BHARAT HEAVY ELECTRICALS LIMITED
HEEP: HARDWAR-249 403 (UA)

Due Date: 28-10-2021

Ref: PPX/EM/EOI/20-21/ Rectangular Stainless Steel Hollow Tubes

Notice Inviting Expression of Interest for empanelment of New Vendors only

The Heavy Electrical Equipment Plant (HEEP) located in Haridwar, is one of the major manufacturing plants of BHEL. The core business of HEEP includes design and manufacture of large steam and gas turbines, turbo generators, hydro turbines and generators and so on. We are looking for reputed Vendors having capability to supply Rectangular Stainless Steel Hollow Tubes used in TGs.

Contact Person 1:
Mr. Abhimanyu Arya
Designation: Dy Manager (PPX/EM)
Email ID: abhimanyu@bhel.in
Tel: +91 1334 28 5158

The offers received will be technically evaluated by BHEL & successful short listed parties will be asked to submit their detailed Techno-Commercial offers through formal NIT/Enquiry, for our future requirements. Vendors shall confirm that there is no deviation with respect to BHEL Specifications. However, deviations, if any, are to be listed as a separate attachment. The offers that do not meet the substantial requirements of our specifications are liable to be ignored. **Following documents are to be necessarily filled and submitted along with the technical offer:**

1. Details/ Documents in support of EOI (**Annexure-A,1,2&3**).
2. Quality control documents / procedure.
3. Details of Manufacturing Facility
4. Company Profile.
5. Financial report of the company.
6. Past experience along with documentary proof.
7. Details such as technical features, experience details, product catalogue, reference list or any other relevant information.
8. List of equipment's manufactured in-house.
9. List of Bought Out items along with vendors list of each equipment's with experience details with respect to size rating and years of operation.

Only Technical BID along with the documents mentioned above should be sent & the envelope containing the offer shall be duly sealed and super scribed **as "EOI for (ITEM NAME) AGAINST Reference No. PPX/EM/EOI/20-21/ Rectangular Stainless Steel Hollow Tubes, SUBMITTED BY (Name of company)"**

The last date for submission of EOI is 28-10-2021.

- **The EOI complete in all respect must be addressed to "Shri Ashish Jain, AGM (PPX/EM), 4th Floor, Tender room, Main ADM. Building, HEEP- BHEL, Haridwar-**

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249403, Uttarakhand" and should reach before 13: 45 Hrs. (IST) on date 28-10-2021

- **EOI will be opened on the same day at 14: 00 Hrs. (IST) in the Tender Room.**
- Late offers will not be considered in any case. BHEL will not be responsible for any type of postal delay / incomplete information from vendor.
- EMD & Tender fee are not applicable.
- The Quotation should be from the Principle / Original Manufacturer, otherwise the Quotation is likely to be ignored. In case the quotation is submitted through agent, the quotation must accompany original authorization letter from Principle / Original Manufacturer.
- Amendments / Corrigendum, if any, will be hosted on our website only.
- For any further clarifications, feel free to contact the undersigned or log on to www.bhel.com.

(Abhimanyu Arya)
Dy. Mgr (PPX-EMI)

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Annexure-A

EXPRESSION OF INTEREST FOR RECTANGULAR STAINLESS STEEL HOLLOW TUBES

INTRODUCTION:

Rectangular hollow tubes of stainless steel are being used to manufacture the Stator Winding of Turbo generator. In fact, the winding bars are bunch of insulated solid copper conductor & few Rectangular stainless steel hollow tubes. Through these hollow tubes, cooling water is being circulated to dissipate losses (heat). These losses are generated in normal operation of Generator due to flow of load current through insulated solid copper conductors around the steel tube.

During the manufacturing of the stator winding bars, each rectangular hollow tubes are transposed (bended in two plane) at three locations along the length to minimize circulating current. Hence, proper quality of Rectangular stainless steel hollow tubes is of paramount importance in successful operation of the generator.

EXPERIENCE:

The vendor should have the experience of manufacturing and supplying Rectangular stainless steel hollow tubes of **grade X2CrNi19-11 (material number 1.4306)** austenitic stainless steel. which are either seamless as per **BS EN 10216-5 or** seam-welded along length as per **BS EN 10217-7** and solution annealed. Required dimensions should be as per figure-1. In support of which, vendor to submit the following documents: -

1.1. Vendor to provide the copy of test certificates for the above rectangular stainless steel hollow tubes or similar items.

1.2. Vendor to provide the documentary evidence of the acceptance of material like Acceptance Certificate or letter from customer or copy of invoice.

2. **MANUFACTURING FACILITIES:**

The vendor should have in-house facilities for manufacturing Rectangular stainless steel hollow tubes which are either seamless or seam-welded along the length.

After profiling, heat treatment, annealing with sufficiently rapid cooling down has to be performed. Annealing temperature should be in range of 1000℃, duration 3 - 5 min.

3. **DIMENSIONS: -** Refer the Annexure-1 for dimensions & applicable tolerances.

4. **Sample test certificate corresponding to following tests for review:**

This is required to ensure the quality of product: -

a) Chemical composition in % by mass
b) Wrinkle and re-deflection (bending and re-bending) test (Applicable for conductors drawn from welded tube & Refer Annexure 2 & 3 for test details)
c) Corrosion chemical properties: -The resistance to inter-crystalline corrosion is verified on a tub/melt in final state as per EN ISO 3651-2.
d) Leak test (Applicable for conductors drawn from welded tube)- 6 bar for 30 sec. minimum as per EN ISO 10893-1.
e) Eddy current test performed in line with EN ISO 10893-2.

f) Mechanical properties as per EN ISO 6892-1.
Mechanical properties are to be determined by tensile tests on 1 specimen/100 tubes, at least, however on 2 specimens/melt in the state as to be delivered.
The following properties have to be achieved:
- Yield strength (0.2% offset): 180 - 280 N/mm2
- Tensile strength: 460 - 680 N/mm2
- Elongation after fracture (A5): ≥ 50%

5. The vendor should forward the Mill Test Certificates if they outsource the raw material.

NOTE:

1. All correspondence shall be preferably in English.

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ANNEXURE-1

Dimensions and tolerance of rectangular conductor:

Dimensions of rectangular conductor are represented as: 14mmX4.0mmX0.9 mm; Length=11400 mm

Tolerance on dimensions shall be as per Fig. 1. Thickening of weld seam (in case conductors drawn from welded tube) should not exceed 0.1 mm as against the actual wall thickness.

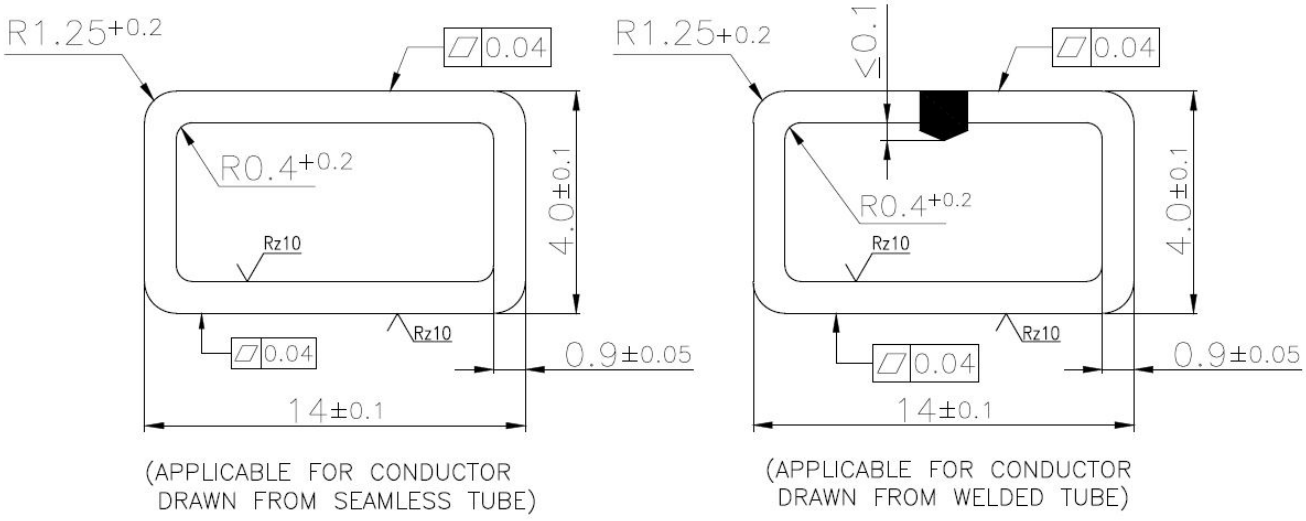
Straightness of the conductor : within 3 mm/m

Torsion : 5 degree max., over the ordered length

Tolerance on order length : -0/+15 mm

Radius on corners:

The conductors shall have corner radius as per Figure-1. The specified radii shall be maintained within tolerance of +0.2 mm. The weld seam (if applicable) shall merge smoothly into the flat surface of conductor and the strip shall be free from sharp, rough and projecting edges.



FIGURE–1

(ALL DIMENSIONS ARE IN mm)

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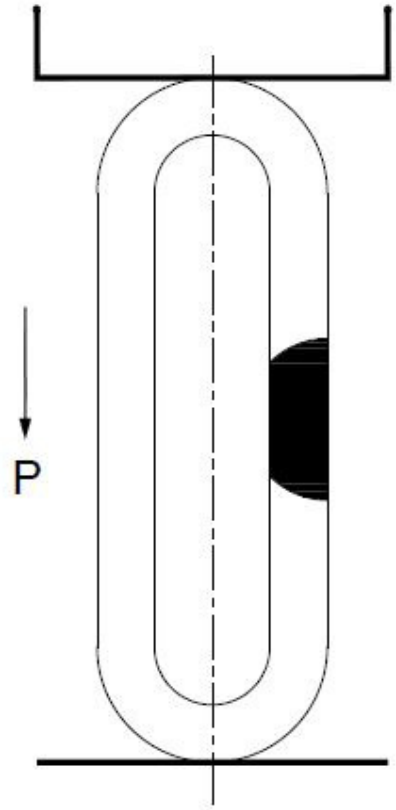
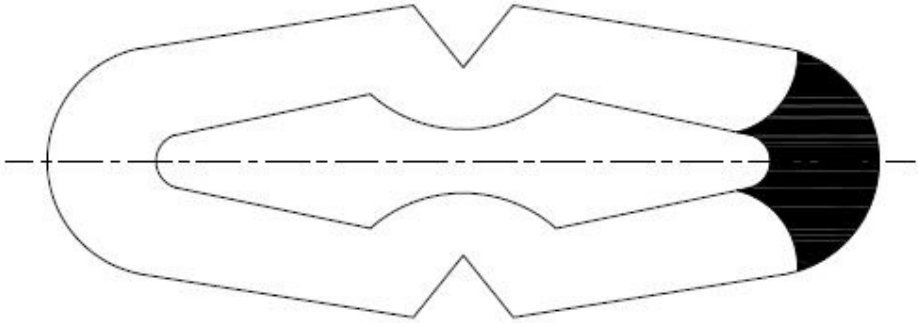
ANNEXURE-2

WRINKLE & RE-DEFLECTION (BENDING & RE-RENDING) TEST

1. CLAMP HOLLOW CONDUCTOR IN VISE OVER 20mm



2. COMPRESS HOLLOW CONDUCTOR ALONG THE LONG AXIS.



3. NO CRACKS WITH BARE EYES SHOULD BE VISIBLE.

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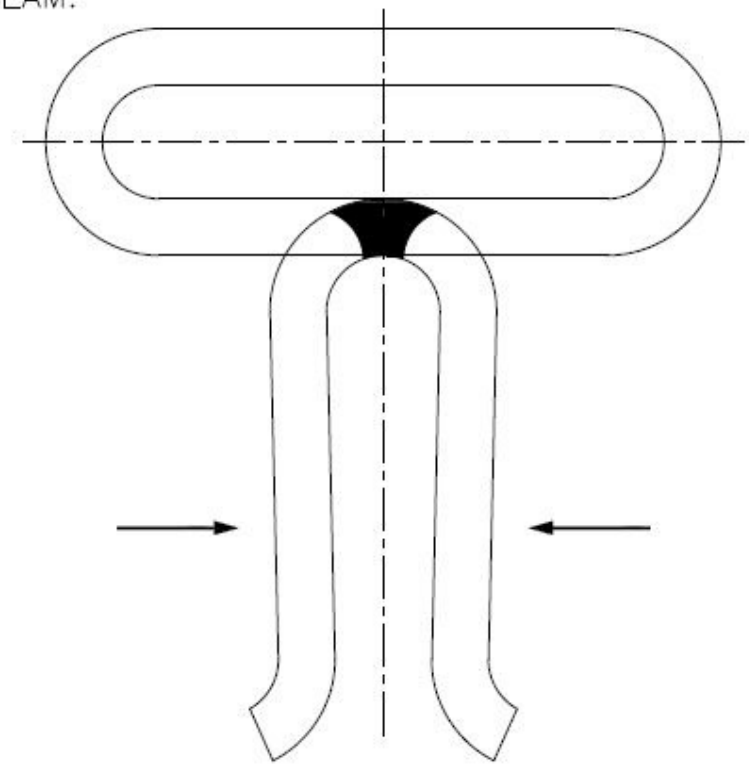
ANNEXURE-3

WRINKLE & RE-DEFLECTION (BENDING & RE-RENDING) TEST

1. CUT OPEN HOLLOW CONDUCTOR IN LONGITUDINAL DIRECTION OVER 30 mm.

2. CUT HOLLOW CONDUCTOR AT THE END OF LONGITUDINAL SECTION IN TRANSVERSE DIRECTION UP TO (INCLUDING) THE WELD SEAM.



3. BEND OPPOSITELY HOLLOW CONDUCTOR AT THE WELD POSITION.
4. NO CRACKS WITH BARE EYES SHOULD BE VISIBLE.