



ISO 9001 : 2015
ORGANISATION



सत्यमेव जयते

भारत सरकार
परमाणु उर्जा विभाग
भारतीय पानी बोर्ड

GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
HEAVY WATER BOARD

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Ref No.HWB/AD(O-P)/ARC-2021/ 04059

Dt. 30/11/2021

Sub: Annual Rate Contract for preparation of test specimens, testing, analysis and submission of reports of metallic / non-metallic samples to be received from HWB.

Dear Sir,

We are in need of carrying out various tests (destructive as well as non-destructive) on aged & process-medium exposed material samples from operating plants, located in various parts of India. These test results would be used for study of material degradation, failure/trend analysis vis-à-vis in arriving measures to mitigate such degradation.

It is learnt that you are carrying out various destructive & non-destructive testing in your laboratory. We are also carrying out various failure analysis of components in various Heavy Water Plants & hence such tests are likely to be necessary in future for HWB/HWPs, which shall be carried out by your agency through a rate contract. Some of such relevant testing & the nos. of samples that may be required to be tested have been worked out for coming year.

On behalf of the President of India, we hereby invite sealed quotations for preparation of test specimens, conducting actual tests (along with printouts), carrying out technical analysis of test results and submission of reports to HWB, for metallic samples on annual rate contract basis. Type of tests envisaged and no. of samples estimated for this contract over a period of **two year** is enclosed as **annexure I**.

While detail scope of work in general shall be as indicated above, other highlights/requirements of this contract are as follows: -

GENERAL REQUIREMENTS

1. The tests/examinations shall be carried out only as per codes & standards or procedure approved by HWB.
2. Appropriate calibration of testing apparatus, to be used by your firm is very much essential. Such calibration certificate for the test equipment/instrument

used for the testing should be provided to HWB whenever the same is demanded.

3. HWB reserves the right to check-test the samples at their own cost, in any other laboratory to verify/compare the results furnished by your laboratory and there you should have no objection for carrying out such parallel testing, by HWB.
4. Accuracy of the test results (for tests conducted by you) of various analysis/examinations shall be extremely important & hence you are required to indicate the same in your offer.
5. In case the tests results & report submitted by you are found to be incorrect or testing procedure do not meet the requirement of approved codes & standards or procedure, you would be required to re-perform such test/analysis at your own cost & HWB shall be at their discretion may witness the entire testing process at your Laboratory.
6. In case the agency, on whom Work Order will be placed, does not execute the testing & analysis over a reasonable lapse of time, after intimation, it would be executed by HWB through some other agency with the risk & cost of the Agency on whom Work Order would be placed.
7. HWB reserve their right to witness any or all the tests at your premises and you would agree for extending such access to HWB employees & permitting them to visit the premises, while the tests/analysis is being carried out & assess the accuracy of the machines/methods employed by you in such examinations.
8. The numbers of examinations/tests to be carried out in a year provided in annexure-I is only an estimate and actual no of tests may vary.
9. You would be required to depute your person to collect exposed material sample from the office of HWB for testing. Material that would be left out after preparation of test samples shall be returned back to HWB's office along with test results. Six sets of test results (also in soft form) complete with drawing of the test specimen prepared, details of testing write up, in-progress test graphs/plots & 'destructive test pieces (duly marked with identification nos.)' shall be delivered to HWB' office at following address:

Heavy Water Board
5-th floor, Vikram Sarabhai Bhavan,
Anushaktinagar, Mumbai – 400094.

10. There are some occasions where you may be required to conduct some in-situ testing on samples available in HWB's office premises at Mumbai. Charges for such in-situ examinations shall be inclusive of all accompanying expenses and shall be indicated by you separately along with main testing. For such in-situ tests/examinations, you would be required to carry your own instruments/gadgetry.
11. In **annexure-I**, various tests of similar nature are grouped together viz. Group-A, B, C, D, E, F & G). While evaluating the quotations/offers, the Unit rates quoted for all the items in the individual group shall be considered. Any agency need to confirm quoting for entire types of testing (even if they do not have such facility, in house, they need to get it executed through some other agency who are NABL accredited & submit a report under one Laboratory letter head.

12. The tensile testing of virgin and service exposed wrought /cast Inconel 625 cracker tubes (3"NB and approximately 9mm thick) at room temperature and at elevated temperature upto 700°C are required to be carried out as per the sketch given in **Annexure II**. This may need mandrel of special material like NIMONIC-90. Bidder has to confirm the availability of testing facility for this.
13. Inlet outlet pig tail (MOC: either Inconel 625 or Incoloy 800 H, Approximate Dimension: 21 mm OD & 3.9 mm thick) are required to be tested for tensile testing at room temperature and at elevated temperature upto 600°C. As the sample length is small, sub size specimen for testing is made by EDM machining with approximate dimension: Gauge length 16 mm, width 4mm and thickness 0.8 mm as per **annexure III**. Bidder has to confirm the availability of testing facility for this or specimen as per bidder's facility shall be machined at their cost.
14. Lowest Bid will be finalized using the criteria of "Overall Lowest in Cost – worked out with one unit of test, in each item".
15. It may also be noted that the Quantities of Samples indicated are only indicative and there is no guarantee on requirement of execution of such quantities in the Tenure of the contract.
16. CPWD contract procedures & its Terms & Conditions shall be applicable during the tenure/validity for this Work Contract.

Your offer should include following information/details:

- The quotation shall clearly indicate the quoted Unit Rate per item basis. This shall include rate for test specimen preparation, conducting actual tests, taking test result printouts, carrying out technical analysis of results and submission of reports including cost for handling during sample collection & return of unused material to & from HWB's office at Mumbai.
- For in-situ examination/test the rate shall be extra as indicated in Sr. No.-9 above.
- Duration within which the results of the analysis/examination would be communicated. We however would consider a reasonable period of 3 to 4 days, after collection of samples from us.
- You are requested to furnish a list showing the type, make, model etc. of the equipment/instruments available with you and to be employed in the analysis/examinations along with sensitivity, least counts etc. of the instruments/equipment, against each category of tests as indicated by us.
- You are requested to submit a copy of the Certificate of Approval/Accreditation of your laboratory by the appropriate Government agencies, right at the time of submitting your Price Bid.
- List of reputed customers/clients along with the type of tests conducted by you for them, may be submitted to us.
- You are requested to submit your organizational set up, details about your employee's i.e. total number of staff in various disciplines, qualification & experience of key personnel etc. along with your offer.

- Kindly note that the 'per test unit rate (inclusive all above factors as indicated earlier)' shall be kept firm over **the quoted period.** (i.e. Unit Rate Valid for 24 Calendar Months from date issue of Work Order). Your quoted rate for any item, must be inclusive of all applicable taxes & duties.
- **Earnest Money Deposit (EMD.)** of **Rs 7,000/-** (Rs. Seven Thousand) in the form of Department's receipt/Demand Draft/Pay Order/Banker's cheque/Deposit at call receipt/ Fixed Deposit Receipt (FDR), issued by a Scheduled Bank, drawn in favour of Pay & Accounts Officer, Heavy Water Board need to be paid along with the quotation. Offer received without EMD shall be considered in valid.
- **Security Deposit (SD):** The EMD received from the successful bidder (i.e. on whom Work Order will be issued) will be converted in to performance guarantee for the contract period and shall be retained with HWB till completion of the Contract. There is a likely chance of total value of execution of complete Work (in single Work Order or multiple Work Orders together) of **Rs. 3.5 Lakhs** in two Year Period and accordingly the Successful Bidder(s) will be required to deposit a Performance Bank Guarantee of **Rs. 17,500/-** with HWB (right after award of Work Order) valid for entire validity period of the Work Order. Apart from this **5%** of the value of each RA Bill shall be recovered as Security Deposit & shall be combined with EMD amount (till total such amount becomes equal to **Rs. 17,500/-**) and shall be retained with HWB for six months from the date of completion of the Work Order. Six month period shall be considered as defect liability period and such SD amount (along with EMD amount) shall be returned back after successful completion of the defect liability period.

You are requested to submit your Price Bid, to the undersigned in a sealed cover superscribed with the Name of the Work on or before **16:00 hrs.** of **30/12/2021** at HWB's office at above shown address. Such Price Bids will be opened at **16:30 hrs.** on the same day in presence of all the Bidders or their authorized representatives whoever so desire to be present. As it is not possible to write down entire terms & conditions of contract here, only the key conditions have been given. We being a Central Govt. Organization, general CPWD guide lines, as in vogue, shall be applicable to both HWB & your organization.

Undersigned reserves the right to accept or reject any or all the Bids without assigning any reasons.

Thanking you,

Yours faithfully,


(V.V.S.A Prasad)
AD (O-P), HWB

Annexure - I

Tender enquiry No. HWB/QA-16/01				
<u>Cost Estimation Sheet - Rates Valid for 2 years</u>				
Sr. No	Item	No. of Samples	Unit Rate	Total
A	<u>Mechanical Testing</u> (Charges inclusive of normal machining charges). Bidders must confirm that Raw test data, as the testing progresses, are generated by the machine itself, which has built-in servo mechanisms, so that such output in excel sheet is available, automatically).			
A-1	Tensile test with stress & strain diagram (With extensometer)			
A-1.1	Test to be conducted at Room Temperature	30		
A-1.2	Test to be conducted at Elevated Temperature (upto 300 ^o C)	10		
A-1.3	Test to be conducted at Elevated Temperature > 300 ^o C & upto 700 ^o C	10		
A-2	Bend/Flattening/Flaring test	1		
A-3	Hardness determination test (3 indentation)	25		
A-4	Micro-hardness test (3 indentation)	25		
A-5	Impact test upto (-) 60 ^o C (Set of 3 specimens)	10		
B	<u>CHEMICAL ANALYSIS</u>			
B-1	<u>Wet Analysis:</u>			
B-1.1	First element (Ferrous)	5		
B-1.2	First element (Non-ferrous)	5		
B-1.3	Each additional element (other than Boron or Nitrogen)	40		
B-1.4	Each additional element (if it is either Boron or Nitrogen)	5		
B-2	<u>Spectro Analysis: Complete analysis (upto eight elements)</u>			
B-2.1	in Ferrous material of any composition	10		
B-2.2	in Non-Ferrous material of any composition	10		
C	<u>METALLOGRAPHY EXAMINATION:</u>			
C-1	Macro-examination per specimen per location (as per ASTM-E-318)	5		
C-2	Micro-examination with 3 copies of photographs at one Magnification	20		
C-3	Grain size determination as per ASTM-E-112	1		
C-4	Inclusion rating determination as per ASTM-E-45 Method-A	1		
C-5	Ferrite check as per ASTM-E-562 (Metallography / Area Fraction)	1		
C-6	Ferrite check using ferrite meter (Magnetic instruments)	1		
C-7	<u>Replica Examination at Lab</u>			
C-7.1	With Optical Microscope (Per Replica)	1		

Tender enquiry No. HWB/QA-16/01

Cost Estimation Sheet - Rates Valid for 2 years

Sr. No	Item	No. of Samples	Unit Rate	Total
C-7.2	SEM (Per Replica) or per sample of fractured surface	1		
C-8	In-situ metallography work to be carried out at in & around Mumbai (Rate per Visit or minimum 8 replica) with Optical Microscope	1		
C-8.1	Rate for additional replica (In-situ metallography work) (over and above 8 locations) to be carried out at in & around Mumbai	1		
D	CORROSION TESTS			
D-1	As per ASTM A 262			
D-1.1	Practice 'A' (With Photographs)	1		
D-1.2	Practice 'C' (5 Cycles of 48 hrs each)	1		
D-1.3	Practice 'C' (per 48 hrs. cycle)	1		
D-1.4	Practice 'E' (72 hrs test)	1		
D-2	Stress corrosion cracking test as per ASTM-G 36 (upto 100 Hrs.)	1		
D-3	Pitting & Crevice corrosion tests as per ASTM-46 & G 48	1		
D-4	Weld Decay Test as per ASTM A-249	1		
D-5	Sulphide Stress Corrosion Cracking Test (SSCC) - As per NACE TM -0177	1		
D-6	HIC Testing as per NACE TM-0284(set of Three specimens)	1		
E	MISCELLANEOUS TESTS:			
E-1	Dye Penetrant Test (per sq. feet)	1		
E-2	Ultrasonic Examination Test (in-situ check per visits)	1		
E-3	Solution annealing, Stress Relieving, normalizing of Test coupon (up to 2 hrs soaking period)			
E-3.1	Solution Annealing upto 1160° C	1		
E-3.2	Stress Relieving	1		
E-3.3	Normalizing	1		
E-3.4	Gas Analysis - Hydrogen analysis in metals and alloys.	1		
F	<u>Sample Preparation for Mechanical Test</u>			
F-1	<u>Tensile Test</u>			
F-1-1	Carbon Steel, Stainless Steel, alloys of Pb, Cu, Al etc. (softer material)			
F-1-1.1	Specimen thickness upto 20 mm	10		

Tender enquiry No. HWB/QA-16/01**Cost Estimation Sheet - Rates Valid for 2 years**

Sr. No	Item	No. of Samples	Unit Rate	Total
F-1-1.2	Specimen thickness > 20 mm but upto 50 mm	2		
F-1-2	New and Service exposed Inconel 625, Inconel 600, Incoloy 800 H (with threaded portion) (may be Harder Material) Specimen thickness upto 20 mm	5		
F-2	<u>Sample Preparation for Impact Test</u>			
F-2-1	Carbon Steel, Stainless Steel, Alloys of Pb, Cu, Al etc. (Softer Material)	1		
F-2-2	New and Service exposed Inconel 625 (with threaded portion)(Harder Material)	1		
F-3	Sample Preparation for Fracture Toughness (CT Specimens) of either carbon steel, Stainless steel or Incoloy	1		
F-4	EDM machining charge per specimen	5		
G	Fracture Toughness Test			
G-1	Fracture Toughness Testing (KIC Testing) with sample preparation	1		
G-2	Fracture Toughness Testing (CTOD Test) with sample preparation	1		

Round Tension Specimen
for Alloy - 625 Tubes



