



Annexure A

NOTICE INVITING TENDER

Ref: NIT 35369 (9171183E) dt 03.11.2017

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Contact Details

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Technical Requirement

Tenders are requested for entering the rate contract for supplying the following items.

Sl.no	Size	Description	Grade & IS Dstandard	Rate Contract Quantity	Firm Qty.	Delivery
Set-A						
1	M12X45	HSFG Bolt	GR.10.9 AS PER IS 3757	200	100	30-12-17
2	M12X55	HSFG Bolt	GR.10.9 AS PER IS 3757	1100	550	30-12-17
3	M12X70	HSFG Bolt	GR.10.9 AS PER IS 3757	1500	750	30-12-17
4	M12	HSFG Nut	Class 10 Gr.B AS PER IS 6623	2800	1400	30-12-17
5	A12	HSFG Washer	AS PER IS 6649	2800	1400	30-12-17
Set-B						
6	M16X30	HSFG Bolt	GR.10.9 AS PER IS 3757	700	350	30-12-17
7	M16X50	HSFG Bolt	GR.10.9 AS PER IS 3757	35000	13450	30-12-17
8	M16X55	HSFG Bolt	GR.10.9 AS PER IS 3757	66000	6950	30-12-17
9	M16X60	HSFG Bolt	GR.10.9 AS PER IS 3757	18000	8700	30-12-17
10	M16X75	HSFG Bolt	GR.10.9 AS PER IS 3757	22000	2500	30-12-17
11	M16X80	HSFG Bolt	GR.10.9 AS PER IS 3757	400	200	30-12-17
12	M16X100	HSFG Bolt	GR.10.9 AS PER IS 3757	7000	700	30-12-17
13	M16	HSFG Nut	Class 10 Gr.B AS PER IS 6623	150000	32850	30-12-17
14	A16	HSFG Washer	AS PER IS 6649	150000	32850	30-12-17

Annexure A



Set-C						
15	M20X50	HSFG Bolt	GR.10.9 AS PER IS 3757	2000	950	30-12-17
16	M20X60	HSFG Bolt	GR.10.9 AS PER IS 3757	6000	2830	30-12-17
17	M20X65	HSFG Bolt	GR.10.9 AS PER IS 3757	13000	6400	30-12-17
18	M20X70	HSFG Bolt	GR.10.9 AS PER IS 3757	7200	3600	30-12-17
19	M20	HSFG Nut	Class 10 Gr.B AS PER IS 6623	29000	13780	30-12-17
20	A20	HSFG Washer	AS PER IS 6649	29000	13780	30-12-17
Set-D						
21	M24X50	HSFG Bolt	GR.10.9 AS PER IS 3757	1000	450	30-12-17
22	M24X60	HSFG Bolt	GR.10.9 AS PER IS 3757	6000	2780	30-12-17
23	M24X65	HSFG Bolt	GR.10.9 AS PER IS 3757	4600	2300	30-12-17
24	M24X70	HSFG Bolt	GR.10.9 AS PER IS 3757	27000	1880	30-12-17
25	M24X75	HSFG Bolt	GR.10.9 AS PER IS 3757	145000	25950	30-12-17
26	M24X80	HSFG Bolt	GR.10.9 AS PER IS 3757	13000	5690	30-12-17
27	M24X85	HSFG Bolt	GR.10.9 AS PER IS 3757	4200	2100	30-12-17
28	M24X90	HSFG Bolt	GR.10.9 AS PER IS 3757	62000	6675	30-12-17
29	M24X95	HSFG Bolt	GR.10.9 AS PER IS 3757	2600	1300	30-12-17
30	M24X100	HSFG Bolt	GR.10.9 AS PER IS 3757	45000	14800	30-12-17
31	M24X110	HSFG Bolt	GR.10.9 AS PER IS 3757	3200	800	30-12-17
32	M24X120	HSFG Bolt	GR.10.9 AS PER IS 3757	400	200	30-12-17
33	M24	HSFG Nut	Class 10 Gr.B AS PER IS 6623	315000	64925	30-12-17
34	A24	HSFG Washer	AS PER IS 6649	315000	64925	30-12-17

Technical delivery condition as per TDC-5-211 Rev 02

Note: Evaluation of offers will be done on set basis only. Bolt, Nut & Grip washer of a particular Diameter (M12/M16/M20/M24) i.e Enq.Sl.No 1 to 5,6 to 14,15 to 20 & 21 to 34 will be treated as sets

Tender may be submitted through <https://bheleps.buyjunction.in>

Note: All corrigenda, addenda, amendments, time extensions, clarifications etc., to the tender will be hosted on BHEL website (www. bhel.com) only. Bidder should regularly visit website www.bhel.com to keep themselves updated.

A] Pre Qualification Requirement (PQR):

- Suppliers should be a manufacturer of High Strength Friction Grip Fasteners (or) similar item(s) for participating in the tender and should have necessary manufacturing facilities to meet BHEL's quality and delivery requirement. Offer received from other than manufacturer will not be considered. Necessary certificate like Company/s registration/Incorporation certificate, etc in support of this, should be enclosed along with the Part-I (technical) offer.
- Bidders should have experience in manufacture and supply of High Strength Friction Grip Fasteners (or) similar items for the Last 2 Years.
- This items is reserved for Micro and small enterprises

- iv) **In support of the above points, documentary evidence like Customer's unpriced Purchase order copy , etc should be submitted along with the technical offer.**
- v) ITR / balance sheet for last two years required to analyze the financial status.
- vi) PAN Number and GST registration copy required.

Terms and conditions

- (i) This Enquiry is for entering into Rate Contract for the procurement of **HSFG BOLT,NUT AND GRIPWASHER** required for various projects. Contractual period shall be one year from the date of finalization of the Rate Contract for ordering.
- (ii) The Rate Contract Period for One year means twelve months from the date of Letter of Intent .
- (iii) The quantity indicated is tentative only. The qty indicated are not guaranteed requirement. It may increase / decrease. However our present firm requirement is as indicated .
- (iv) Rates shall be firm and shall be valid for ordering for a period of twelve months from the date of Letter of Intent. This means the order can be released on the last date of the Contract period.
- (v) The rates shall be firm till completion of supplies.
- (vi) Vendor shall indicate in the commercial offer their delivery capacity with delivery period.
- (vii) Also vendor shall indicate their delivery capacity with delivery period from the date of release of subsequent addendums that can be released by BHEL based on further requirement.
- (VIII) Vendor shall offer their prices on F.O.R.BHEL Stores, Ranipet basis i.e. price shall be inclusive of P&F and Freight & Insurance.
- (IX) Vendor shall furnish all the details as per the enclosed commercial terms & conditions format.
- (X) Delivery period condition: Offer from the suppliers who can supply the material within 2 months from the date of Firm Purchase order only will be considered for this tender.



II - Special Terms and Conditions

- (i) BHEL reserves the right to increase or decrease the tendered quantity and split the tendered quantity among more than one tenderer & place orders accordingly in any proportion based on commitment, requirement and supplier's capability in terms of delivery and quality as detailed above vide clause viii & ix.
- (ii) Lowest prices received against BHEL tenders need not be the technically acceptable
L1 price and BHEL reserves the right not to consider the same.
- (iii) BHEL reserves the right to negotiate or re-float the tender opened if L1 price is not the lowest acceptable price to inter-alia other reasons.
- (iv) BHEL may order on more than one vendor at the lowest acceptable price to BHEL.

BHEL reserves the right to split the tendered quantity against each enquiry in the ratio of 50:30:20 among the L1 -50% , L2-30% and L3 -20% vendors respectively. The L1 rate will be counter offered to the L2 and L3 vendor and upon acceptance of the counter offer, PO will be placed on L2 vendor for 30% of the enquiry quantity and L3 vendor for 20% of quantity. If L2/L3 vendor does not accept counter offer, it will be counter offered to next higher bidders leaving out H1 bidder (i.e., H1 bidder will not be given any counter offer) and also if no one accepts the counter offer, the entire enquiry quantity will be ordered on the L1 vendor.

Manager/purchase

Revision record:

Rev 00: 18/10/2011 Fresh Issue released and Test Sampling Plan Rev 00

Rev 01: 19/04/2012 Cl 2: Requirement if the Carbon content is below 0.6% - Added for Bolts; Mn for Nuts: limited to 0.25 min instead of 0.25 max. Cl 5: Hardness of Bolt & Nut: Acceptance values changed. Cl 7: Preservation and Packing added and Test Sampling Plan Rev 01

Rev 02: 28/10/2014 Property class Bolt 10.9 and Nut 10 and its requirements added (for Neyveli 2x500MW Tower boiler) in all clauses and Test Sampling Plan Rev 02

1. SCOPE:

This technical delivery condition covers the requirements for the High strength structural steel bolts, Nuts and Washers applicable for boiler structures and shall be procured from the BHEL approved manufacturers only. The mandatory requirements, test methods and procedures from the applicable IS standards to confirm a product to its relevant latest IS standard shall be met with. TDC is in addition to specification.

Size, Specification and Qty: As per the BHEL Purchase order (PO) / BHEL Drawing. The bolts, nuts and washers shall be supplied in the dull black heat treated condition with residual coating of light oil.

For Bolts: IS: 3757 (Latest) Property class: 8.8 or 10.9. Product Grade C of IS Specification IS: 1367 Part 2 (Latest).

For Nuts: IS: 6623 (Latest) Property class: 8 or 10, Product Grade B

For Washers: IS: 6649 (Latest) Material: 45C8, Type-A: Plain hole Circular Washers. Grade: Ordinary

2. RAW MATERIAL:

- Bolts and Nuts: Rolled/Forged bar of Carbon steel. Washer: as per IS 1571 Part 2 (Latest)
- Chemical composition:** Shall be checked on receipt of raw material at supplier works for every heat
Bolts: Plain Carbon Steel, Carbon steel with additives (eg Br, Mn or Cr) – As per Table 2 of IS: 1367 Part 3 (Latest)
Nuts: As per Table 4 of IS 1367 Part 6 (Latest)
Washers: As per IS 1570 Part 2 and Sulphur, Phosphorous <0.06% in check analysis

3. DIMENSIONS AND TOLERANCES:

- Process: Cold/Hot Forging with Dies and tools clean of loose scale and sheet particles.
- Threads on the bolts shall be checked with a properly calibrated ring gauge with a tolerance class 6g. Threads on the nuts shall be checked with a properly calibrated plug gauge with tolerance class 6H (in an NABL accredited LAB).
- Dimensions of the Bolts shall be as per the table given in IS 3757 (Latest)
- Dimensions of the Nuts shall be as per the table given in IS: 6623 (Latest)
- Dimensions of the Washers shall be as per the table given in IS 6649 (Latest)

Note: The washers shall be flat with a maximum deviation not exceeding 0.25 mm from the straight edge laid along a line passing through the center of the hole. The hole of the washer shall be concentric with the outside dimensions within 0.50 mm. washers are required to be clipped to provide clearance, the clipped edge shall not be closer to the center of the washer than 0.9 of the bolt diameter.

4. Post Forming Heat Treatment (HT):

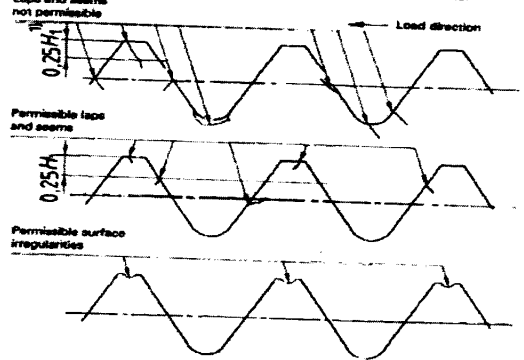
- Bolt: After forming shall be quenched (HT at AC 3 temperature, with soaking time 30minutes per inch followed by quenching) and tempered (at 425°C min, 60 minutes per inch). There should be a sufficient hardenability to ensure a structure consisting of approximately 90 % martensitic in the core of the threaded sections for the fasteners in the as-hardened condition before tempering.
- Nut: Shall be hardened and then tempered (at a temperature of 425°C minimum).
- Washer: Shall be hardened and tempered. Carburized washers are not permitted.

5. CHEMICAL & MECHANICAL & NDE: (on Heat Treated finished product)

Sample Size for Mechanical test: & NDE: As per Sampling Plan

BOLT :

Sl	Test	Test Method - As per Table 3 of IS: 1367 Part 3 (Latest)	Acceptance
1	Chemistry	Spectro / Wet Analysis Method – One sample for every heat Of raw material and One sample/HT batch on product	As per Cl 2.0 of this TDC
2	Hardness Test	Note: Surface hardness shall not be more than 30 Vickers above the measured core Hardness on the product when readings of both surface and core are carried out at HV 0.30. For property class 10.9, any increase in hardness at the surface which indicates that the surface hardness exceeds 390 HV is not acceptable.	8.8 – Min 255 HV Max 335 HV 10.9 – Min 320HV, Max 380HV
3	Minimum Tensile Strength, %Elongation on 5.65√A, % Reduction in Area after fracture	*if wedge load test is satisfactory the axial tensile test is not required	8.8 – 830N/mm ² , 12 min, 52% min 10.9 – 1040 N/mm ² , 9 min, 48% min
4	Proof Load Test	8.8 – Proof Load of M16(91KN), M20 (147KN), M24 (212KN), M30 (337KN), M36 (490KN); 10.9 – Proof Load of M16(130KN), M20 (203KN), M24 (293KN), M30 (466KN), M36 (678KN) shall be applied axially to the bolt in a calibrated tensile testing machine for 15sec.	Length of the bolt after loading shall be the same as before loading within a tolerance of ± 12.5 µm allowed for measurement error.
5	Strength under Wedge load test	IS: 1367 Part 3 (Latest)	8.8 – < 830N/mm ² 10.9 – < 1040 N/mm ²
6	Decarburization Test at 200X min magnification	Determination of the following by MICROSCOPIC Method a) Minimum Height of non decarburized thread zone – E b) Maximum depth of complete decarburization – G	E = 2/3 H1 G = 0.015 mm
7	Hardness after Retempering	IS: 1367 Part 3 (Latest) # test not mandatory, to be applied in case of dispute only	Reduction of hardness 20 HV max.
8	NDE for Surface Integrity	before machining – For bar Diameter ≥ 40 mm: UT as per ASTM A388. For bar Diameter < 40 mm: MPI as per ASTM E 709 After machining – MPI as per ASTM E 709 or as per ISO 6157 Part 3 (Latest)	UT – ASME SEC-VIII. Div-II Part: 3.3.4 (Latest). MPI – Linear indications like cracks, folds & other injurious defects are not acceptable.

9	Micro Examination for Surface Integrity – Laps at threaded region. If any defectives found in visual and NDE examinations, the extent of defect can be determined by micro examination. 	Max depth of laps in thread = 0.41 mm Laps of any depth or length are not permitted in the following places: - at the root of the thread - at the loaded flank of screw thread below the pitch diameter, even if they start beyond the pitch diameter. The following laps are permissible: - laps in the crest of the threads of 0.25 H1 max.; - crest of the threads not entirely rolled out, maximum half a turn on one thread; - laps below the pitch diameter, if they run on the non-loaded flank towards the major diameter and not deeper than 0.25 H1 and not longer than half a turn on one thread.
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NUT: (on Heat Treated finished product)

Sl	Test	Test Method	Acceptance Value
1.	Chemistry	Spectro / Wet Analysis Method – For every heat Of raw material and, One sample/HT batch on product	As per CI 2.0 of this TDC
2.	Hardness Test	Hardness of the test mandrel shall be minimum 45 HRC.	8S – Min 188 HV Max 372 HV 10S – Min 272 HV Max 372 HV
3.	Proof Load Test	Proof Load of 8S – M16(168.9KN), M20 (263.4KN), M24 (379.5KN), M30 (603.1KN), M36 (878.3KN) 10S – M16(195.5KN), M20 (305KN), M24 (439.5KN), M30 (698.4KN), M36 (1017.2KN) shall be applied axially to the nut in a tensile testing machine for 15sec.	The nut shall resist the load without failure by stripping or rupture, and shall be removable by the fingers after the load is released.
4.	NDE for Surface Integrity	Before coating, as per IS 1367 Part 10 Cl 4.2 (Latest)	Linear indications like cracks, folds & Other injurious defects are not acceptable.

WASHER: As per IS 5369. The washers shall be free from cracks, burrs, pits and other defects. All sharp edges shall be removed. **(on Heat Treated finished product)**

Sl	Test	Test Method	Acceptance Value
1.	Chemistry	Spectro / Wet Analysis Method – For every heat Of raw material and One sample/HT batch on product.	As per CI 2.0 of this TDC
2.	Hardness Test	IS 1586 (latest)	Min 35 HRC Max 45 HRC

6. MARKING, PRESERVATION AND PACKING:

The following to be hot stamped or embossed on the top surface of the bolt and nut:

Bolt – Manufacturer's Identification Symbol and 8.8S/10.9S

Nut – Manufacturer's Identification Symbol and 8S/ 10S

Washers – Shall be identified by – the provision of 2 nibs and manufacturers identification symbol being placed as near to the outer edge as possible.

The following details shall be clearly indicated in the tags tied to the bundle:

- Customer Name
- Manufacturer's Name
- Vendor Code
- Purchase Order No and Supplier internal W.O No
- Quantum and Weight
- BHEL Material Code
- Item Description with diameter, length

Shall be packed in bituminous coated Polythene lined Hessian Cloth/Bag. Each bag shall contain only the same size of bolts/ nuts/ washers respectively and the same shall be indicated in the tags.

7. INSPECTION AND CERTIFICATION:

All the finished components shall be visually and dimensionally inspected as per sampling plan. All the test results shall be documented and maintained. Products to be inspected at works & test certificates (in English) shall be submitted with the following details counter signed by BHEL/BHEL Authorized Inspection agency as indicated in the PO. Manufacturers Test certificate (MTC) shall contain the following:

- Purchase Order No. (BHEL), TDC No, Specification and Grade.
- Name of raw material bar supplier.
- Forming process
- Dimensional reports for each product.
- Chemistry including incidental elements on the raw material and final product checked in NABL lab/ suppliers own lab.
- HT details of materials temperature, soaking time, ROH/ROC medium etc.
- All Mechanical test result report including hardness.
- MPI, Micro examination and decarburization test report with the reference & acceptance standard.
- TC of raw material, UT/MPI report done on raw material shall accompany the MTC.

8. AUDITS AT BHEL:

BHEL reserve the right to reject any item found to be not meeting the requirements during tests at supplier works or during subsequent processing at BHEL.

Haritha.C QA	Venkanna Rupani QA	Kalyanaraman.V QA	Viswanathan.D Engineering	Sekar.S QC	Balachandran.K.S MM	Revisankaran.U QA
Prepared By			Reviewed By			Approved By

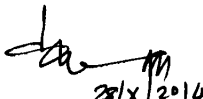
BHEL: TRICHY – 14

TEST SAMPLING PLAN FOR HSFG BOLTS, NUTS & WASHERS AS PER BHEL TDC: 5:211 Rev 02

Lot Size (In nos.)	SAMPLE SIZE										Remarks
	Visual (nos.)	Dimensional (nos.)	MPI (nos.)	Physical Tests							
				Total nos.	Hardness (nos.)	Hardness after Re-tempering (nos.)	Proof Load (nos.)	Wedge Load (nos.)	Min Tensile Strength (nos.)	Decarb (nos.)	
Upto 100	20	8	15	5	5	5	2	2	2	1	
101 to 300	32	13	15	5	5	5	2	2	2	1	
301 to 500	50	20	15	5	5	5	2	2	2	1	
501 to 1000	80	32	15	5	5	5	2	2	2	1	
1001 to 3000	125	50	25	8	8	8	2	4	2	1	Upto 1500 nos. 15 nos. for MPI
3001 to 10000	200	80	50	13	13	13	2	6	2	1	Upto 5000 nos. 25 nos. for MPI
10001 to 35000	315	125	75	20	20	20	4	10	4	2	Upto 15000 nos. 50 nos. for MPI
Above 35000	500	200	100	32	32	32	6	15	6	3	Upto 50000 nos. 75 nos. for MPI
Inspection by BHEL/BHEL AIA	W	W	W		W	W	W	W	W	W	

Remarks:

- Acceptance Number is zero. If the sample is having deviations in Visual, Dimensional and MPI then the entire lot shall be 100% inspected. In case of deviations in Physical tests a second sample of twice the sample size of initial sample shall be taken. The lot will get rejected if the second sample fails.
- Preservation & Packing: The bolts shall be supplied in the dull black heat treated condition with a residual coating of light oil. Finished products shall be packed in a bituminous coated Polythene lined Hessian cloth/bag. Each bag shall contain only the same size of bolts/nuts/washers respectively and the same shall be indicated in the tags.
- Inspection by BHEL / BHEL AIA shown as "W" shall be witnessed for the sample size indicated against the lot size.

				
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