



**CSIR - NATIONAL METALLURGICAL LABORATORY**  
(Council of Scientific & Industrial Research)  
BURMAMINES, JAMSHEDPUR - 831 007  
Tel: 0657 2345129/132, Fax: 0657 2345131  
Email: spo@nmlindia.org Website: www.nmlindia.org



## **TENDER ENQUIRY (BIDDING) DOCUMENT**

**FOR PROCUREMENT OF**

**SINGLE-LEVER TYPE CONSTANT LOAD CREEP TESTING MACHINE**

**Tender Enquiry No. NML-FG/MTE-CVS/11-18, Date: 23/07/2018**

The Bidding Document includes the following Sections:

<b>Sl. No.</b>	<b>Section</b>	<b>Page No.</b>
1	Section A: Invitation for Bids	2
2	Section B: Terms and Conditions	3 - 10
3	Section C: Standard Forms	11 - 22
4	Section D: Technical Specifications of Item/Service	23 - 27

### **Section A: Invitation for Bids**

Director, CSIR-National Metallurgical Laboratory (CSIR-NML), Jamshedpur (India), invites e-tenders through Central Public Procurement Portal ([www.etenders.gov.in](http://www.etenders.gov.in)) from manufacturers, their distributors and Indian Agent of Foreign principals, if any, for purchase of item /service listed below.

Sl. No.	Tender Enquiry No. & Date	Description of Item	Qty.	Single/ Two-Bid	Bid Security/ EMD (in Indian Rupees)
1	<b>NML-FG/MTE-CVS/11-18 dated 23/07/2018</b>	<b>Single-Lever Type Constant Load Creep Testing Machine</b>	<b>5 Nos.</b>	<b>Two-Bid</b>	<b>3,75,000.00 (Rupees Three Lac Seventy Five Thousand Only)</b>

#### **Instructions to Bidders for Online Bid Submission:**

1. All bidders (including foreign bidders) need to enroll themselves on the Central Public Procurement Portal (<https://etenders.gov.in/eprocure/app>). Only enrolled/registered bidders with the above portal would be allowed to participate in the tendering process. Bids must be received within the due date through e-tenders mode only. Manual/Offline/Bid received by post/fax/email shall not be accepted under any circumstances. The E-bids shall be opened online by authorised officials of CSIR-NML as per schedule given in the Date Sheet.
2. The bidding documents may be downloaded from the website. Interested Bidders may please go through the complete bidding document before submission of their bids. Further information may be obtained from the office of The Stores & Purchase Officer, CSIR-National Metallurgical Laboratory, Burmahines, Jamshedpur 831007, E-mail: [spo@nmlindia.org](mailto:spo@nmlindia.org), Tel: +91 657 2345129, Fax: +91 657 2345131.
3. Tenders/Bidders are requested to regularly visit the website. Any modifications in tender enquiry will be intimated by corrigendum through this website only and no separate Notification will be issued.
4. Bidders are required to send (offline) a Bid Security / EMD as specified above and the same must be delivered to this office on or before the last date of receipt of bids. Bids of those bidders whose EMD are not received within the deadline for receipt of Bids, will be summarily rejected. Any postal delay in this respect will not be entertained.
5. Critical Date and Time Sheet

Bidding Document Publishing Date and Time	23/07/2018	6.30 PM
Document Download Start Date and Time	23/07/2018	6.30 PM
Seek Clarification Start Date and Time	23/07/2018	6.30 PM
Seek Clarification End Date and Time	30/07/2018	6.30 PM
Bid Submission Start Date and Time	02/08/2018	9.00 AM
Bid Submission End Date and Time	22/08/2018	3.30 PM
Bid Opening Date and Time	23/08/2018	3.30 PM

(N.K. Singh)  
Store & Purchase Officer

## **Section B: Terms and Conditions**

**1. Opening of Bids:** The E-bids shall be opened online by authorised officials of the Purchaser as per schedule given in the Date Sheet. In case, the day of bid opening is declared a holiday by the government, the E-bids will be opened on the next working day at the same time. No separate intimation shall be sent to the bidders in this regard. Since, E-bid is an online process; the E-bid opening or any other process may be delayed due to any technical/server issue. If any such issue arises, this will not be tantamount to process delay and CSIR-NML will not be responsible for the same. On opening of bids online, accepting the bid will not mean that the firm is technically or financially qualified. Price Bid of bidders will be opened only if Technical Bid is found compliant in all respects.

**2. Bid Security / Earnest Money Deposit (EMD):** Manufacturers/Agents must submit a Bid Security. Bids without EMD will not be valid or considered. However, firms registered permanently with NSIC, Govt. Public undertakings, Central Autonomous Bodies, who are exempted from payment of EMD, will be allowed exemption subject to production of documentary evidence to this effect. Such registration includes the item they are offering which are manufactured by them and not for selling products manufactured by other companies. The bid security shall be in Indian Rupees for offers received for supply within India and denominated in the currency of the bid or in any freely convertible foreign exchange in the case of offers received for supplies from foreign countries in equivalent Indian Rupees. The bid security shall be in one of the following forms at the bidders' option:

- a) A bank guarantee issued by a Nationalized/ Scheduled Indian Bank/Foreign Bank operating in India in the format provided in the bidding documents and valid for 45 days beyond the validity of the bid. In case a bidder desires to submit a BG issued from a foreign bank, then the same should be confirmed and routed through Nationalised / Scheduled Indian Bank.
- b) Fixed Deposit receipt pledged in favour of the Laboratory / Institute.
- c) A Banker's Cheque or demand draft in favour of the NML, Jamshedpur issued by any Nationalised /Scheduled Indian Bank.

**3.** The Bid Security furnished by all unsuccessful bidders shall be returned to them without any interest whatsoever, at the earliest but not later than 30 days after conclusion of the contract. The Bid Security of the successful bidder shall be returned without any interest whatsoever, after receipt of performance security as per the contract/purchase order.

**4.** In case a firm is unable to submit the EMD before the due date and time and the firm provides an undertaking that they will provide the EMD within the next 48 hours of due date of opening then CSIR-NML can provisionally accept the bid subject to the condition that the EMD should be submitted within the next 48 hrs to the SPO, CSIR-NML who will accept the same on the basis of an approval by the Director, CSIR-NML, Jamshedpur. It is also to be seen that it should not become the rule for some firms to submit their EMD's late or else the Director, CSIR-NML can take a decision not to accept such requests if it has become a repetitive case.

**5.** The Bid Security may be forfeited if the bidder withdraws or modifies or amends its tender or impairs or derogates from its bid during the bid validity period or fails to sign the contract or fails to furnish order acceptance or performance Security in time.

**6.** In a tender, either the Authorised Indian Agent on behalf of the Principal/OEM or Principal/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender. If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the same tender for the same item/ product.

**7.** Equipment manufacturers within India have to quote directly. Agents of Indian Equipment manufacturers who doesn't have a track record of supply of similar items i.e., installation and commissioning not done directly will not be entertained. In such cases bids submitted by Agents of Indian Equipment manufacturers would be rejected on the grounds of subletting or subcontracting. Such offers from so called agents of indigenous manufacturers will summarily be technically rejected for not following laid down Terms & Conditions of tender document and for not having any installations done by them directly.

**8.** Bids shall remain valid for minimum 180 days after the date of bid opening prescribed by NML. A bid valid for a shorter period shall be rejected by the NML as non- responsive.

9. Bidders are not permitted to withdraw/alter or modify their bids after expiry of the deadline for receipt of bids. No request from bidder for extension of date of receipt of tender and opening shall normally be entertained.

10. **Language of the Bids:** The Language of the documentation & details in the Bids must be in **ENGLISH**.

11. The Purchaser will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt fraudulent, collusive or coercive practices in competing for the Contract in question.

12. The Institute reserves the right to seek past purchase order copies from the Bidder/ User organizations. The past purchase order copies obtained from the bidder / user organizations will be kept entirely confidential & this will only be for facilitating the purchase process.

13. The institute also may seek performance certificates from equipment manufacturers/the user organizations so as to confirm satisfactory functioning, installation & commissioning of the equipment.

14. In case of two-bid system adopted then the exchange rate as prevailing on the date of opening financial bid should be the basis for preparing the comparative statement.

15. **Two Bid System :** Under Two-Bid system, the techno-commercial un-priced bid (technical bid) will be opened first and will be evaluated by the Technical Sub-committee (TSC) of the Technical & Purchase Committee (T&PC) with respect to the qualification criteria and the technical specifications as spelt out in the tender. The committee doing the evaluation will also draw a Technical Comparative Chart. The techno commercial bid shall include - Detailed Specifications, International Standards (BIS / INTERNATIONAL), Catalogues, List of users & Technical Details, Technical Compliance Sheet, Operating Parameters, Pre-Installation Requirements, payment terms, warranty etc. The tender meeting the qualification criteria and technical specifications will be short listed for financial evaluation. Then, the Price Bid of the short listed parties will be opened and evaluated for lowest responsive offer. Cost break up indicating the applicable prices for each component of the equipment like price of the goods, costs for installation and commissioning, training should be mentioned in the Price Bid.

16. **Essential and Optional Spares:** All essential spares should be listed in the technical specification in sequential form. Firm who do not quote for one / any of the essential spare as listed will not be considered for Price-Bid opening. If the bidder has quoted certain optional items, these items should not be taken into consideration for the evaluation of the bid unless the specifications of the optional item quoted by the vendor are part of original indented specification (i.e., Main Equipment + Essential spares).

17. Any correction in the price quoted in the tender in words and/or figures shall be encircled in red ink by the representative of finance and signed. The officials of stores & purchase shall endorse this.

18. The bidder shall provide an item-by-item commentary vis-à-vis NML's Technical Specifications demonstrating substantial responsiveness of the goods and services to these specifications or a statement of deviation and exceptions to the provision of the technical specifications. The information may be provided in the respective standard format of the bidding document.

19. All Manufacturers / Agents must submit Compliance Statement, Performance Statement, and Deviation Statement along with the technical bid as per our Standard Forms.

20. **Evaluation and comparison of bids:** The Purchaser shall evaluate each bid that has been determined, up to this stage of the evaluation, to be substantially responsive. To evaluate a Bid, the Purchaser shall only use all the factors, methodologies and criteria defined below. No other criteria or methodology will be used. The bids shall be evaluated on the basis of Final landing cost which shall be arrived as under:

(a) For Goods manufactured within India

i) The price of the goods quoted Ex-works. ii) GST which will be payable on the goods if the contract is awarded. iii) The charges for inland transportation, insurance and other local services required for delivering the goods at the desired destination as specified in the price schedule form. iv) The installation, commissioning and training charges including any incidental services, if any as given in Scope of Supply

(b) For Goods manufactured abroad

i) The price of the goods, quoted on FCA (named Airport abroad) or FOB (named port of shipment), as specified in the price schedule form. ii) The charges for insurance and transportation of the goods to the port /

place of destination i.e. CIP/CIF Price. iii) The agency commission charges payable to Indian agent in Indian rupees, if any. iv) The installation, commissioning and training charges including any incidental services, if any.

**21.** The comparison between the indigenous and the foreign offers shall be made on FOR destination basis and CIF / CIP basis respectively. However, the CIF / CIP prices quoted by any foreign bidder shall be loaded further as under:- (a) Towards customs duty and other statutory levies—as per applicable rates. (b) Towards custom clearance, inland transportation etc.- 2% of the CIF / CIP value.

**22.** Orders for Imported Goods need not necessarily be on FOB / FCA basis rather it can be on the basis of any of the Incoterms latest edition as may be amended from time to time by the ICC or any other designated authority and favorable to CSIR -NML.

**23.** Wherever the price quoted on FOB / FCA and CIF / CIP basis are the same, the Contract would be made on CIF / CIP basis only.

**24.** The terms FOB, FCA, CIF, CIP etc shall be governed by the rules prescribed in the current edition of the Inco terms published by the International Commerce, Paris.

**25.** Where there is no mention of packing, forwarding, freight, insurance charges taxes etc. such offer shall not be considered as a responsive bid and the acceptance of such bid will vest entirely with the Director, CSIR-NML.

**26.** Bidder quoting lowest total price among the technically successful bidders will qualify for the award of contract, Subject to the following Order of Government of India in respect of Preference to Make in India:

Preference to Make in India Pursuant to Government of India, Ministry of Commerce and Industry, Department of Industrial Policy and Promotion Order No. P-45021/2/2017-B.E.-II Dated 15th June, 2017 with subject Public Procurement (Preference to Make in India), Order 2017 –

(a) (i.) Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.

(ii.) If L1 is not from a local supplier, the lowest bidder among the local suppliers, will be invited to match the L1 Price subject to local supplier's quoted price falling within margin of purchase preference, and the contract shall be awarded to such local supplier subject to matching the L1 price.

(iii.) In case such lowest eligible local supplier fails to match the L1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the local suppliers within the margin of purchase preference matches the L1 price, then the contract will be awarded to the L1 bidder. (Para 3c of the order dated 15th June 2017 above)

(b) The minimum local content shall ordinarily be 50%. (Para 5 of the order dated 15th June 2017 above)

(c) The margin of Purchase Preference shall be 20%. (Para 6 of the order dated 15th June 2017 above)

(d) In case of procurement for a value in excess of Rs. 10 Crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant and practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content. (Para 9b of the order dated 15th June 2017 above)

(e) False declarations will be in breach of code of integrity under Rule 175(1)(i)(h) of the General Financial Rules 2017 for which the bidder or its successors can be debarred for upto two years as per Rule 151 (iii) of the General Financial Rules 2017 along with such further actions as may be permissible under law. (Para 9f of the order dated 15th June 2017 above)

(f) No provision whatsoever in this document shall prevent the purchaser from implementing the Government of India, Ministry of Commerce and Industry, Department of Industrial Policy and Promotion Order No. P-45021/2/2017-B.E.-II Dated 15th June, 2017 with subject Public Procurement (Preference to Make in India), Order 2017.

**27.** Non-conformities between the figures and words of the quoted price: Any discrepancy between quoted prices in figures and that in words, if noted, will be sorted out in the following manner.

- If there is a discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of the Purchase Committee / Technical & Purchase Committee there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly.

- If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.
- If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to above.
- If there is such discrepancy in a bid, the same is to be conveyed to the bidder with target date on the above lines and if the bidder does not agree to the observation of the Purchaser the tender is liable to be ignored.

**28.** The price quoted shall remain fixed during the contract period and shall not vary on any account. All lots and items must be listed and priced separately in the Commercial Bid. If a Price Schedule shows items listed but not priced, their prices shall be assumed to be included in the prices of other items. Lots or items not listed in the Price Schedule shall be assumed to be not included in the bid.

**29. Delivery Period:** a) In case of **foreign suppliers** firm delivery period (in weeks) after opening irrevocable Letter of Credit (**LC**) must be given in Techno-commercial Bid. No part shipment is permitted. Transshipment is permitted in case of International flights only. b) In case of **Indigenous suppliers** the firm delivery period (in weeks) after issue of Purchase Order must be given in the Technical Bid. Delivery is to be made at NML Stores, Jamshedpur. Delivery must be on FREIGHT PAID BASIS for despatch by Road.

**30. Payment for Indigenous supplier:** **70%** payment to be released on receipt of material at CSIR-NML in good condition duly certified by the user Scientists. **30%** payment would be released after satisfactory installation & commissioning as certified by the user Scientists subject to submission of Performance Bank Guarantee (PBG) for 10% of the purchase order value covering the period of warranty + 60 days. All the bidders are required to furnish requisite information for making payment by e-mode.

**31. Payment for Foreign Suppliers:** **70%** payment by Irrevocable Foreign Letter of Credit subject to submission of Performance Bank Guarantee (PBG) by the vendor for 10% of the purchase order value covering the period of warranty + 60 days within 21 days of placement of purchase order and before opening Irrevocable Letter of Credit (**LC**). **30%** payment would be released after satisfactory installation & commissioning as certified by the user Scientists of CSIR-NML. Agency Commission, if any, will be paid in India Rupees to the Indian Agent.

**32.** No outright advance payments will be made to the firms. Any advance will be against a bank guarantee of equivalent value.

**33. Taxes, Duties and Levies:**

- (a) For goods manufactured outside India, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside India. For goods Manufactured within India, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred till its final manufacture / production. If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in India, the Purchaser shall make its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent. All payments due under the contract shall be paid after deduction of statutory levies (at source) (like ESIC, IT, etc.) wherever applicable.
- (b) Customs & Excise Duty Exemption: This Laboratory is registered with Department of Scientific and Industrial Research, Government of India, and thus eligible for availing Customs Duty Exemption in terms of Notification No. No.51/96-Customs dated 23/07/1996, Notification No. 47/2017 – Integrated Tax (Rate) dated 14/11/2017 and Notification No. 45/2017-Central Tax (Rate) dated 14/11/2017, Notification No. 45/2017-Union Territory Tax (Rate) dated 14/11/2017, as amended from time to time.

**34. Negotiations:** There should not be any negotiations. Negotiations if at all shall be an exception and only in the case of proprietary items or in the case of items with limited source of supply. Negotiations if at all required shall be held with the lowest (L-1) evaluated responsive bidder with the cogent reasons to be recorded.

**35.** The following are some of the points, for which a tender may be declared as unresponsive:

- i) The Bid is unsigned.
- ii) The Bidder has quoted for goods manufactured by different firm without the required authority letter from the proposed manufacturer.

- iii) Bidder has not agreed to give the required performance security.
- iv) The goods quoted are sub-standard, not meeting the required specifications.
- v) Against the schedule of Requirement (incorporated in the tender enquiry), the tenderer has not quoted for the entire requirement as specified in that schedule.
- vi) The tenderer has not agreed to some essential condition(s) incorporated in the tender enquiry.

**36.** Orders for equipments shall be dispatched to the vendor in two copies with an instruction that the vendors has to return one copy duly signed as a token of the acceptance of the order or the vendor may be asked to submit the order acceptance promptly within 21 days or earlier.

**37.** The order confirmation should be received within 21 days however the sanctioning authority has the powers to extend the time frame for submission of order confirmation and submission of Performance Security (PS).

**38.** Even after extension of time, if the order confirmation / performance security are not received, then in consultation with Purchase Committee / Technical & Purchase Committee, the purchase order should be cancelled and limited tender irrespective of the value may be invited from responding firms in line after forfeiting the bid security of the defaulting firm, where applicable provided there is no change in specifications. In such case defaulting firm should be considered again for tendering in the particular case. However, if the contract is signed across the table, then order acceptance is not required.

**39.** A formal contract should be executed, with all necessary clauses which can be altered suitably wherever felt necessary by the Laboratory/Institute to make it a self contained contract. A simple one page contract can also be entered into by attaching copies of the General Conditions of Contract (GCC) & Special Conditions of Contract (SCC) and details of scope and specifications. The decision making committee at NML may decide to place order without mentioning specifically the General Conditions of Contract (GCC) & Special Conditions of Contract (SCC) and may follow its own format which is more comprehensive.

**40.** In all cases where a contract is to be signed on a stamp paper, a letter of Intent (LOI) may be issued to the firm in advance of the contract. The LOI should specifically mention, inter-alia, the deadline for signing of the contract which should not normally be more than two weeks from the date of issuance of LOI. The decision making committee at NML may decide not to furnish Letter of Intent but to directly place the purchase order.

**41.** All Vendors / Agents must submit full details and requirements for Installation & Commissioning of the Equipment as per Technical Specifications submitted by them.

- (i) Water Supply (Filtered, Flow rate).
- (ii) Civil Works including Foundation, Flooring.
- (iii) Mechanical and Fabrication work required.
- (iv) Ambient Temperature Control (if required, as applicable).
- (v) Cooling requirement (if any).
- (vi) Electrical and Power requirements.
- (vi) Space and Dimensions for Installation of the equipment as per the Quotation of the Vendor.
- (vii) Requirements of Special Gases, if any.

**42.** All participating vendors are requested to provide the approximate period required for the equipment to become operational from the date of the arrival.

**43. Installation & Commissioning:** Installation & Commissioning will be the sole responsibility of the Supplier / Indian Agent. Installation & Commissioning with all infrastructural works have to be done by the supplier. The vendor and Indian Agent will complete the installation & commissioning within two months from the date of supply of equipment to CSIR-NML. CSIR-NML will provide the electrical connections and water supply to the equipment. All the necessary connectors will have to be provided by the vendor.

**44. Training:** The supplier should provide onsite training at CSIR - National Metallurgical Laboratory, Jamshedpur after installations and commissioning of the said equipment at CSIR-NML free of cost. This training shall be to the satisfaction of CSIR-NML Scientists.

**45. Warranty:** The Supplier must warrant that the goods supplied under the Contract are new, unused and the most recent or current and incorporate all recent improvements in design, materials as per specifications in this

Tender Document. All bidders (Manufacturers/Agents) must quote comprehensive warranty for the period as specified in the technical specifications, which will begin after successful installation & commissioning in all respects at Site, i.e., (CSIR-National Metallurgical Laboratory, Jamshedpur, India which would be considered for the tender evaluation purpose). The successful installation & commissioning date along with the date to be reckoned for start of the warranty period needs to be certified by the vendor & the user scientist. The warranty offered should be unconditional and the seller should agree to replace or repair the equipment at his cost. The spare parts for the warranty repair have to be provided by the vendor.

**46. Annual Maintenance Contract (AMC):** The Annual Maintenance charge would only be an estimate and would not be the basis of evaluation and selection of the technically suitable lowest quoting firm. The AMC Charges would only enable CSIR-NML to take a decision at a future date whether it wants to enter into an AMC for the particular equipment at the price quoted by the bidding firms. AMC charges for 3 Years (Comprehensive and Non-Comprehensive) after the expiry of warranty period to be separately mentioned.

**47.** In case a foreign bidder who does not have an agent in India quotes then the foreign principal shall have to furnish a certificate to the effect that the bidder is or will be represented by an agent in India equipped and able to carry out the supply, maintenance, repair obligations etc. during the warranty and post-warranty period or ensure a mechanism at place for carrying out the supply, maintenance, repair obligations etc. during the warranty and post-warranty period. In case the foreign suppliers themselves would provide service during warranty then their service visit plan for mandatory visits and for breakdown visits may be provided.

**48.** In order to assess the financial solvency of a firm Director, CSIR-NML may seek a report from the bankers of the technically evaluated lowest quoting firm in order to assess if the firm is financially capable of executing the purchase order/work successfully.

**49. Extension of Time:** Delivery of the Goods and performance of the Services shall be made by the Supplier in accordance with the time schedule specified by the Purchaser. If at any time during performance of the Contract the supplier should encounter conditions impeding timely delivery of the Goods and performance of Services, the supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may, at its discretion, extend the Supplier's time for performance with or without penalty, in which case the extension shall be ratified by the parties by amendment of the Contract. Except as provided under the Force Majeure clause, a delay by the Supplier in the performance of its delivery obligations shall render the supplier liable to the imposition of penalty pursuant to Penalty Clause unless an extension of time is agreed upon pursuant to above clause without the application of penalty clause.

**50. Penalty Clauses:** (a) Penalty (Liquidated Damages) @ **0.5%** of basic price per week will be deducted from Manufacturer's/ Indian Agent's Bill for delay in Delivery & Despatch beyond Delivery dates (as extended by NML in Purchase Order and Letter of Credit Schedule). Maximum deduction for failing to deliver within NML's approved delivery period & extensions will be limited to **5%** of Ex-works Value (equivalent in Indian Rupees) for non-fulfilment of delivery deadlines and any other contractual obligations as per Purchase Order. Once the maximum is reached, NML may consider termination of the Contract. (b) Delay in Installation & Commissioning beyond contractual deadline will result in forfeiture of Performance Bank Guarantee.

**51. INSPECTION / TEST AND REJECTION:**The Director, CSIR-National Metallurgical Laboratory, Jamshedpur reserves the right to depute officials from CSIR-NML for pre-despatch inspection, if required, at the Works of Supplier. The Supplier shall inform the Purchaser about the readiness of the goods before its despatch for arranging pre-despatch inspection. Once the goods are delivered at our end, all inspections & tests will be carried out by end user at CSIR-NML and in case of rejection the supplier will arrange to take back the rejected goods at their own cost & risk within 15 days of intimation of rejection.

**52. Assignment:** The supplier shall not assign in whole or in part their obligation to perform under the contract, except with the Purchasers prior written consent. Purchase of equipment shall be made directly from manufacturers or their authorised agents in India. The authorized agents should not sublet the contract to sub-agents.

**53. Patent Rights & IPR Laws:** The supplier shall indemnify the purchaser against all third party claims of infringement of Patent, Trademark or Industrial Design Rights arising from the use of Goods or any part thereof in the Purchaser's country. The vendor should be sure about his claim on the ownership of technology and total compensation in the event of a claim should be paid to the buyer in case of patent infringement.



**54. Right to information Act 2005:** The tenderer may indicate if any information in his tender includes information of commercial confidence, trade secrets or intellectual property, the disclosure of which would harm the competitive position of your company.

**55. Applicable Laws:** The contract shall be interpreted in accordance with Laws applicable in India and any dispute would be resolved by the court in Jamshedpur, Jharkhand India.

**56. Adoption of Integrity Pact in major Government Procurement Activities:** As per directives of CVC all organisations including CSIR labs/institutes have to adopt an integrity pact (IP) with the equipments manufactures where ordered equipment value exceeds Rs.3 (Three) crores to ensure transparency, equity and competitiveness in major Public procurement activities. The integrity pact envisages an agreement between the prospective bidders/vendors with the buyer committing the persons/officials of both the parties with the aim not to exercise any corrupt influence on any aspect of the contract.

**57. Termination:** CSIR-NML may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part.

- a) If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the contract, or within any extension thereof granted by the NML.
- b) If the Supplier fails to perform any other obligation(s) under the Contract.

**58. Debarring the firms from business:** The process of debarring the firm would be initiated in the below mentioned cases subject to the recommendation of the decision making committee and Director, CSIR-NML. The conditions for debarring the firm are:

- i) Not supplying the materials as per the technical specifications of CSIR-NML as mentioned in the Purchase Order.
- ii) Not fulfilling the contractual obligations as per the terms & conditions of the Purchase Order.
- iii) Not able to provide the required spares for the time period 15 (fifteen) years / period as specified in the vendors quotation "or" in the tender enquiry "or" Purchase Order of the buyer.
- iv) Repeated failures during installation, commissioning & trial run.
- v) Inadequate service back-up in terms of spares & manpower being repeatedly observed in a number of occasions and recorded by CSIR-NML during warranty and even afterwards (during the life cycle of the equipment).
- vi) In case it is proved that the Purchase Order of CSIR-NML has been sub-letted to some other vendor.

**59. Arbitration:** All disputes will be referred to Director General, Council of Scientific & Industrial Research (CSIR), New Delhi for arbitration. The decision of Director General, CSIR will be final and binding on both supplier and customer (NML).

- a) NML and the supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
- b) If, after twenty-one (21) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then NML or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given.
- c) In case of Dispute or difference arising between NML and a domestic supplier relating to any mater arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings, The dispute shall be referred to the Director General, Council of Scientific & Industrial Research and if he is unable or unwilling to act, to the sole arbitration of some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.
- d) The venue of the arbitration shall be the place from where the purchase order or contract is issued.

- e) Provision for settlement of disputes through arbitration indicating clearly that the resultant contract will be interpreted under Indian Laws in case of Purchase from Indian suppliers and / or United Nations Commission on International Trade Laws (UNCITRAL) in the case of foreign suppliers.

**60. Force Majeure:-**

(a) In case of an event or situation beyond the control of the supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the supplier. Such events like wars, revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes may be considered as not foreseeable and unavoidable by the supplier and thus the vendor in case of a loss the supplier shall promptly notify the purchaser in writing of such condition and the cause thereof within 21 days of its occurrence. The purchaser in such cases would accept the postponement in delivery period but the damage to goods due to such natural calamity needs to be replaced free of cost by the seller. Unless otherwise directed by the purchaser in writing the supplier shall continue to perform its obligation under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

(b) If the performance in whole or in part or any obligations under the contract is prevented or delayed by any reason of force majeure for a period exceeding 60 days, the purchaser may at its option terminate the contract without any financial repercussions on either side. In case the payment has been transacted by the purchaser in favour of the seller then the seller is bound to remit the payment in whole before closure of the Contract.

**61.** Notwithstanding the above, Director, CSIR-National Metallurgical Laboratory, Jamshedpur, India, reserves the right to "accept / reject" any or all tenders either in part or in full or to split the order without assigning any reason there for.

### **Section C: Standard Forms**

Bidders are required to fill in the following forms in accordance with the instructions given in Terms and Conditions (Bidding Document).

<b>Sl. No.</b>	<b>Name of the Form</b>
<b>1</b>	Bidder Information Form
<b>2</b>	Manufacturers' Authorization Form
<b>3</b>	Bid Security Form
<b>4</b>	Compliance Statement Form
<b>5</b>	Deviation Statement Form
<b>6</b>	Performance Statement Form
<b>7</b>	Non-Blacklisting Self Certificate
<b>8</b>	Price Schedule Form (Imported + Indigenous)
<b>9</b>	Performance Security Form*
<b>10</b>	Indemnity Bond*

**\*To be submitted after Placement of Purchase Order**

### **Bidder Information Form**

[The Bidder shall fill in this Form in accordance with the instructions indicated below. This should be done of the letter head of the firm]

Tender Enquiry No. and Date: [\[insert number and date from Invitation for bids\]](#)

1	Bidder's Legal Name: <a href="#">[insert Bidder's legal name]</a>
2	In case of JV, legal name of each party: <a href="#">[insert legal name of each party in JV]</a>
3	Bidder's actual or intended Country of Registration: <a href="#">[insert actual or intended Country of Registration]</a>
4	Bidder's Year of Registration: <a href="#">[insert Bidder's year of registration]</a>
5	Bidder's Legal Address in Country of Registration: <a href="#">[insert Bidder's legal address in country of registration]</a>
6	Bidder's Authorized Representative Information Name: <a href="#">[insert Authorized Representative's name]</a> Address: <a href="#">[insert Authorized Representative's Address]</a> Telephone/Fax numbers: <a href="#">[insert Authorized Representative's telephone/fax numbers]</a> Email Address: <a href="#">[insert Authorized Representative's email address]</a>
7	Attached are copies of original documents of:  Articles of Incorporation or Registration of firm named in 1, above.

Signature of Bidder \_\_\_\_\_  
Name \_\_\_\_\_  
Business Address \_\_\_\_\_

## **MANUFACTURERS' AUTHORIZATION FORM**

*[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated below. This letter of authorization should be on the letterhead of the Manufacturer and should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer.]*

Tender Enquiry No. and Date *[insert number and date from Invitation For Bids]*

To: The Director  
CSIR-National Metallurgical Laboratory, Jamshedpur 83100 (India)

### WHEREAS

We *[insert complete name of Manufacturer]*, who are official manufacturers of *[insert type of goods manufactured]*, having factories at *[insert full address of Manufacturer's factories]*, do hereby authorize *[insert complete name of Bidder ]* to submit a bid the purpose of which is to provide the following Goods, manufactured by us *[insert name and or brief description of the Goods]*, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty as specified in bidding document with respect to the Goods offered by the above firm.

Signed: *[insert signature(s) of authorized representative(s) of the Manufacturer]*

Name: *[insert complete name(s) of authorized representative(s) of the Manufacturer]*

Place:

Date:

**BID SECURITY FORM**

Whereas .....<sup>1</sup> (hereinafter called "the tenderer") has submitted their offer dated ..... for the supply of ..... (hereinafter called "the tender").

Against the NML's tender enquiry No..... KNOW ALL MEN by these presents that WE ..... of ..... having our registered office at .....are bound unto ..... Hereinafter called the NML, Jamshedpur.

In the sum of ..... for which payment will and truly to be made to the said, NML the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this ... day of .....20.....

**THE CONDITIONS OF THIS OBLIGATION ARE:**

- (1) If the tenderer withdraws or amends, impairs or derogates from the Tender in any respect within the period of validity of this tender.
- (2) If the tenderer having been notified of the acceptance of his tender by the NML during the period of its validity:-
- (3) If the tenderer fails to furnish the Performance Security for the due Performance of the contract.
- (4) Fails or refuses to accept/execute the contract.

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee shall remain in force up to and including forty five (45) days after the period of the tender validity, and any demand in respect thereof should reach the Bank not later than the above date.

-----  
(Signature of the authorized officer of the Bank)  
Name and designation of the officer  
Seal, Name & address of the bank and address of the Branch

**COMPLIANCE STATEMENT**

(1) NML's Enquiry Specifications	(2) Specification of Equipment (offered by Manufacturer)	(3) Compliance to NML's Technical Specifications YES or NO	(4) Details of Deviation, if any, as per NML's Specifications

Date : .....

Signature of Manufacturer / Agent

**DEVIATION STATEMENT FORM**

The following are the particulars of deviations from the requirements of the tender specifications:

<b>Sl. No.</b>	<b>CLAUSE</b>	<b>DEVIATION</b>	<b>REMARKS (INCLUDING JUSTIFICATION)</b>

Place:

Date:

Manufacturer/Bidder

Signature and seal of the

NOTE: Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "No Deviations".



**PERFORMANCE STATEMENT FORM**

Details of similar equipment / systems supplied & installed during past 3 years in India & Abroad

Name of the Firm \_\_\_\_\_

Sl. No.	Order Placed by (full address of Purchaser)	Order No. and date	Description and quantity of ordered equipment	Value of order	Date of completion of deliver as per contract	Date of actual completion of delivery	Remarks indicating reasons for late delivery, if any	Has the equipment been installed/ working satisfactory? (Attach a certificate from the purchaser / Consignee)	Name of Contact person along with Telephone No., Fax No. and e-mail address

Signature and Seal of the manufacturer/Bidder .....

Place:

Date:

**Non - Blacklisting Self Certificate**

This is to certify that M/s. \_\_\_\_\_ has not been blacklisted by any Central / State Government Department / organization in last 3 years.

**PRICE SCHEDULE FOR GOODS BEING OFFERED FROM ABROAD**

*(Bidder should quote in this format however, if quoted in different format; all parameters given below should be covered)*

Tender Enquiry No. and Date:

Quotation No. \_\_\_\_\_ Date: \_\_\_\_\_ Quotation Valid Upto: \_\_\_\_\_

Country of Origin: \_\_\_\_\_ Currency: \_\_\_\_\_

Sl. No.	Description of Item	Quantity	Unit	Rate	Amount
1	Item name (Catalogue, Part/Model No. and specifications)				
2	Essential Accessories (if any)				
3	Essential Spares/Consumables (if any)				
4	Installation, Commissioning and Training Charges				
Total Ex-Works Price					
(-) LESS: Discount ___% (if any)					
Total Ex-Works Price after Discount					
(-) LESS: Agency Commission ___% (if any)					
Net Ex-Works Price					
(+ ) Packing & Forwarding Charges					
(+ ) Inland Freight Charges					
(INCO TERM): FOB / FCA _____ International Airport, _____ Country Price					
(+ ) Freight upto Kolkata (India) & Insurance Charges					
CIF / CIP Kolkata (India) Price					

Note: Optional Items, if any, may be quoted separately.

	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year
Charges for Annual Maintenance Contract			
Comprehensive			
Non-Comprehensive			

Approximate Weight of the Consignment	
Approximate Dimensions of the Consignment	
Mode of Shipment (BY AIR / SEA)	
Delivery Schedule (Delivery Period shall count from _____)	
Time Frame required for conducting Installation & commissioning of the equipment, Acceptance Test, Training, etc.	
Port of Shipment	
Port of destination	Kolkata, India
Final Destination	CSIR-NML, Jamshepur, India
Warranty	
Payment Term (Please refer to our Payment terms)	
Bank Charges (Inside India to CSIR-NML account and Outside India to beneficiary's account)	

SIGNATURE OF AUTHORISED PERSON

**PRICE SCHEDULE FOR GOODS BEING OFFERED FROM INDIA**

*(Bidder should quote in this format however, if quoted in different format; all parameters given below should be covered)*

Tender Enquiry No. and Date:

Quotation No. \_\_\_\_\_ Date: \_\_\_\_\_ Quotation Valid Upto: \_\_\_\_\_

Sl. No.	Description of Item	Quantity	Unit	Rate	Amount
1	Item name (Catalogue, Part/Model No. and specifications)				
2	Essential Accessories (if any)				
3	Essential Spares/Consumables (if any)				
4	Installation & Commissioning and Training Charges				
Total Ex-Works Price					
(-) LESS: Discount ____% (if any)					
Net Ex-Works Price					
(+ Packing & Forwarding Charges					
(+ Transportation Charges					
FOR, CSIR-NML, Jamshedpur, Price					
Tax _____%(GST)					
Grand Total					

Note: Optional Items, if any, may be quoted separately.

Charges for Annual Maintenance Contract	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year
Comprehensive			
Non-Comprehensive			

Approximate Weight of the Consignment	
Approximate Dimensions of the Consignment	
Mode of Shipment (By Air / Rail / Road)	
Delivery Schedule (Delivery Period shall count from _____)	
Time Frame required for conducting Installation & commissioning of the equipment, Acceptance Test, Training, etc.	
Warranty	
Payment Term (Please refer to our Payment terms)	

SIGNATURE OF AUTHORISED PERSON

**MODEL BANK GUARANTEE FORMAT FOR PERFORMANCE SECURITY**

To: The Director,  
CSIR-National Metallurgical Laboratory,  
Jamshedpur 831 007,  
Jharkhand, India.

WHEREAS .....

(name and address of the supplier) (hereinafter called "the supplier") has undertaken, in pursuance of contract no. .... dated .....to supply (description of goods and services) (herein after called "the contract").

AND WHEREAS it has been stipulated by you in the said contract that the supplier shall furnish you with a bank guarantee by a scheduled commercial bank recognized by you for the sum specified therein as security for compliance with its obligations in accordance with the contract;

AND WHEREAS we have agreed to give the supplier such a bank guarantee;

NOW THEREFORE we hereby affirm that we are guarantors and responsible to you, on behalf of the supplier, up to a total of ..... (amount of the guarantee in words and figures), and we undertake to pay you, upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the supplier before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the supplier shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until the ..... day of ....., 20.....

(Signature of the authorized officer of the Bank)

.....

Name and designation of the officer

.....

Seal, name & address of the Bank and address of the Branch

**INDEMNITY BOND**

No. -----

Date: -----

**1) Amalgamation/Acquisition**

In the event of M/s----- proposes for amalgamation, acquisition or sale of its business to any other firm during this contract period, M/s. ----- and proposed Buyer/Successor of the Principal Company are liable to execute, fulfill contractual obligations without any deviations. For this purpose M/s. -----/M/s ----- and proposed Buyer/Successor of the Principal Company shall indemnify itself to the Director, CSIR-National Metallurgical Laboratories, Jamshedpur to fulfill the contractual obligations as per the terms of the CSIR-NML Global Tender and quotation of M/s. -----No. ----- dated----- and CSIR-National Metallurgical Laboratories P.O. No.-----dated ----- -. The contractual obligations are supply, installation, commissioning, warranty maintenance/replacement of spares, accessories etc. as per the above mentioned Purchase Order.

**2) Joint Venture, Consortium or Association**

If the Supplier is a joint venture, consortium, or association, all the parties shall be jointly and severally liable to the CSIRNML for the fulfillment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the CSIR-NML.

**3) Patent Indemnity**

The Supplier shall, subject to CSIR-NML's compliance and indemnify and hold CSIR-NML and its employees and officers harmless from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which CSIR-NML may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of: (a) the installation of the Goods by the Supplier or the use of the Goods in India; and (b) the sale in any country of the products produced by the Goods.

For M/s. -----  
Principal Supplier.

For M/s -----  
Indian Agent

## Section D: Technical Specifications of Item/Service

**Name of the Item: Single-Lever Type Constant Load Creep Testing Machine**

**Quantity: 05 Nos.**

### **Technical Specifications:**

#### **1. Description of the ITEM:**

Supply, installation and commissioning of single-lever type creep testing machine.

#### **2. Detailed SPECIFICATIONS and Quantity:**

Supply, installation and commissioning of single-lever type creep tests machine for testing in an air environment in accordance with ASTM E139 testing standard with the following features (Quantity:05 Nos).

##### **2.1. General features**

- I. The machine includes a loading frame with an integral control cabinet.
- II. The capacity of the machine shall be 5500 Kg. The load will be applied to the specimen through a single-lever arm with lever ratio of 20:1 and with a loading accuracy of  $\pm 0.5\%$ .
- III. The machine should be equipped with a three zone furnace to carry out the tests at high temperatures in the range 50 °C to 1000 °C with an accuracy of  $\pm 1^\circ\text{C}$ . High precision, high accuracy temperature controller and power control unit are to be employed to achieve the above-mentioned temperature accuracy over a length of 150 mm. each zone should be controlled by separate temperature controller and power supply unit.
- IV. Automatic load lever beam levelling device with over travel trips is required.
- V. The specimen elongation (strain) has to be measured by an attachment of extensometer and digital dial gauge during the test continuously.
- VI. Continuous temperature and strain measurements, and also storage and analyses of data are required through the computer controlled data acquisition system.
- VII. It is required to indicate the elapsed test time by a digital time meter with a zero hour to a full-scale reading of 99999 hours, with a resolution of 0.1 hour. The digital meter shall have provision for manual reset to zero hour and with a memory at power break.
- VIII. There must be a provision to automatically shut off the electrical power to the machine when the specimen breaks.
- IX. The operating power for the whole control cabinet and the furnace should be of 230 Volts single phase 50 Hz.
- X. The main switch and the other switches for temperature controllers, elevator motors etc. must be provided with a suitable good quality circuit breaker for the safety reasons.
- XI. A good quality of bright neon pilot light should be used wherever required.
- XII. Fuses should be used wherever required and the fuse points shall be easily accessible.
- XIII. Spirit level should be mounted on top of the lever arm in each machine so that the horizontal position of the beam can be confirmed periodically.
- XIV. Provision should be there to put off the power to the furnace, in case of overshooting of temperature due to malfunctioning of any of the temperature controllers.

##### **2.2 Load Frame**

- I. The capacity of the machine shall be 5500 Kg. The load will be applied to the specimen through a single-lever arm with lever ratio of 20:1 and with a loading accuracy of  $\pm 0.5\%$ . Fulcrum material should be high strength tool steel (HSS).
- II. Free standing load frame features a small footprint that optimizes laboratory floor space.
- III. Automatic load lever beam levelling device with over travel trips is required.
- IV. Design of the machine is such that it requires no special foundation.
- V. There should be provision for vibration isolation with neoprene waffle pads.
- VI. The material for the frame is IS 226 mild steel (MS). All the components should be painted with three coats of epoxy paint and finally coated with approved colour.

VII. Provision of spirit level to indicate beam position.

### **2.3 Motorized Draw Head Assembly to maintain lever horizontality**

- I. Provision should be made to prevent the draw head assembly from exceeding the limits during manual or automatic operations.
- II. There must be a provision to manually operate the draw head motor (i.e. the motor and gear assembly which supports the creep specimen train) electrically to move it up or down. During the test, it should be ensured the draw head motor moves down automatically by the above said beam-levelling unit.
- III. There must be a provision to de-clutch the motor assembly from the gear assembly so that the specimen train assembly can be moved up or down manually by a hand wheel.
- IV. Precise, anti-rotation worm gear drive jack with at least 100 mm linear travel and powered by a gear reduced high torque motor.
- V. Flexible coupling for stable, no-jitter continuous draw head motion.
- VI. Proximity switch for non-contact sensing of lever arm position. (This is required for auto-levelling control and prevents damage when the specimen fails.)

### **2.4 Furnace**

- I. Three-zone vertical cylindrical furnace should be of split type and hinged in the rear side. Another end should have provision for locking at top and bottom using CAMLOC type of assembly or equivalent.
- II. The power supply terminals to the furnace should be kept near the hinges i.e. in the rear side of the furnace with the suitable protective covers.
- III. Heating element specifications:
  - Material: Kanthal - A1
  - Max. Temperature: 1200 °C
  - Operating Voltage: 230 V AC single phase 50 Hz.
- IV. Top and bottom finish insulation should be low thermal conducting (low 'K' factor) vacuum cast ceramic fibre insulation to provide minimum heat loss, high-temperature capability and for a rigid structure.
- V. The outer shell should be made of a bright stainless steel 1.6 mm thick or above. It is preferable to avoid using flanges. Closures at top and bottom of the furnace should fit snugly around pull bars and reduce the heat loss at these points. Provisions must be there to seal the top and bottom of the furnace by the compressed vacuum cast ceramic fibre insulation. Clamps or equivalent can be provided to keep the tight fitting of the above thermal insulation boards to seal the leakages.
- VI. Dimensions:
  - Outer Diameter: 300 mm.
  - Inner Diameter: 90 mm.
  - Height: 400 mm.
- VII. Uniform temperature zone ( $\pm 2^\circ\text{C}$ ) at the middle of the furnace should be at least 150 mm.
- VIII. Separate temperature controllers with power supply unit should be employed to control the temperature of each zone.
- IX. The rear-hinged part of the furnace should be mounted on the machine frame such that the position of the furnace is adjustable vertically over a distance of double of the furnace height.
- X. Integrated, sophisticated control-Algorithm for a precise temperature control along specimen and to prevent overshooting temperature.
- XI. Automatic temperature control setting from 50 °C to 1200 °C.
- XII. Interface for 4 Thermocouples (3 for 3 zones of furnace, 1 for over-temperature protection)
- XIII. Digital display of temperature.

### **2.5. PID Temperature controller: (Eurotherm make)**

#### **2.5.1. Input.**



1. Temperature range: 50 °C to 1200°C
2. Input range: ± 100 mV and 0 to 10 V DC (auto-ranging)
3. Sample rate: 9 Hz (110 ms)
4. Calibration accuracy: 0.25% of reading, ± 1 LSD, ± 1°C/F
5. Resolution: < 1 µV for ± 100 mV range, < 0.2 mV for 10 V dc range
6. Linearization accuracy: < 1.0 of reading
7. Input filter: 1.0 to 999.9 seconds
8. Zero filter: To be available

### 2.5.2 Thermocouple

R-Type only

1. Cold junction compensation : Automatic
2. Thermocouple break protection : To be available

### 2.5.3. Output

Relay output and control output (4-20 mA)

Control functions

1. Modes: PID or PI with overshoot inhibition, PD, PI, P only on/off
2. Application: Heating and cooling
3. Auto/manual: Bumpless transfer
4. Set point rate limit: 0.01 to 99.99 degrees or display units per minute
5. Cooling algorithms: Linear
6. Tuning: One-shot tune: Automatic calculation of PID and overshoot inhibition parameters
7. Automatic droop compensation: Automatic calculation of manual reset value when using PD control
8. Alarm types: Full scale high or low, deviation high, low, or band

### 2.5.4. General

1. Display: Dual, 4 digit x 7 segment high intensity LED
2. Dimensions: 48 x 48 x 103 mm (width, height and depth respectively)
3. Supply: 230 V AC, 50 Hz, 5 Watts Max
4. Temperature and RH: 0 to 55°C RH: 5 to 90% non-condensing
5. Panel sealing: IP65
6. Non-volatile EEPROM: To be available

### 2.6. Thyristor Power Control Units: (Eurotherm make)

1. Load type: Constant resistance
2. Power supply: 230 V AC, 50 Hz
3. Heater voltage: 230 V AC
4. AC current rating: 15 A
5. Firing mode: Phase angle
6. Input: 4-20 mA DC or 0-5V
7. Manual input: Input impedance 330 kilo ohms
8. Slave output: +10 V
9. Operating temperature: Up to 50°C
10. Mounting: DIN Mounting
11. Current limit: Adjusted from 10 to 100%
12. Compatibility: Should be compatible with the above temperature controller

### Thyristor protection

1. External: High-speed fuse
2. Internal: RC snubber

### 2.7. Pull Rods, Universal coupling, Grips, Adapter and Fixtures

- I. Pull rods made of nickel-base superalloy grade MarM246/ 247 having durability greater than 3 years at full load and at a temperature up to 1100 °C.
- II. The system shall have suitable fixtures to avoid bending and eccentricity.
- III. Specimen adapters made of nickel-base superalloy grade MarM246/247 to adopt specimen having M8x1.25 and M10X1.5 threading (one pair of each size per machine), 0 to 5 mm flat specimen adapter and pin grade MarM246/247 (quantity 4-pairs total).
- IV. Pull Rods, Universal coupling, Grips, Adapter and Fixtures should provide perfect axial alignment according to the ASTM E 292 standard.
- V. Length of the pull rods and adapters should be sufficient to complete the load train with the test sample (typically 70-150mm length) and to travel +/- 50mm in the specimen mounted condition.

### **2.8 Extensometer (One number with each machine)**

Extensometer should be of the 4-rod type with provision for averaging elongation measuring instrument (Digimatic indicator or Optical linear encoder). Materials of the extensometer should be nickel base superalloy (preferably Inconel 601) to work up to 1100 °C.

### **2.9 Strain Measuring Instruments (one pair number with each machine)**

If Digimatic indicator (Mitutoyo make) is supplied it should be with the following features.

- I. Inductive Spring loaded type.
- II. Stroke: 20 mm length.
- III. Least count: 1 micron (0.001 mm).
- IV. Accuracy:  $\pm 1$  micron (0.001 mm) or better
- V. Data output: compatible with data logging system.

If linear encoder is supplied it should be with the following features

- (i) stroke - 12mm
- (ii) Least count - 1 micron (0.001mm) or better
- (iii) Accuracy -  $\pm 1$  micron or better
- (iv) Data output - compatible with data logging system.

### **2.10 Data Logging System**

- I. Data logging system for logging data for 3 temperature channels and 2 displacement transducers from each machine and storing of data for minimum of 1 year (all channels data from 4 machines)
- II. Extra 30 channels should be provided for future extension.
- III. Variable data scanning speed is required (1 sec, 1 min, 10 min, 30 min, 1 hr).
- IV. Scanning speed in each channel should be independently altered (Not in a group of the machine in a particular scanning/recording speed). Data reduction automatic and suitable for long-term creep test data (typically 33000 h)
- V. Provision should be there to upload the data periodically to the computer.
- VI. Alignment check (cold run) and manual step loading (hot run) and test process data logging and storage and display for creep test analysis purpose. If automatic hot step loading is possible it can be offered as an optional item.
- VII. Display of online progress of creep test with creep curve plot for each machine
- VIII. Software should have graphing and reporting functions both for online progress monitoring and post-test stages. Software and computer hardware should be suitable for test data logging and processed data plot and data analysis for creep test. Protection of test control data and logged test output data in the event of computer failure should be provided.

### **2.11 Calibrated Load-Cell Unit**

One calibrated load cell having 50 kN capacity has to be supplied along with calibration certificate with traceability to national and international standards.

### **2.12 Computer, Software and Printer**

- I. User-friendly software and windows features for uploading data from data logger to computer with the suitable interface between them.
- II. Laserjet Colour Printer.

### **2.13. Power failure protection**

Each test frame and data logger should have provision for the protection of test data and retain the control of the data in the event of power failure. The test should resume automatically on power resumption. Suitable UPS system should be supplied for data logger, computer and printer.

### **2.14 Calibration Certificates**

- I. Calibration certificate for all digital and non-digital instruments and probes to be used.
- II. Verification certificate for creep testing machine.
- III. The following devices should be calibrated against standards traced to the National Institute of Standards and Technology. Applicable ASTM standards are listed beside the device.
  - Load measuring system Practice E4 and E74
  - Extensometer Practice E83
  - Thermocouples Method E 220
  - Load Cell, Digimatic Indication/ linear encoder and temperature measuring devices also should be verified.

### **2.15. Inspection, testing, warranty and Annual Maintenance Contract (AMC)**

- I. The supplier shall demonstrate all the functions of the system according to the specifications at the time of installation at site
- II. Once installed and commissioned at user's site, the equipment shall be under warranty for a period of three years.
- III. AMC charges, after the end of warranty period, shall be quoted separately in the bid. The AMC charges shall be frozen hereunder and the supplier shall be liable to comply with the same. However, the cost of AMC charges shall not be included for price comparison.

### **2.16 Acceptance test**

- I. User scientist will conduct the short-term creep test for accuracy and repeatability of the result to assess the machine reliability for creep testing.

### **2.17 Documentation**

- I. Detailed user manual, complete with circuit diagrams (mechanical, electronic and electrical), operational features, calibration certificates as mention in the column-14. Installation diskettes/CDs shall be supplied along with the equipment.
- II. Calibration/verification procedures should be provided for all digital and non-digital instruments to which calibration/verification certificates are needed as per test standards and duly issued along with a supply of machines.

### **2.18 Spares**

- I. Load train assembly (Pull rods, Universal coupling, Grips, Adapter and Fixtures): Quantity 2 Nos.
- II. Furnace coils for replacement: 06 Nos.
- III. PID Temperature controller: 1 Nos.
- IV. Thyristor Power Control Units: 3 Nos.
- V. Extensometer – 2 Nos.
- VI. Digimatic indicator - 2 Nos.

### **2.19 The offer shall include**

- I. List of users in India.
- II. Availability of technical service and assurance on the supply of proprietary spares for at 5 years after sales for the model to be supplied.

### **2.20. Quantity: 05 Nos.**