दूरभाष :
TELEPHONE :
तार : बार्क–मुंबई, चेम्बुर.
TELEGRAMS: BARC-MUMBAI, CHEMBUR.
टेलेक्स : ०११-६१०१७/०११-६१०२२ बार्क ईन
TELEX: 011-61017/011-61022 BARC IN
फेक्स संख्या : 91 – 22 – 550 5151
FAX NUMBER: 91-22-5505151

ट्रॉम्बे,
मुंबई-४०० ०८५.
TROMBAY,
MUMBAI-400 085.

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
भाभा परमाणु अनुसंधान केन्द्र
BHABHA ATOMIC RESEARCH CENTRE

RESEARCH REACTOR MAINTENANCE DIVISION
Mechanical Maintenance Section, Dhruva

Ref: RRMD/ TR-1/TN- 58 /2018 **6th December, 2018.**

To,
The Relevant party

Sub: Proposal for Fabrication & supply of Lead screw (17-4 PH Stainless steel) & Box nut (Aluminum Bronze) of SFSB fuel transfer buggy.

Sir,
Sealed quotation is invited for Fabrication & supply of Lead screw (17-4 PH Stainless steel) & Box nut (Aluminum Bronze) of SFSB fuel transfer buggy as per the description and scope of work given below. Sealed quotation, subscribing the tender notice no. with name of work over the envelope, shall be sent to Administrative Officer - III, Reactor Group Office, Dhruva, BARC, Trombay, Mumbai-400085 so as to reach on or before 18.12.2018.

The quotation shall be sent through registered post/speed post through Indian postal services only. Quotation delivered by person or through courier will not be accepted and not considered for bidding process.

1.	Name of work	Fabrication & supply of Lead screw (17-4 PH Stainless steel) & Box nut (Aluminum Bronze) of SFSB fuel transfer buggy
2.	Time of completion	Ninety days
3.	Offer validity	90 days from due date of submission of the tender

The quotation shall be in the format of attached schedule-B and shall show the basic cost and GST separately, if applicable and shall include the tender ref. no., PAN and GSTIN of the firm.

1.0 INTRODUCTION:

The lead screw is Φ75 x 1860 mm long having external Acme thread (4 TPI) and the box nut is Φ112.7 & 241 mm long having internal Acme thread (4 TPI) suitable for above lead screw.

2.0 Scope of work:

Fabrication and supply of

i) Lead Screw, ASTM- A564 Grade 630, 17-4 PH Stainless steel - 2 nos. as per attached drawing- A-R-5/34613/4015/GA and heat treatment as per specifications.
ii) Box nut, Aluminium Bronze, ASTM- B169 – 3 nos. as per drawing- A-R-5/34613/4015/GA and as per specifications.

1. Technical specification:

i) The manufacturing tolerances of the lead screw & box nut shall be as per Drawing no. A-R-5/34613/4015/GA.
ii) The lead screw and box nuts shall be perfectly matching with each other and the movement shall be smooth through out the entire length of the lead screw. The backlash between lead screw & box nut shall be within 0.250 mm.
iii) The raw material for lead screw shall be forged bar and for box nut shall be extruded tubular section. The raw materials shall be checked for its trueness / straightness, ovality and other defects etc. before starting the job.
iv) Before starting the machining of Lead screw, raw material forged bar (17-4 PH) shall be heat treated along with sample pieces so as to achieve final surface hardness of the bar between 33 to 38RC throughout the depth of raw material of lead screw.
v) Heat treatment shall be preferably as per H 1025 of ASTM A564. The detailed procedure of the heat treatment (solution annealing and precipitation hardening) shall be submitted by vendor for scrutiny and approval of BARC after placement of work order and prior to heat treatment.
vi) The entire process of heat treatment and final hardness checking before thread machining on the bar will be witnessed by BARC representative.
vii) Machining of 4 TPI ACME threads on above heat treated bar as per drawing no. A-R-5/34613/4015/GA.
viii) After machining of the lead screw and box nut, material shall be checked for its trueness and other defects and matching at Vendors premises. The ovality shall be within 0.030 mm and straightness shall be within 0.100 mm.

3.0 Testing and QAP:

i) The raw material of the lead screw and box nut shall be chemically tested before starting the job.
ii) Volumetric Ultrasonic testing of raw materials for lead screw and box nut shall be carried out for internal defects at vendor's premises.
iii) A sample shall be drawn from the material of Box nut and tested for physical properties as per standard.
iv) Two sample pieces shall be cut from material of lead screw, which shall be subjected to the same heat treatment as the lead screw. One sample shall be subjected to physical and hardness testing and depth of hardness as per the standard. Another sample shall be subjected to impact testing as per standard.
v) The tests shall be carried out at M/s. TCR Engineering Services, or any other Govt. approved test laboratory in the presence of BARC representative. The samples shall be cut and delivered by the vendor. The cost of samples and testing charges shall be borne by the vendor.
vi) All the machined surfaces of the lead screw and box nut shall be DP tested for evaluation of any surface defects at vendor's works.
vii) All the above tests shall be witnessed by BARC representative and the vendor shall inform in advance for the tests to be witnessed by BARC.
viii) Material not qualifying in any of above tests shall be rejected.
ix) The vendor shall submit the QAP to BARC for scrutiny immediately after receipt of the work order & shall indicate the various inspections and testing to be witnessed by BARC. Right from approval of QAP, testing of materials till final machining, all the stages, testing & test results will be scrutinized by BARC for clearance to next stage.

4.0 Documents & Certificates to be submitted by the Vendor to BARC in duplicate at the time of pre –dispatch inspection:

i) Vendor shall submit all the original test certificates (physical chemical, impact, heat treatment, DPT and dimensional) to BARC prior to dispatch of the material.

ii) Standard warrantee against any manufacturing defects and assembly fitment for a period of 12 months from the date of installation or 18 months from the date of delivery.

iii) Certificate of free and smooth assembly fitment of lead screw and box nut. Should there be any fitment problem at the time of assembly the vendor shall rectify / replace the defective part free of cost.

Completion schedule:

The job shall be completed within 90 days from the receipt of the work order.

5.0 Payment terms and conditions:

5.1 No advance or part payment is admissible. The full and final payment will be made within 45 days after delivery of the material and production of the following documents whichever is later:

a) Original Bill in duplicate (GST should be shown separately, PAN & GSTIN should be reflected on the bill).

b) Advance stamped receipt

5.2 GSTIN and PAN number to be indicated in the stamped invoice.

BARC being a research organisation is entitled to concession in GST and 5% GST only will be applicable against exemption certificate. The certificate will be issued against Work Order. Consider this while quoting.

5.3 BARC is the final consumer of the goods/services procured and does not intend to make any outward supply. BARC will not avail the benefits of Input Tax Credit and hence, the goods can be supplied without quoting the GSTIN of BARC, Mumbai on the invoice. The invoices taxed under GST, as per rates applicable under the GST Schedule of Rates, shall be admitted for payment.

5.4 Payment will be made only through ECS/Core Banking System. Hence, please furnish the bank details such as Bank's name & address, A/c No. and IFSC code in the invoice.

5.5 Income tax @ 2% will be deducted from your bill.

5.6 Vendor shall quote their formal quotation/rate clearly in the enclosed format and GST, if any quote separately.

5.7 The prices quoted by the vendor shall be valid for at least 90 days from the date of opening of the tender.

5.8 Please indicate whether any of your relatives are employed in BARC or you or any of your employed in BARC or any other unit of DAE.

6.0 <u>Confidentiality Clauses</u> -

i) Confidentiality: No party shall disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as "Proprietary" in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party. This clause shall apply to the sub-contractors, consultants, advisers or the employees engaged by a party with equal force.

ii) <u>"Restricted information" categories under section 18 of the atomic energy act, 1962 and "Official Secrets" under section 5 of the official secrets act, 1923</u> :-

Any contravention of the above mentioned provisions by any contractor, sub-contractor, consultant, adviser or the employees of a contractor will invite penal consequences under the aforesaid legislation.

iii) <u>Prohibition against use of BARC's name without permission for publicity purposes</u> :

The contractor or sub-contractor, consultant, adviser or the employees engaged by the contractor shall not use BARC's name for any publicity purpose through any public media like Press, Radio, T.V. or Internet without the prior written approval of BARC.

7.0 <u>General information to vendor</u> :

(i) The desirous bidders can contact with Shri S. K. Banerjee (Tel.: 022-25594643) for any clarifications.

(ii) The bidder Vendor shall quote their formal quotation/rate clearly in the enclosed format and GST, if any quote separately.

(iii) The quotation shall be inclusive of all the charges including the transportation, mobilization, testing etc.

iv) Vendor shall execute the entire work within a period of 90 days from the date of acceptance of work order.

v) The prices quoted by the vendor shall valid at least 90 days from the date of opening of the tender.

Encl: i) Schedule-B with sketch attached.

ii)Appendix-A.

(K Rama Varma)
EIC, P(M).
For & On behalf of President of India

APPENDIX - A

LIQUID PENETRANT EXAMINATION

The rules contained herein describe methods that shall be employed whenever Liquid Penetrant Examination is specified. The rules are substantially in accordance with articles of ASME Sec-V and generally conform to SE-165 "Standard Practice for Liquid Penetrant Inspection Method" and reference to this standard may be made for additional details to be included in written procedures required herein.

1.0 DESCRIPTION OF METHOD

Liquid penetrant examination is a method of non-destructive examination, which provide for the detection of discontinuities open to the surface in ferrous and non-ferrous materials, which are non-porous. Typical discontinuities detectable by this method are cracks, seams, laps, cold shuts and laminations. A liquid penetrant is applied to the surface to be examined and allowed to enter such openings. Then the excess penetrant is removed, the part is dried, and a developer is applied which is wetted or otherwise affected by the penetrant entrapped in the discontinuities. This increases the evidence of the discontinuities so that thy may be seen.

2.0 APPROVED METHOD

Since the major use of liquid penetrant examination will be on field erected piping, only the visible dye penetrant-solvent removable method is specified. Other methods shall require the specific approval of the Quality Surveyor.

3.0 METHOD REQUIREMENTS

3.1 Surface Preparation:

3.1.1 In general satisfactory result may be obtained when the surface is in the as-welded, as-rolled, as-cast, or as forged condition. When surface irregularities mask the indication of defects, grinding or machining of the surface will be required.

3.1.2 Prior to liquid penetrant examination, the surface to be tested and any adjacent area within at least 25mm of the surface to be tested shall be dry and free of any dirt, grease, lint, scale, welding flux, spatter, oil or any extraneous matter that would obscure surface openings or otherwise interfere with the test.

3.1.3 Typical cleaning agents which may be used for removing contaminates are detergents, organic solvents, descaling solutions, and paint removers.

3.2 Drying:

Drying of the surface to be tested, after cleaning, can be accomplished by normal evaporation. A minimum period of time shall be established and included in the written procedure to assure that the cleaning solvents have evaporated prior to the application of the penetrant. When employing the non-volatile solvent, it is recommended that forced hot air be used to accelerate drying.

3.3 Penetrant application:

The penetrant shall be applied by dipping, brushing, or spraying. If the penetrant is applied by spraying using compressed air type apparatus, filters shall be placed at the air inlet to preclude contamination of the penetrant from oil, water and

dirt sediment that may have collected in the lines. The temperature shall remain between 30º C to 50º C and penetration time shall be at least 15 minutes.

3.4 Excess penetrant removal:

Guidelines given in Para 6.5 of SE 165 shall be followed:

3.4.1 After the penetrant time specified in the procedure has elapsed, any penetrant remaining on the surface shall be removed.

3.4.2 Excess penetrant, in so far as possible, shall be removed by using clean, dry cloths or absorbent paper. The operation should be repeated until most trances of penetrant have been removed. A clean dry cloth or absorbent paper shall then be moistened, with solvent and the surface shall be wiped lightly until all remaining traces of excess penetrant have been removed. Care shall be employed not to use an excess of the solvent in order to avoid removing penetrant from the defects. Flushing the surface with solvent following the application of the penetrant and prior to developing is prohibited.

3.5 Developing:
3.5.1 The developer shall be applied as soon as possible after the penetrant removal operation and the interval shall not exceed the time established during procedure qualification.

3.5.2 The quality of the developer and the method of application in fine spray are important and shall be demonstrated to the satisfaction of the Quality Surveyor.

4.0 EXAMINATION
4.1 The true size and type of discontinuities are difficult to evaluate if the penetrant diffuses excessively in the developer. Consequently, it is good practice to observe the surface during the application of the developer in order to detect the nature of certain indications which might tend to bleed out profusely. Final interpretation, however, shall be made after allowing the penetrant to bleed out for a minimum of seven (7) minutes to a maximum of thirty (30) minutes. If the test surface is sufficiently large to preclude complete testing and examination within the prescribed times, the surface shall be tested and examined in suitable increments.

4.2 The developer should form a more or less uniform white coating. Surface discontinuities are indicted by bleeding out of the penetrant which is normally of a deep red colour. Indications which exhibit a light pink colour may indicate excessive or inadequate cleaning.

4.3 Illumination shall be provided which is adequate to ensure than there is no loss in the sensitivity of the test.

5.0 QUALIFICATION OF PROCEDURE
5.1 Required procedures shall be qualified on test pieces representative of the manufacturer's product with respect to material type and product form (weld, casting, wrought product etc.)

6.0 EVALUATION OF INDICATIONS
6.1 Defects which occur as mechanical discontinuities at the surface will be indicated by bleeding out of the penetrant, however, localized surface imperfections such as may

occur from machining marks or surface conditions may produce similar indications which are not relevant to the detection of defects.

6.2 Any indication which is believed to be non-relevant shall be regarded as defect until the indication is either eliminated by surface conditioning or it is demonstrated to be non-relevant. Non-relevant indications and broad areas of pigmentation which would mask indications of defects are unacceptable.

6.3 Relevant indications are those which result from mechanical discontinuities. Linear indications are those indications in which the length is equal or more than three times the width. Rounded indications are indications which are circular or elliptical with the length less than three times the width.

7.0 REPAIR OF DEFECTS

All repairs shall be made in accordance with the requirements for the particular product form, including welds. Whenever a defect is removed and subsequent welding is not required, the affected area shall be blended into the surrounding surface so as to avoid sharp notches, crevices or corners.

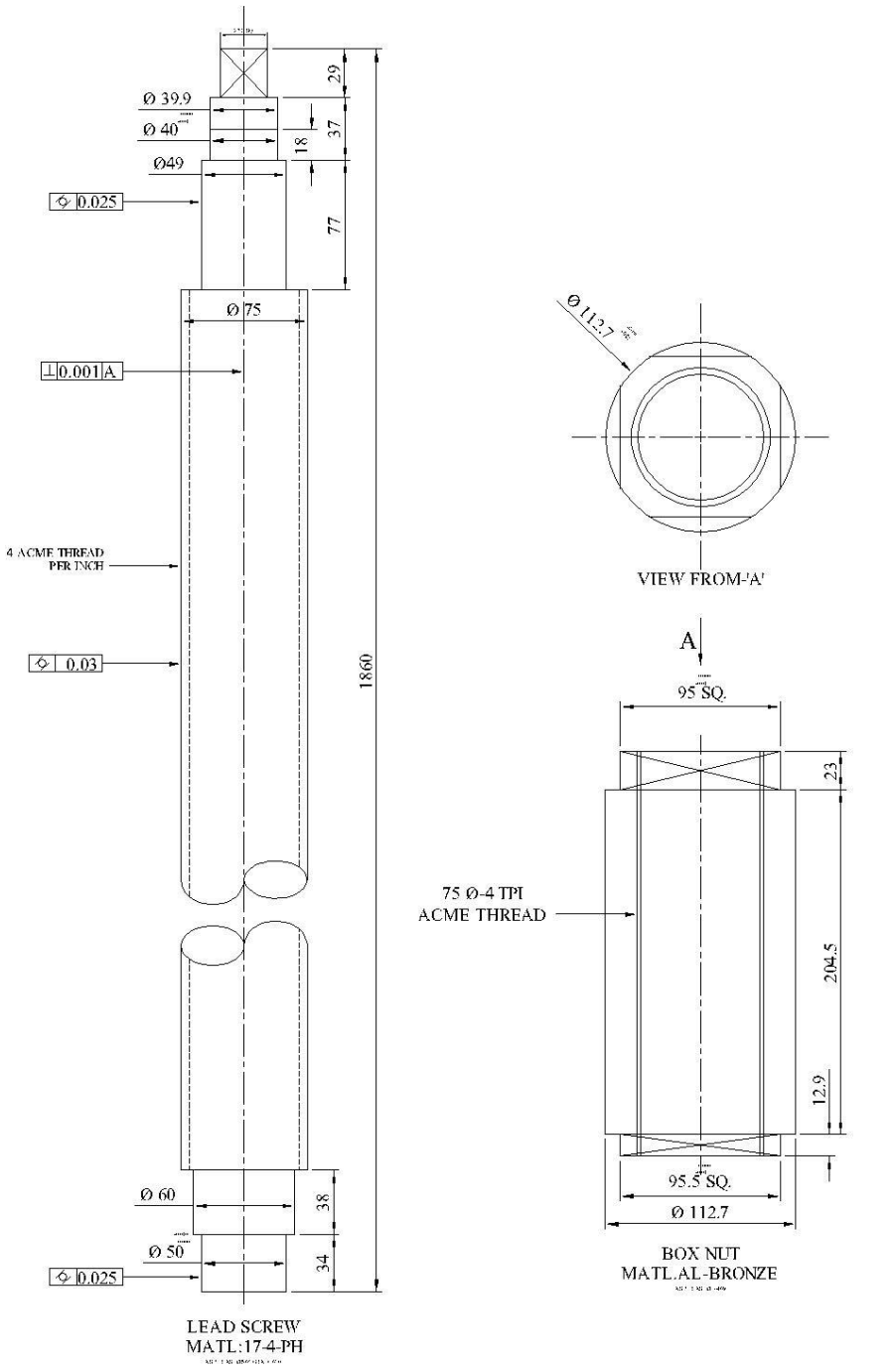
Schedule B

Name of Work: Fabrication & supply of Lead screw & Box nut of SFSB fuel transfer buggy.

Sr. No.	Description	Rate (Rs.)	Qty	Amount (Rs.)
1.	Fabrication & supply of lead screw (SS 17-4 PH), 75mm OD, 1860mm long, Acme thread 4 TPI, as per ASTM A-564 Grade-630 and attached drawing and specs.		2 Nos.	
2.	Fabrication & supply of box nut (Aluminium Bronze), 240mm long and 113mm OD, Acme thread 4 TPI, as per ASTM B-169 and attached drawing and specs.		3 Nos.	
GST @				
Transportation				
Others(Material testing etc.)				
Total				

Total amount in words:

Signature of contractor
with rubber stamp



BUGGY RAISE/LOWER MECHANISM LEAD SCREW & BOX NUT

DIMENSIONS ARE AS PER DRG NO.A-R5/34613-4015/GA