☐ Chaudhry Steel</td> <td> </td> </tr> </tbody> </table> <u>Option 2:</u> Raw material from other than above listed vendor can also be considered with following condition: - Vendor to submit details of their source for carbon steel with details of their steel melting and refining facility. - At least one mill test certificate of ingot/billet/bloom of carbon steel supplied by this source. c Vendor to confirm that they have all testing facility (in-house / outsourced) to carry out testing as per enquiry drawing and specification. In case of outsourcing of any test, vendor to agree for testing at NABL accredited labs only.	☐ CFFP BHEL	☐ Mahindra Sanyo	☐ Arcvac	☐ MIDHANI	☐ Skyway Steel	☐ Laxcon	☐ Goradia	☐ RMG Alloy	☐ Saarloha Special Quality Steel	☐ Starwire India	☐ SAIL	☐ Jallaxmi Casting	☐ Parbhat Heavy	☐ Sunflag Iron	☐ ISMT	☐ Saurabh Metal	☐ Mahendra Sponge	☐ RINL	☐ Sunflag Iron	☐ Aroara Iron	☐ Welspun Speciality	☐ KISCO	☐ Chaudhry Steel		
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☐ Mahendra Sponge	☐ RINL	☐ Sunflag Iron	☐ Aroara Iron	☐ Welspun Speciality	☐ KISCO	☐ Chaudhry Steel																				

(Quality Requirements)

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
1	Pre-dispatch Inspection by BHEL TPIA QUEST as per BHEL approved Quality Plan (QA/CF/QP/319 REV 01).	
2	Vendor to accept and endorse BHEL Quality Plan (QA/CF/QP/319 REV 01).	

Signature with stamp

Name:

Name of Firm:

Designation:

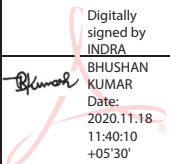
Date:

(Quality Plan)

To be signed & Stamped by bidder

MANUFACTURER'S NAME AND ADDRESS			STANDARD QUALITY PLAN				TO BE FILLED BY BHEL		TO BE FILLED BY BHEL					
BHEL	VENDOR'S NAME	ITEM	CARBON STEEL FORGING	QP NO.	QA/CF/QP/319									
				REV	01									
		DRG. NO.		AS PER PO										
		SPEC.		AS PER PO										
		REV				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	CRITICAL	CHEMICAL	100%	BHEL SPEC.	BHEL SPEC.	TC	P	V		RAW MATERIAL SHALL BE PROCURED FROM BHEL APPROVE D SOURCES ALONG WITH TEST CERTIFICATE		
2.	FORGING	FORGING STEPS	MAJOR	VISUAL	100%	INTERNAL TECHNOLOGY	INTERNAL TECHNOLOGY		P	V				
3.	QUALITY HEAT TREATMENT	TIME TEMP CONTROL	MAJOR	MEASURE	100%	BHEL SPEC	BHEL SPEC	TC	P	V				
4.	TEST PIECE IDENTIFICATION	STAMPING	MAJOR	VISUAL	BHEL SPEC	BHEL SPEC. & DRG.	BHEL SPEC & DRG.		P	W				
5.	MECHANICAL TESTING	MECHANICAL PROPERTIES	MAJOR	MECHANICAL	PER HEAT PER HT BATCH	BHEL SPEC.	BHEL SPEC.	TC	P	W				
6.	CHEMICAL TESTING	CHEMICAL COMPOSITION	MAJOR	CHEMICAL		BHEL SPEC.	BHEL SPEC.	TC	P	V				
7.	UT	ULTRASONIC TEST	MAJOR	UT	100%	BHEL SPEC.	BHEL SPEC.	TC	P	W				
8.	ANY OTHER TEST IF CALLED IN DRG. INCLUDING IBR CERTIFICATE	AS PER DRAWING	MAJOR	AS PER DRG.	100%	BHEL SPEC.& DRG.	BHEL SPEC.& DRG.	TC	P	W				
9.	MACHINING	DIMENSIONS	MAJOR	MEASURE	100%	DRAWING	DRAWING	TC	P	W				
10.	MARKING PRESERVATION & PACKING	MARKING PRESERVATION & PACKING	MAJOR	VISUAL	100%	BHEL DRAWING & SPEC	BHEL DRAWING & SPEC		P	V				

MANUFACTURER/SUBCONTRACTOR	 Digitally signed by INDRA BHUSHAN KUMAR Date: 2020.11.18 11:40:10 +05'30'	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		

(Specification/Standards/Drawings)

Specification: AA19341 Rev:08

Standard: AA0850118 Rev 01

Drawing: 41074258998 Rev 01



CORPORATE PURCHASE SPECIFICATION

AA 193 41

Rev. No. 08

PREFACE SHEET

1.5% MANGANESE STEEL FORGINGS – (Gr: 20C15)

FOR INTERNAL USE ONLY
REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS

Comparable Standards:

Suggested/Probable Suppliers and Grades:

Refer plant vendors list.

User Plant References:

- | | |
|------------------|--------------|
| 1. HEEP, HARDWAR | : -- |
| 2. HYDERABAD | : CSN 411523 |
| 3. BHOPAL | : -- |

Revisions :

Cl: 31.713 of MOM of FCF+HTM

APPROVED :

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (FCF+HTM)

Rev. No. 08

Amd.No.

Reaffirmed

Prepared
HEEP
HARDWARIssued
Corp. R&DDt. of 1st Issue
MARCH, 1978

Dt.:22.11.2011

Dt :

Year :



CORPORATE PURCHASE SPECIFICATION

AA 193 41

Rev. No. 08

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1.5% MANGANESE STEEL FORGINGS – (Gr:20C15)**1.0 GENERAL:**

This specification governs the quality requirements of 1.5% Manganese Steel Forgings, Material Grade 20C15.

2.0 APPLICATION:

Suitable for components requiring high strength and weldability.

3.0 CONDITION OF DELIVERY:

Forgings shall be suitably heat treated to achieve mechanical properties as specified in clause 12.0 of this specification.

Rough machining of the forgings shall be carried out, unless otherwise specified on BHEL order/drawing.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

There is no national standard covering this material and mechanical properties.

5.0 DIMENSIONS AND TOLERANCES:

The dimensions and tolerances shall be as specified in BHEL order/drawing. Wherever these are not specified, the machining allowances and tolerances shall be as specified below.

For finish machined drawings : 3 ± 1 mm

For rough machined drawings : ± 1 mm

6.0 MANUFACTURE:

Forgings shall be manufactured from steel produced by the open hearth, electric or such other process as may be agreed to between BHEL and the manufacturer. Steel shall be fully killed.

Sufficient discard shall be made from each ingot to ensure freedom from pipe, segregation and other defects.

The amount of hot working and finishing temperature shall be such as to ensure complete soundness and adequate uniformity of structure and mechanical properties after heat treatment. The forgings shall not be over heated.

The minimum reduction ratio when forgings are made out of ingots shall be 4:1.

For sizes above 250mm ruling section the minimum reduction ratio shall be 3.5 : 1

Revisions :

Cl: 31.713 of MOM of FCF+HTM

APPROVED :

**INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (FCF+HTM)**

Rev. No. 08

Amd.No.

Reaffirmed

Prepared
HEEP
HARDWARIssued
Corp. R&DDt. of 1st Issue
MARCH, 1978

Dt. 22.11.2011

Dt :

Year :

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CORPORATE PURCHASE SPECIFICATION



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

7.0 HEAT TREATMENT:

Forgings shall be suitably heat treated to achieve mechanical properties as specified in clause 12.0. Test pieces shall also be heat treated along with the forgings they represent.

8.0 FINISH:

As mentioned in the drawing.

9.0 FREEDOM FROM DEFECTS:

Forgings shall be free from defects such as cracks, flakes, seams, segregation, harmful non-metallic inclusions and other defects which may affect the utility of the forgings.

10.0 CHEMICAL COMPOSITION:

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

Element	Melt analysis, percent		Permissible variation, percent.
	min.	max	
Carbon	0.16	0.24	± 0.02
Silicon	0.10	0.35	± 0.03
Manganese	1.30	1.70	± 0.05
Sulphur	--	0.035	+ 0.005
Phosphorus	--	0.035	+ 0.005

Note:

- 1) Elements not quoted above shall not be added to the steel, other than for the purpose of finishing the heat and shall not exceed the following limits:

Element	Percent, max.
Nickel	0.30
Chromium	0.30
Copper	0.25
Molybdenum	0.15
Vanadium	0.05
Tin	0.05

- 2) Carbon equivalent (melt analysis) value : C.E. = 0.48%, max.

$$\text{C.E.} = \text{C} + \frac{\text{Mn}}{6} + \frac{\text{Cr} + \text{Mo} + \text{V}}{5} + \frac{\text{Ni} + \text{Cu}}{15}$$

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11.0 TEST SAMPLES:

- 11.1 Unless otherwise specified in the order/drawing, test samples shall be taken from each melt and each heat treatment batch. Test samples should be cut from the heat treated forgings by cold process only and shall receive no further heat treatment.

Test samples shall be taken from locations indicated on the drawing, leaving enough material, if required, for testing at BHEL's end, integral with the forging.

Test samples shall be cylindrical or rectangular in shape and cut at a distance of 12.5 mm below the heat treated surface.

- 11.2 When integral test pieces are not called for, a test sample equivalent to the ruling section or 65 mm diameter, whichever is less and 610 mm long, having similar reduction ratio and heat treatment, as the forgings it represents shall be provided per heat, per heat treatment batch for check testing at BHEL along with the forgings. The sample shall be properly identified and correlated with the heat/heat treatment Batch No/Test certificate No. Test samples shall be taken at a distance of 12.5 mm below the heat treated surface.
- 11.3 Test samples shall generally be taken in the longitudinal direction. However, for economic reasons or where the size/configuration does not permit the same. Test samples may be taken in the transverse or radial direction. The test sample orientation shall be mentioned in the test certificate.

12.0 MECHANICAL PROPERTIES:

The test pieces, after being heat treated as per clause 7.0 above, shall show the following properties upto a limiting section of 800mm. Properties for thicker sections shall be subject to agreement between BHEL and the manufacturer. Test methods are specified below:

- 12.1 Tensile test : As per IS:1608
- 12.2 Hardness test (Brinell) : As per IS:1500
- 12.3 Charpy Impact Value (2mm U-Notch) : As per IS :1499

This test applicable for forgings of sizes above 16mm only.

Property	Sample (See cl.11.3)	Limiting ruling section, mm	
		Upto & incl.400	> 400 & upto 800
Tensile strength N/mm ²	Longitudinal/ Transverse/ Radial/Tangential	510	490

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Yield strength min, N/mm ²	Longitudinal/ Transverse/ Radial/Tangential	295	275
Elongation on 5.65 $\sqrt{S_0}$ gauge length percent, min	Longitudinal Transverse Radial Tangential	17 9 11 13	15 7 9 11
*Hardness, Brinell, HB	—	143 - 197	143 - 197
Charpy Impact Value (2mm, U-Notch) min., Joules	Longitudinal Transverse Radial Tangential	31 16 19 24	25 13 16 20

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

13.0 ULTRASONIC TEST:

Each forging 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.

14.0 ADDITIONAL TESTS:

If specified in the drawing/order, the following tests shall be conducted:

- i) Magnetic particle test.
- ii) Any other tests.

Norms and acceptance shall be as specified in the drawing/order.

15.0 SCOPE OF THIRD PARTY INSPECTION:

Wherever, separate quality plan is not attached, the scope of third party inspection shall be as follows:

1. Review of supplier's declared chemical composition.
2. Selection of test samples for mechanical tests and witness of mechanical tests.
3. Witness of Non-destructive tests as applicable.
4. Review of HT charts.
5. Dimensional inspection.

16.0 TEST CERTIFICATES:

Three copies of test certificates shall be supplied unless otherwise stated in the order, preferably in the test certificate format annexed to this specification (Annexure-1).

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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.

Dimensional Inspection.
 Details of heat treatment.
 Reduction ratio
 Chemical composition including trace elements.
 Results of mechanical tests.
 Results of ultrasonic test.
 Results of additional tests called for in the order/drawing.

17.0 PACKING AND MARKING:

Forgings shall be suitably packed to prevent corrosion and damage during transit. Machined surfaces shall be properly protected with anti-corrosive compounds. Each package or forging (when supplied separately) shall be legibly marked with the following Information:

AA 19341 : 1.5% Manganese Steel Forgings, Material Grade.:20C15
 BHEL Order No.
 Consignment/Identification No.
 Weight.
 Batch No.
 Supplier/s name

18.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. AA 085 01 18 2. IS: 1499 3. IS: 1500 4 IS: 1608

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CORPORATE PURCHASE SPECIFICATION



ANNEXURE - 1: RECOMMENDED TEST CERTIFICATE FORMAT FOR FORGINGS

SUPPLIER'S NAME AND ADDRESS														
TEST CERTIFICATE FOR FORGINGS														
1. Customer:					9. Reduction Ratio: } Ingot to Bloom Bloom to Blank									
2. TC No. & Date:					10. Batch No.:									
3. PO No.:					11. Heat/Melt No.:									
4. Process of Melting Ingot:					12. Spec. No.:									
5. Decarburisation Process:					13. Test Bar Size & Nos.:									
6. Forging Method:					14. Supplier of the Ingot/Billet/ Bloom and TC reference.									
7. BHEL's Reference for Approval of Bloom														
8. Discard: Top _____ %; Bottom _____ %														
15. FORGINGS COVERED BY TEST CERTIFICATE														
S.No.			Drawing No. & Item No.			Description			Quantity & Weight					
16. CHEMICAL COMPOSITION (PERCENT)														
Element		C	Si	Mn	S	P								
As Per Specn.		Min.												
		Max.												
Actual Values														
17. HEAT TREATMENT (To be accompanied by Recorder Chart, Whenever called for)														
Condition		Heating Rate, °C/hr.		Temp. °C		Soaking Time, Hrs.		Cooling Rate, °C/hr		Cooling Medium				
18. MECHANICAL PROPERTIES														
		T.S. N/mm ²	Y.S. 0.5/0.2% Proof N/mm ²	% Elongation 5.65/5.0 GL	% RA Min.	Hardness BHN (Min. 3 values)	Impact Value Joules	Bend Test						
								Angle of Bend	Dia of mandrel	Result				
As Per Specn.		Min.												
		Max.												
Actual Values														
19. SURFACE FINISH (When called for in the order/drg.)														
20. DIMENSIONAL INSPECTION														
21. NON-DESTRUCTIVE TESTS														
Nature of Test		Acceptance level		Instrument used		Range		Results		Any other detail				
Ultrasonic														
Radiographic														
Dye penetrant/ Magnetic Particle														
22. METALLOGRAPHIC EXAMINATION (To be conducted if called for and photo micrographs to be attached along with a report)														
Location of Sample		Etchant used		Magnification		Constituent observed		Relative %						
Microstructure		Macroetch		Inclusion Rating										
23. OTHER TESTS IF ANY (MICROSCOPIC, SULPHUR PRINTS, ETC)														
24. IDENTIFICATION OF FORGINGS AS PER PURCHASE SPEC.														
We hereby certify that the items mentioned above have been tested and inspected in our presence and are found to be in accordance with drawings, specifications and purchase order.														
SIGNATURE, NAME & SEAL OF THE INSPECTING OFFICER										SIGNATURE, NAME & SEAL OF THE CHIEF OF QUALITY CONTROL/ CHIEF METALLURGIST OF THE SUPPLIER				
DATE:										DATE:				
INSTRUCTIONS														
a) Details of all heat treatment processes carried out should be furnished sequentially in 17.														
b) Test certificates are to be furnished as per Purchase order and specification, in A4 size preferably in transparent paper.														
c) All the entries including signature should be in block colour ink.														
d) If testing is done by outside agencies, the original TCs shall be furnished.														
e) The actual TC may run into more than one A4 size paper, if needed, to facilitate filling up of details.														

CS-692



CORPORATE STANDARD

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**ULTRASONIC TESTING, CLASSIFICATION AND ACCEPTANCE
STANDARDS FOR STEEL FORGINGS, BILLETS AND BLOOMS**

1.0 SCOPE:

This standard deals with the ultrasonic testing of steel forgings, billets and blooms. The procedure covers pulse echo direct contact manual ultrasonic flaw detection technique. This standard does not apply to austenitic steel forgings for which AA 085 0119 may be referred to.

2.0 PERSONNEL REQUIREMENT:

Personnel performing non-destructive examination and evaluation shall be qualified to the recommended practice SNT - TC - 1A or any other recognised practice.

3.0 EQUIPMENT CHARACTERISTICS:**3.1 Frequency range:**

The ultrasonic equipment shall be suitable for operating at frequencies within the range of 0.5 to 6 MHz.

3.2 Sensitivity:

The sensitivity of the equipment shall be tested to ensure that the number of full screen back wall echo is not less than that given below, when the appropriate probe is placed on the metalised surface of plastic insert of the Indian Standard reference block (IS:4904)/IIW block.

<u>Frequency range, MHz</u>	<u>Min.No. of full screen back echoes</u>
1	5
2	4
4 to 6	2

3.3 Resolution:

The resolution of the equipment and probe combined shall be such as to show separately indications of the three grooves in the IIW - VI block.

Revision:

C1.9.4 OF MOM OF WG(NDT)

Approved:

INTERPLANT STANDARDIZATION
COMMITTEE - (WG-NDT)

Rev.No. 01

Amd.No. 01

Reaffirmed

Prepared
CFFP
HARDWARIssued
CORP. R&DDt. of 1st issue
Jan '80

Dt. Jan '95

Dt. 29.10-99

Year:

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4.0 SURFACE CONDITION:

The test surface shall be free from loose scales, rust and such other extraneous material that would interfere with the ultrasonic energy transmission. In case of machined surface, it is desirable to have a surface finish of 6.25 microns or better. A gramophone record type of finish and tear produced by machining tools shall be avoided since these give rise to spurious echoes and cause probe wear.

5.0 COUPLANT:

To ensure adequate transmission of ultrasonic energy between the probe and the test object, a suitable couplant having good wetting characteristics such as oil, grease or water, ~~glycerine or cellulose paste~~ shall be used.

6.0 TESTING TECHNIQUE:

6.1 Selection of testing technique shall be made after giving due consideration to the method of manufacture and shape of the object tested. Testing technique should be such that each and every part of the object volume is scanned at least once. Successive scans shall overlap a minimum of 15% of the probe width. Uniform contact shall be maintained between probe and object and scanning speed shall not exceed 150 mm/ second. The following techniques are considered to be minimum for providing adequate coverage.

6.2 Scanning Scheme (Solid And Hollow Forgings):

Complete length of the forging shall be scanned radially from sides / cylindrical surface through 360° using longitudinal wave probe. Whenever practicable the forging shall be scanned in axial direction also. Hollow forgings, and when necessary, solid forgings also shall be scanned using appropriate shear wave probes to detect axial and radial cracks. Hollow forgings are the forgings made hollow on the press by punching or ring rolling operation.

6.3 Solid Rectangular Forgings, Billets And Blooms:

Complete length of the object shall be scanned from two adjacent faces and whenever practicable one end face using longitudinal wave probe.

6.4 Radial cracks on round sections which can not be detected by normal testing method may be subjected to other crack detection methods such as MPI.

7.0 SCANNING:7.1 Probes and Frequency:

Overall scanning shall be done using 2 MHz nominal, 20-25 mm diameter probes except when large grain size and path length make it necessary to use a lower frequency. Smaller probes may be used when necessary. However, for forgings intended for backing material for white metal lined bearings, the examination shall be carried out by 4 MHz probes.



7.2 Time Base Calibration:

The time base shall be calibrated using a calibration block or a known dimension of forging under examination.

7.3 Sensitivity:

7.3.1 When Calibrated Attenuator Is Not Available:

Reference sensitivity of equipment shall be set such that the maximum acceptable defect equivalent flat bottomed hole in the test block is equal to 75% of the full screen height. Testing shall be carried out at the highest sensitivity possible.

7.3.2 When Calibrated Attenuator Is Available:

The sensitivity of the equipment during scanning shall be set 6 dB more than the sensitivity required to give a full screen height echo from the maximum acceptable size of defect.

Note: The above sensitivity level adjustment is purely for scanning purposes. Once a defect is encountered, the sensitivity shall be brought down to estimate the size of defect for evaluation of the material under test.

8.0 ESTIMATION OF FLAW SIZE:

8.1 Large Size Flaws:

The size of large flaws can be estimated by moving the probe in all directions and plotting the midpoint of the probe when echo falls to 50 percent or 6 dB.

8.2 Small Size Flaws:

8.2.1 When Calibrated Attenuator Is Not Available:

8.2.1.1 The size of the flaw may be estimated by comparing with the echoes of the flat bottomed holes at appropriate depths in a test block of ultrasonically similar material.

8.2.1.2 The size of the flaw may also be estimated by moving probe successively in all the four directions at right angles to each other and plotting the mid point of the probe when echo height falls to 50% or 6 dB. Due allowance shall also be made for beam spread, depth and orientation of flaw and diameter of the forging if the scanning is done from the curved surface.

8.2.2 When Calibrated Attenuator Is Provided With The Equipment:

The size of the flaw (smaller than the beam spread) can be estimated accurately in millimetres of equivalent circular flaw with the help of Krautkramer's DGS (Distance - gain - size) diagram. Method of estimating flaw size using a DGS diagram is given in Annexure - A.

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**9.0 CLASSIFICATION OF FORGINGS, BILLETS AND BLOOMS:**

9.1 Forgings, billets and blooms are classified into the following five categories depending upon the defect size admissibility for the purpose of ultrasonic testing:

CategoryUnacceptable defects

- | | |
|---|--|
| 1 | <ul style="list-style-type: none"> (i) Cracks, flakes, seams & laps. (ii) Defects giving indication larger than that from a 2 mm diameter equivalent flaw. (iii) Groups of defects with maximum indication less than that from a 2 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 70%. (iv) Defects giving indications of 1 to 2 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws. |
| 2 | <ul style="list-style-type: none"> (i) Cracks, flakes, seams & laps. (ii) Defects giving indication larger than that from a 4 mm diameter equivalent flaw. (iii) Groups of defects with maximum indication less than that from a 4 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 50%. (iv) Defects giving indications of 2 to 4 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws. |
| 3 | <ul style="list-style-type: none"> (i) Cracks, flakes, seams & laps. (ii) Defects giving indication larger than that from a 6 mm diameter equivalent flaw. (iii) Groups of defects with maximum indication less than that from a 6 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 40%. (iv) Defects giving indications of 3 to 6 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws. |
| 4 | <ul style="list-style-type: none"> (i) Cracks, flakes, seams & laps. (ii) Defects giving indication larger than that from a 10 mm diameter equivalent flaw. (iii) Groups of defects with maximum indication less than that from a 10 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 20%. |



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- (iv) Defects giving indications of 5 to 10 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.
- 5 (i) Cracks, flakes, seams & laps.
- (ii) Defects giving indication larger than that from a 15 mm diameter equivalent flaw.
- (iii) Groups of defects with maximum indication less than that from a 15 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 10%.

Note: Loss of back wall echo not attributable to the presence of defects or geometry and exceeding the limits mentioned in item (iii) of each category of unacceptable defects shall be a cause for rejection.

ANNEXURE - A

The equivalent flaw size curves of the DGS diagram is prepared by plotting the amplitude in decibels from a series of circular reflectors with increasing distance from the probe in water and so the graph incorporates only the loss in water. When it is found that the attenuation in the material under test is more (this can be checked using back echo curve of DGS diagram), this shall be taken into account while calculating the flaw size. Corrections will not be required for majority of heat treated forgings when tested with 2-4 MHz probes.

A step by step method of estimating flaw size using universal DGS diagram is given below:

- (a) Adjust the depth range of the equipment to the required depth.
- (b) Adjust the back echo to 70% of screen height from a defect free area parallel wall of the material under test or ultrasonically similar test block and note the dB value (A) on the calibrated gain control.
- (c) Mark on the back echo curve of the diagram, the back wall of the distance in terms of near field in millimetres in the case of universal DGS diagram.
- (d) Move the probe to the defective area and get the maximum defect echo. Read off the flaw depth. Increase the gain with the calibrated gain control until echo height reaches 70% of screen height. Note the attenuator reading in dB (B).
- (e) Calculate the gain (G) in dB by subtracting 'A' from 'B'. Count off the gain 'G' downwards from the marked point on the back echo curve, and then move horizontally to intersect the vertical line from the base line corresponding to the flaw depth 'D' in terms of near field in the case of universal diagram.

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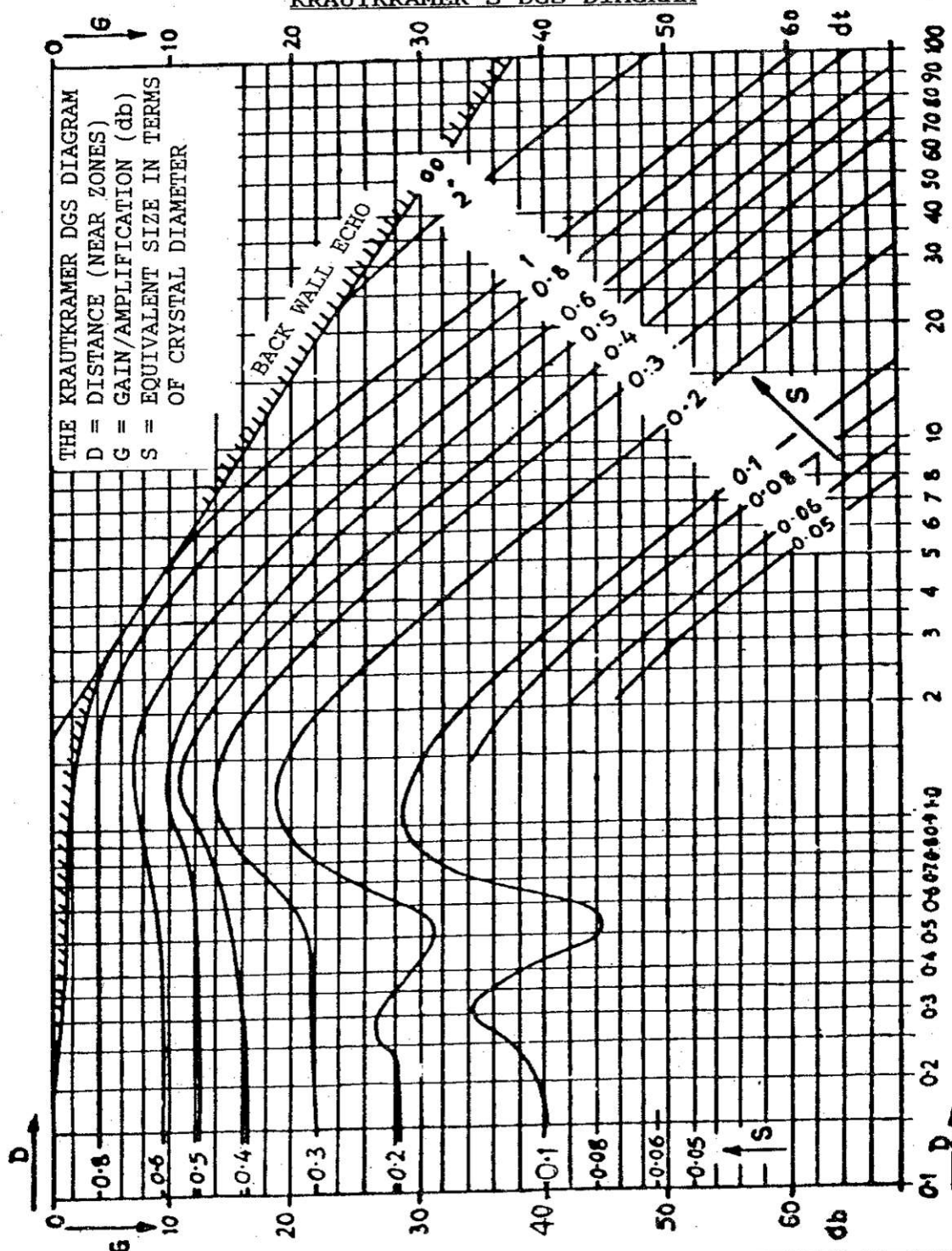
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- (f) Note the equivalent flaw size curve passing through the above point. Multiply the reduced flaw dimension (S) of the curve by the probe diameter to give the equivalent flaw size in millimetres.

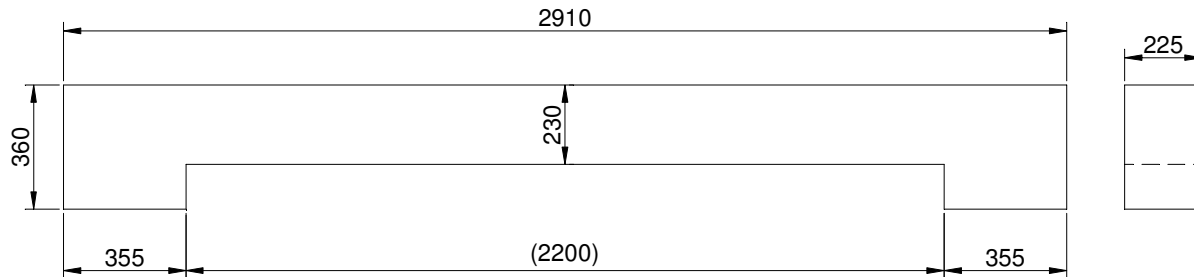
ANNEXURE - A
KRAUTKRAMER'S DGS DIAGRAM



FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED	REV	DATE	ALTERED RAJPAL sd/-	GMS No.-/ C.B.O.M.- NO. 0-10742-58000	STATUS OF DRG U		
		CHECKED			CHECKED ASHISH sd/-				
ZONE			ZONE	DRAWING SUPERSEDES UNDER THE SAME NUMBER. C/A No.: MTE-24-F0008	AGREED DEPT	NAME	SIGN	DATE	
					WTX	SUSHANT	sd/-	12.08.23	
					STE TIX	DINESH GOND SS. ORAON	sd/-	14.08.23 16.08.23	
GRADE OF UNTOL.DIM M/CG. Q/M/F -AA0230208						WELDING A/B/C/D AA0621104		GAS CUTTING-T3 AA0621101	

12.5/ALL OVER EXCEPT
OTHERWISE STATED

1. FORGING SHALL BE SUPPLIED IN CONFORMITY WITH THE PURCHASING SPECIFICATION NO. AA19341.
2. TOLERANCES :- OUT SIDE DIMENSIONS : +2
IN SIDE DIMENSIONS : -2
3. IDENTIFICATION MARKING SHALL BE DONE AT THE PLACE MARKED XXXX.

3-10742-58102
Ref. Drawing No.

W95310742093

AA19341

BHARAT HEAVY ELECTRICALS LTD.
RANIPUR, HARDWAR

NAME	SIGN	DATE	NO. OF VAR
DRN RAJPAL	sd/-	01.08.23	
CHD SUBODH RANA	sd/-	01.08.23	
APPD ASHISH RANJAN	sd/-	14.08.23	

DEPT	MTE		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
CODE	4300		NTS	1344.0	-----	—	—
TITLE : FORGING FOR JOINT FLANGE (R/M)				CARD CODE	DRAWING NO.		—
				—	4-10742-58998		—
					SHEET No. 01		No. OF SHEETS 01

A4 SIZE

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Self-Certification for local content

**DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH
REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017 DATED 04TH
JUNE, 2020 AND SUBSEQUENT ORDER(S)**

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,

(BHEL HEEP Haridwar)

Dear Sir,

Sub: Declaration reg. minimum local content in line with Public Procurement (Preference to Make in India), Order 2017-Revision, dated 04th June, 2020 and subsequent order(s).

Ref: 1) GeM Bid Specification No:

2) All other pertinent issues till date

We hereby certify that the items/works/services offered by..... (*specify the name of the organization here*) has a local content of _____ % and this meets the local content requirement for **'Class-I local supplier' / 'Class II local supplier'** ** as defined in Public Procurement (Preference to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and subsequent order(s).

The details of the location(s) at which the local value addition is made are as follows:

1. _____ 2. _____

3. _____ 4. _____

...

Thanking you,

Yours faithfully,

**(Signature, Date & Seal of
Authorized Signatory of the Bidder)**

**** - Strike out whichever is not applicable.**

Note:

1. Bidders to note that above format, duly filled & signed by authorized signatory, shall be submitted along with the techno-commercial offer.
2. In case the bidder's quoted value is in excess of Rs. 10 crores, the authorized signatory for this declaration shall necessarily be the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers other than companies).
3. In the event of false declaration, actions as per the above order and as per BHEL Guidelines shall be initiated against the bidder.

Certificate of No-deviation

CERTIFICATE OF NO DEVIATION

(To be Typed & submitted in the Letter Head of the Company/Firm of Bidder)

To,

(Write Name & Address of Officer of BHEL inviting the Tender)

Dear Sir,

Subject: **No Deviation Certificate**

Ref: 1) GeM Bid No:
2) All other pertinent issues till date

We hereby confirm that we have not changed/ modified/materially altered any of the tender documents as downloaded from the website/ issued by BHEL and in case of such observance at any stage, it shall be treated as null and void.

We also hereby confirm that we have neither set any Terms and Conditions and nor have we taken any deviation from the Tender conditions together with other references applicable for the above referred GeM Bid.

We further confirm our unqualified acceptance to all Terms and Conditions, unqualified compliance to Tender Conditions.

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,

Yours faithfully,

**(Signature, date & seal of authorized
representative of the bidder)**

Date:

Place:

DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS
UNDER RULE 144 (xi) OF GFR 2017

DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS UNDER RULE 144 (xi) OF GFR 2017

(To be typed and submitted in the Letter Head of the Entity/ Firm providing certificate as applicable)

To,

(BHEL HEPP Haridwar)

Dear Sir,

Sub: Declaration regarding compliance to Restrictions under Rule 144 (xi) of GFR 2017

Ref: 1) GeM Bid No:,

2) All other pertinent issues till date

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India. I certify that _____ (SPECIFY THE NAME OF THE ORGANIZATION HERE), is not from such a country/ has been registered with the Competent Authority (attach valid registration by the Competent Authority, i.e., the Registration Committee constituted by the Dept. for Promotion of Industry and Internal Trade (DPIIT)).

I hereby certify that we fulfil all requirements in this regard and is eligible to be considered.

Thanking you,

Yours faithfully,

(Signature, Date & Seal of
Authorized Signatory of the Bidder)

Note: Bidders to note that in case above certification given by a bidder, whose bid is accepted, is found to be false, then this would be a ground for immediate termination and for taking further action in accordance with law and as per BHEL guidelines.