

**BUREAU OF INDIAN STANDARDS  
(NORTHERN REGIONAL OFFICE LABORATORY)  
B-69, PHASE –VII, INDUSTRIAL AREA, SAS NAGAR, MOHALI-160059  
(PUNJAB)**

Ref: NROL/PC/BID-02 (15-16)

Date :16 July 2015

**TENDER NOTICE NO.- 02**

Sealed tenders are invited (under two bid system i.e. Technical Bid and Financial Bid) separately from reputed manufacturers or their accredited/sole selling agents for the “Supply, Installation, Commissioning and Satisfactory Demonstration” of following items.

<b>BID Sl. No.</b>	<b>Specifications</b>	<b>Name of Equipment</b>	<b>Location</b>	<b>Qty.</b>
01	For detailed specifications, please refer <b>Doc. No. NROL/SPEC/HC/CEM/15-16/001 at P-10.</b>	Humidity Chamber for curing of cement cubes for compressive strength test as per IS 4031(Pt -6)-1988	NROL (details at clause 4)	01 no. Each
02	For detailed specifications, please refer <b>Doc. No. NROL/SPEC/HC/CEM/15-16/002 at P-11.</b>	Humidity Chamber for curing of Dry Shrinkage test moulds of cement as per IS 4031(Pt -10)-1988.	NROL (details at clause 4)	01 no. Each
03	For detailed specifications, please refer <b>Doc. No. NROL/SPEC/AC/CEM/15-16/003 at P-12.</b>	Auto Clave Soundness test of cement samples by Autoclave Method as per IS 4031(Pt -3)-1988.	NROL (details at clause 4)	01 no. Each
04	For detailed specifications, please refer <b>Doc. No. NROL/SPEC/CTM/CEM/15-16/004 at P-13.</b>	Micro processed control based Compression Testing Machine (MUCTM) for Testing of Cement cubes according to IS 4031:part 6:1988, 0-500KN (L.C: 0.02 KN or better).	NROL (details at clause 4)	01 no. Each

**1. Security Bid (EMD)** – 5% of the Quoted Cost of the equipment may please be sent in the form of a Crossed/Account payee demand draft from a Nationalized Bank, payable at **CHANDIGARH** in favour of “**BUREAU OF INDIAN STANDARDS**”. The Demand Draft of the EMD be placed inside a separate sealed envelope clearly marked ‘EMD’ on the right hand side corner of the envelope and be stapled along with the sealed envelope containing the Financial Bid.

**2. TENDER DOCUMENT** : No printed tender documents will be issued by BIS, NRO LAB. Bidders are requested to download the Tender Notice ( P-I to P- II), Terms & Conditions (P-1 to P- 9), Specifications (Please see **Doc. No. NROL/SPEC/HC/CEM/15-16/001 at P-10**, **Doc. No. NROL/SPEC/AC/CEM/15-16/002 at P-11** , **Doc. No. NROL/SPEC/CTM/CEM/15-16/003 at P-12** and **Doc. No. NROL/SPEC/CTM/CEM/15-16/004 at P-1** .and enclose a

non-refundable bid fee of Rs.500/- (Rupees Five Hundred only) for each item separately, in the form of Demand Draft drawn in favour of “**BUREAU OF INDIAN STANDARDS**” payable at **CHANDIGARH**.

**3.** Unsigned, Incomplete tenders or Tenders without ‘EMD’, Bid Fee shall be summarily rejected. No Ex emption shall be permitted.

\*Last date for receipt of Bids is : 17-08-2015 (1700h)

\*Date of opening of Technical Bids is : 18-08-2015 (1000h)

**4. LOCATIONS WHERE EQUIPMENTS ARE TO BE SUPPLIED:**

**Northern Regional Office Laboratory (BIS)** Plot No.B-69, Phase-VII, Industrial Area SAS Nagar, Mohali- 160059 (PUNJAB); Email: [nrol@bis.org.in](mailto:nrol@bis.org.in) Phone No:0172-3246935

In the event of any of above date(s) being declared a holiday, the last date of submission of completed bid(s) shall be on the next working day.

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**(ANIL KUMAR)**

Scientist F & Head

Northern Regional Office Laboratory (BIS)

Plot No.B-69, Phase-VII, Industrial Area

SAS Nagar, Mohali- 160059 (PUNJAB)

Phone No:0172-3246935

Email: [nrol@bis.org.in](mailto:nrol@bis.org.in)

**BUREAU OF INDIAN STANDARDS**  
**(Northern Regional Office Laboratory)**  
**Plot No.B-69, Phase-VII Industrial Area**  
**SAS Nagar, Mohali-160059 (PUNJAB)**

**TERMS & CONDITIONS**

**TENDER DOCUMENT:**

1. The Tenderers are requested to give detailed tender in their own forms in two bids i.e.

**Part - A Technical Bid.**

**Part - B Financial Bid.**

The Technical & Financial Bids should be sealed and sent separately in sealed envelopes & duly super-scribed (giving Equipment name, technical/financial bid, due date of opening & Ref. No. on the top of the envelope). Such Bids shall remain valid for a period of 120 days from the date of opening. Each page of the tender documents must be duly signed with seal affixed as a token of acceptance of tender conditions, specifications, format etc. and the same shall be submitted along with the technical bid, failing which the tenders shall be rejected.

2. The specifications of equipments, have been specified against each item. However, bidder(s) may be required to arrange practical demonstration of equipment/model(s) quoted by them before finalization of order.

3. No tender documents will be issued by BIS, Northern Regional Office Laboratory. Bidders are requested to download the Tender Documents and enclose a non-refundable bid fee of Rs.500/- (Rupees Five Hundred only) for each item separately, in the form of Demand Draft drawn in favour of “**BUREAU OF INDIAN STANDARDS**” payable at Chandigarh. The Bid fee should be enclosed with Technical bid only. No exemption whatsoever shall be acceptable.

4. In the technical bid the following may be clearly indicated:

- a) The Equipments are required to be installed at location indicated in the Tender Notice and subsequently training is to be provided to the concerned scientists/testing personnel, where necessary.
- b) Packing, Forwarding, Freight & Insurance and Commissioning Charges, if any extra may be quoted separately in Financial Bid.
- c) In case your quote is F.O.R./F.O.B. basis, estimated insurance coverage charges may be indicated.
- d) CIF(Carriage Inward & Freight), SAS Nagar (Mohali) value both by Airfreight and Ocean freight, where applicable.

5. Tenders complete in all respects for each item should be submitted separately for Technical as well as Financial bids as follows

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- a) One sealed envelope superscribed “**Technical Bid**” will contain only the Technical Specifications of the indented equipment as per details in Clause 6 of this tender terms and conditions. The amount of EMD shall not be disclosed in Technical Bid.
- b) A Second sealed envelope superscribed “**Financial Bid**” will contain only the financial bid in which price, maintenance, Annual Maintenance Contract Charges [AMC] etc. and any other information, which has financial implications, will only be given. The Demand Draft of the EMD (see Para 42) be placed inside a separate sealed envelope clearly marked ‘EMD’ on the right hand side corner of the envelope and be stapled along with this sealed envelope containing the Financial Bid. However, the EMD of the successful Bidder may be adjusted against Performance Bank Guarantee.
- c) Both the above sealed envelopes are to be kept in a main envelope, superscribed as           Tender           No.           **NROL/PC/BID-02**           **(15-16)**           for  
\_\_\_\_\_  
(Item /Names) due on **18 August 2015** and duly sealed.

6. The Technical Bid [Part A] should accompany complete specification,   Manufacturer’s name, address and following details :

- a. Expected life span of equipment and accessories.
- b. List of infrastructural facilities and consumables to be arranged by the Bureau for commissioning of equipment.
- c. List of the Users (Other BIS labs/ Govt Labs. /Institutes) in India with complete postal address to whom the similar/ identical equipment has been supplied and also attach the satisfactory performance report of the equipment from user Organization.
- d. Near locations in India from where after sales services shall be provided along with the name of Servicing Agent,
- e. The optional and any other essential items/accessories required for the maintenance of the equipment for the next three years.
- f. Technical Literature of the equipment along with necessary photograph/drawings, if any
- g. Deviation Statement Form (See Annexure 1). It must be enclosed, also please see Clause No.43 (C).
- h. The time required for delivery of equipments after date of placement of order to be indicated.

7. Cost of the items should be mentioned clearly in the Financial Bid [Part-B] only. The following details need to be included :

- a. Price break-up of main equipment and accessories and consumables to be supplied by the party,

- b. Rebate on the quoted price, if additional identical equipment is procured for any other BIS Lab, and
- c. The Annual Maintenance Contract charges for next three years after the expiry of warranty period
- d. The rates quoted shall be valid for a period of 120 days from the date of opening of the tender. However, the current value of the foreign currency would be applicable at the time of placing the order.

8. **In case of foreign quote**, the Principal supplier should clearly indicate the address of the Indian Agent and percentage (%) of Agency Commission payable if any, to be paid to the Indian Agent in Indian Currency.

9. Indicate the names and addresses of the Indian reputed Organizations where you have supplied the similar equipment and may attach the satisfactory performance report of the equipment from user Organization.

10.(A) If you have supplied identical or similar equipment to Govt Labs. /Institutes, the details of such supplies for the preceding three years should be given.

(B) Based on the above information BIS will have its option to obtain details of the equipment, their performance, after sales services etc. for evaluation of the tender, directly from the concerned Labs./Scientists etc.

11. Fax / E-mail / Telegraphic / Telex tenders shall not be considered.

12. All the Bank Charges inside and outside India, including opening of LC, communication, confirmation, amendments etc., will have to be borne by supplier only.

13. Details of after-sales services offered by you are to be made clear in the tender.

14. **Delivery Period:** As time is the essence of the contract, Delivery period mentioned in the Purchase Order should be strictly adhered to. Otherwise the tenderer will forfeit EMD, after maximum 10 days of the last date of delivery.

15. The supplier will have to give along with the equipment complete drawings, circuit diagrams, service/maintenance manual & operating manual of the equipment.

16. With regards to terms of payment including period of warranty, we prefer to release the payment on BILL Basis (excluding Indian Agency Commission) after receipt of consignment in good condition and satisfactory installation, and commissioning thereof. Alternatively, depending upon the value and foreign exchange regulations the payment can also be considered through Sight Draft / Letter of Credit through the Nationalized bank for the order value excluding the Indian Agency Commission. However, the detailed payment for Sight Draft / Letter Credit is mentioned at clause No. 25 of this tender terms and conditions.

17. Supply means "Supply, Installation, Commissioning and satisfactory demonstration of the whole system and training". If there are any charges extra for Installation, Commissioning and training, the same should be specified in the financial bid.

18. All goods shall be inspected by BIS preferably in the presence of supplier or his authorized representative, when the packages are opened in BIS, NRO Lab, prior to installation. The decision of BIS shall be binding. Rejected items/goods/stores shall be removed by the supplier at his own cost and risk, within 30 days of receipt of notice for the removal of such goods, and no liability, whatsoever, on the Bureau shall be attached for the rejected/disapproved goods/items/stores

19. The Tenderer is required to furnish the Permanent Account Number (PAN) Allotted by the Income Tax Department.

20. In case of foreign quote, the address of Principal's / Manufacturer's and their Banker's details should be furnished.

21. The item should be supplied with manuals and the manuals including technical drawings should be complete in all respects to operate the system without any problem. If the manuals are on chargeable basis, the same should be specified in the offer.

22. The supplier is required to ensure having a import license for the equipment quoted where applicable as per GOI guidelines.

23. In case of Indigenous Items the offer should contain the Basic Price and percentage of Excise Duty should be shown separately, BIS shall pay custom duty as applicable.

24. Price shall specifically indicate sales tax, excise duty or any other charges. In absence of any such stipulation, it will be presumed that the prices include all such charges and no Claim for the same shall be entertained. The Bureau pays full CST and neither Form C nor Form D is provided.

25. (A) The successful bidder shall furnish within 15 days of placement of the order an unconditional Performance Bank Guarantee valid till 60 days after the warranty period from a Nationalized Bank for 10% of the order value. On acceptance of this condition and submission of Bank Guarantee, the Letter of Credit will be opened for 100% order value. If the firm fails to submit the same, the Contract shall be deemed as terminated and EMD shall be forfeited, in case of foreign suppliers & indigenous suppliers. The performance Bank Guarantee is to be given in format enclosed at Annexure 2, enclosed with this document.

(B) **For foreign suppliers:** PAYMENT- 90% payment shall be made by Sight Draft / an Irrevocable Letter of Credit established in favour of the supplier through the Nationalized Bank, for the order value, excluding the Agency Commission due to the Indian Agents, against the presentation of original Shipping documents. Balance 10% will be released after completion of satisfactory installation, commissioning and demonstration of the whole system and on completion of training. However Letter of Credit/Sight Draft arrangement will be made for 100% order value. The Agency Commission to the Indian Agent, if any and payable by BIS will be paid only after successful installation, commissioning and satisfactory demonstration and acceptance of the items ordered for.

(C) **For Indigenous items:** 90% payment shall be made against delivery, installation, Commissioning, training and on acceptance as per Purchase Order at site and balance 10% shall be made after receipt of performance Bank Guarantee for 10% of the total order value, to be valid for Two Year from date of installation and acceptance.

26.The Bidder has to state in detail the Electrical Power/UPS requirements, floor space, head room, foundation needed and also to state whether Air-conditioned environment is needed to house the system and to run the tests. i.e. pre-installation facilities required for installation may please be intimated in the technical bid.

27.**INSTALLATION:** Bidder shall be responsible for installation / demonstration and for after sales service during the warranty and thereafter.

28.In case of Foreign Quote, the mode of dispatch should be by Air Post Parcel/Ocean Freight/Air Freight (By Air India Freight) and on Freight to-pay basis only. The approximate dimensions of the packages and weight of consignment are to be indicated.

29.The makes / brand and name and address of the manufacturer, Country of Origin, Country of Shipment and currency in which rates are quoted are to be mentioned.

30.The payment of local currency portion shall be payable in equivalent Indian Rupees, within 30 days after the receipt of the equipment in good condition and after satisfactory installation and commissioning and demonstration.

31.The tender / quotation / offer submitted by you should be valid for a minimum period of 120 days from the date of opening the tender.

32.The quotation should be only in Indian Rupees for indigenous items. In case of foreign quote, the vendors may quote their rates in Indian Rupees as well as in Foreign Currency.

33.The Bidder who submits the tender on behalf of their principals should produce documentary evidence in support of their authority to quote or submit proforma invoice of their principals.

34.BIS will not provide any accommodation/transportation for the Engineers/ Representatives for attending Installation, Commissioning and Demonstration Work. It is the absolute responsibility of the Principal Supplier/Indian Agent to make their own arrangements.

35.**WARRANTY:** The equipment is to be guaranteed for trouble free performance for a minimum period of **two years** after installation. The defects, if any, during the warranty period are to be rectified free of charge by arranging free replacement wherever necessary.

36.Indicate the name of firm, address, contact person, phone no. and fax no. etc of onsite warranty, agency who shall maintain during warranty and undertake Annual Maintenance Contract/Comprehensive Service Maintenance Contract beyond warranty shall be given in the technical bid. In case of foreign quote, the Indian Agent who shall maintain during warranty and AMC beyond warranty shall be given in the Technical Offer.

37.The supply of spare parts is to be guaranteed at least for a period of 10 years after the supply of the equipment.

38.After successful installation what will be the minimum and maximum down time of equipment/instrument in case of breakdown. If the identified firm or person fails to put the system into working condition what is the further alternative course of action suggested by you to adhere to minimum down time.

39.Please mention the charges for comprehensive annual maintenance contract separately for 3 years in financial bid(for post warranty period).

40.No sub-contracting will be allowed for installation or maintaining system/equipment /instrument during or after warranty period.

41.Discount offered should be mentioned clearly in the financial bid only.

42.The Earnest Money Deposit (@5% of Quoted Price) must be sent along with your financial bid in the form of a Demand Draft, Banker cheque or Bank Guarantee (from a Nationalized Bank only) drawn in favour of **“BUREAU OF INDIAN STANDARDS”** payable at Chandigarh, otherwise your technical & financial bids will not be considered at all. The Earnest Money of successful bidder will be returned only after installation, commissioning, satisfactory demonstration and acceptance of the equipment by the user Scientist/HOD as per the terms of our purchase order. The Earnest Money of the unsuccessful bidder whose technical bid has not been found suitable will be returned.

43.(A) Tenders not accompanied with Demand Draft/Bank Guarantee towards “Earnest Money Deposit” & BID Fee will summarily be rejected. No exemption what so ever shall be permitted.

(B) Tenders, which are submitted without following the Two-Bid Offer System, will summarily be rejected.

(C) Unsigned Tenders & Tenders without Deviation Form will also be rejected.

44.Conditional Offers will not be considered.

45.If the supplier fails to Supply, Install and Commission the system as per specifications mentioned in the order within the due date, the Supplier is liable to pay liquidated damages of one percent value of the Purchase Order awarded, per every week delay subject to a maximum of 10% of the total value of the order and such money will be deducted from any money due or which may become due to the supplier.

46.Goods should not be dispatched until the Vendor receives a firm order.

47.Firms which have already supplied similar equipment to BIS and have not completed required installation/commissioning/after sales service/warranty replacements etc. Such firms offers will not be considered for further evaluation and no enquiries thereafter will be entertained.



48. Tenders addressed to the **Scientist 'F' & HEAD, Northern Regional Laboratory, Bureau of Indian Standards, Plot No. B-69, Phase-VII, Industrial Focal Point, Mohali-160059, Punjab** are to be submitted for each item separately as detailed in Clause 5 of this tender terms and conditions

49. The tenders must be clearly written or typed without any cancellations / corrections or overwriting.

50. Please indicate page nos. on your quotation. E.g. If the quotation is containing 25 Pages, please indicate as 1/25, 2/25, 3/25 -----25/25.

51. Last Date and Time for receipt of Tenders: The tenders will be received in the **Purchase Section**, Northern Regional Office Laboratory, Bureau of Indian Standards, Plot No. B-69, Phase-VII, Industrial Focal Point, Mohali-160059, Punjab up to 1700 h on **17 August 2015**.

52. BIS will not be responsible:

- a. For delayed / late quotations submitted / sent by Post / Courier etc.
- b. For submission / delivery of quotations at wrong places other than the Northern Regional office Laboratory, Bureau of Indian Standards, Mohali.

53. **Date and Time of opening of Tenders:** The Tenders (Part – A Technical Bid only) will be opened at 1000 h on **18 August 2015** in the presence of tenderers who wish to be present.

54. The Date and Time of opening for Part B (Financial Bid) will be intimated only to pre-qualified and technically acceptable tenderers for the item.

55. All question, disputes or differences arising under, out of or in connection with this Bid document shall be subject to the exclusive jurisdiction of SAS Nagar (Mohali) Court.

56. The Bureau reserves the right to accept any tender in full or in part or to reject the lowest or any or all tenders without assigning any reason.

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**(ANIL KUMAR)**

Scientist 'F' & HEAD

Bureau of Indian Standards

Northern Regional Laboratory (NROL),

Plot No. B-69, Phase-VII, Industrial Focal Point,

Mohali-160059, Punjab

**ANNEXURE-1**  
**DEVIATION STATEMENT FORM**

- 1) The following are the particulars of deviations from the requirements of the tender document and specifications:

CLAUSE	DEVIATION	REMARKS (INCLUDING JUSTIFICATION)

PLACE:

DATE:

NOTE:

1.Where there is no deviation, the statement should be returned duly signed an endorsement indicating “No Deviations”

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## ANNEXURE-2

### PERFORMANCE SECURITY FORM

To \_\_\_\_\_ (Name of Purchaser)

**WHEREAS** \_\_\_\_\_ (Name of supplier)  
Hereinafter called "the Supplier" has undertaken, in pursuance of Contract  
No. \_\_\_\_\_ dated \_\_\_\_\_ 2015 to supply  
\_\_\_\_\_ (Description of Goods and Services)  
hereinafter 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 Nationalized Bank for the sum specified therein as security for compliance with the Supplier's performance obligations in accordance with the Contract.

**AND WHEREAS** we have agreed to give the Supplier a Guarantee:

**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 limit 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.

This guarantee is valid until the \_\_\_\_\_ day of \_\_\_\_\_ 20.....

Signature and Seal of Guarantors

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Date -----

Address -----

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**Doc. No. NROL/SPEC/UTM/Ply/15-16/001**  
**Specifications of Humidity Chamber**

**Equipment description:** Humidity chamber for curing of cement compressive strength test cubes as per IS 4031(Pt -6)-1988.

**Purpose:** The Humidity Chamber is to be used for conditioning of the samples under controlled Humidity and temperature as per IS 8112, IS 1489(Pt-1&2). It is to be used for storage of compressive strength cubes at humidity 90% RH min. at  $27 \pm 2^{\circ}\text{C}$  as per IS 4031(Part-6):1988. Its door shall be frequently opened and closed to put and to take out test specimens. It will be used at Mohali where ambient Temperature ranges between  $4^{\circ}\text{C}$  to  $48^{\circ}\text{C}$  normally during the year.

Sno.	Technical Specification:	Confirmation By Supplier (Y/N)
1.	The equipment shall have storage space for approx.45 Nos. cube moulds of size 70.6 mm at a time	
2.	It shall have enough free space for air circulation around test specimens.	
3.	Heating , cooling and humidifying system shall be efficient to maintain 90% min. RH at $27 \pm 2^{\circ}\text{C}$ Temperature, at room temperature ranging from $6^{\circ}\text{C}$ to $45^{\circ}\text{C}$ . It shall have Digital PID based microprocessor controller cum indicators for temperature and humidity requirements	
4.	It shall have reliable external digital display device for temperature and RH. Measuring Devices shall be accompanied by Calibration Certificates from NABL accredited Labs.	
5.	It shall be capable of withstanding power fluctuation (160-300 V), without any additional aid.	
6.	Construction should be double walled with stainless steel internal chamber of SS (304/316) grade 16 SWG or better.	
7.	It shall have perforated stainless steel shelves with adequate load capacity for the intended use.	
8.	RH controller shall have range 40% to 95%, Least count 1 RH or better.	
9.	Temperature controller shall have range $10$ to $50^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , indicator display least count $0.1^{\circ}\text{C}$ , accuracy $\pm 1^{\circ}\text{C}$	

**Conditions :**

- 1) Calibration by NABL Accredited agency shall be part of commissioning by the supplier.
- 2) Each of the above specification and design requirement shall be clearly replied while quoting.

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**Doc. No. NROL/SPEC/UTM/Ply/15-16/002**  
**Specifications of Humidity Chamber**

**Humidity Chamber for curing of Drying Shrinkage test moulds as per IS 4031(Pt -10)-1988**

**Purpose:** The Humidity Chamber is to be used for conditioning of the samples under controlled Humidity and temperature as per **IS 4031(Pt -10)-1988**. The Chamber is used for conditioning of Drying shrinkage test specimens of cement at  $50 \pm 5$  % RH at  $27 \pm 2^\circ\text{C}$  Temperature as per IS 4031(Part-10):1988 . Its door shall be frequently opened and closed to put and to take out test specimens. It will be used at Mohali where ambient Temperature ranges between  $4^\circ\text{C}$  to  $48^\circ\text{C}$  normally during the year.

Sno.	Technical Specification:	Confirmation By Supplier (Y/N)
1.	The equipment shall have storage space for 60 Nos. beam moulds at a time, each of cross section 25 mm x 25 mm and length 282 mm.	
2.	It shall have enough free space for air circulation around test specimens.	
3.	Heating , cooling and humidifying system shall be efficient to maintain $50 \pm 5$ % RH at $27 \pm 2^\circ\text{C}$ Temperature, at room temperature ranging from $6^\circ\text{C}$ to $45^\circ\text{C}$ . It shall have Digital PID based microprocessor controller cum indicators for temperature and humidity requirements.	
4.	It shall have reliable external digital display device for temperature and RH. Measuring Devices shall be accompanied by Calibration Certificates from NABL accredited Labs.	
5.	It shall be capable of withstanding power fluctuation (160-300 V), without any additional aid.	
6.	Construction should be double walled with stainless steel internal chamber SS (304/316) grade, 16 SWG.	
7.	It shall have perforated stainless steel shelves with adequate load capacity for the intended use.	
8.	RH controller shall have range 40% to 95%, Least count 1 RH or better.	
9.	Temperature controller shall have range $10$ to $50^\circ\text{C} \pm 1^\circ\text{C}$ , indicator display least count $0.1^\circ\text{C}$ , accuracy $\pm 1^\circ\text{C}$	

**Conditions :**

- 3) Calibration by NABL Accredited agency shall be part of commissioning by the supplier.
- 4) Each of the above specification and design requirement shall be clearly replied while quoting.

**Doc. No. NROL/SPEC/AC/CEM/15-16/003**

**Specifications of Auto Clave**

**Equipment description:** Auto Clave Soundness test by Autoclave Method as per IS 4031(Pt -3)-1988.

**Purpose:** The Laboratory Cement Autoclave is suitable for conducting accelerated soundness tests on Cement or the Autoclave expansion test as per IS 4031(Pt -3)-1988 .

<b>Sno.</b>	<b>Technical Specification:</b>	<b>Confirmation By Supplier (Y/N)</b>
1.	The autoclave must be supplied as per details of IS 4031(Pt 3):1988.	
2.	Rust proof stainless steel pressure vessel & enclosure, fabricated out of high quality Stainless Steel Sheet. Pressure vessel ID 150 mm and depth 500 mm.	
3.	The pressure gauge (Dial type) shall have a nominal dial diameter of 115 mm and shall be graduated from 0 to 4.1 MPa with scale division of not more than 0.04 MPa. The error in the gauge shall not exceed plus or minus 0.02 MPa at the operating pressure of 2.1 MPa. The pressure gauge should have maximum capacity of 4.2 Mpa.	
4.	The temperature indicator/ controller must be capable of maintaining/ indicating temperature at $215.7 \pm 1.7^{\circ}\text{C}$ . Should be equipped with Microprocessor based PID controller for accurately controlling the temperature hence pressure.	
5.	The autoclave shall be designed to permit the pressure to drop from 2.1MPa to less than 0.07 MPa in one hour after the heat supply has been shut off.	
6.	The capacity of heating unit shall be Such that with maximum load (water plus specimens) the pressure of the saturated steam in the autoclave may be raised to a gauge pressure of 2.1 MPa or to an absolute pressure of about 2.2 MPa, in 1 to 1 ½ hour from the time the heat is turned on.	
7.	The pressure inside the vessel is controlled through a micro processor based PID controller and capable of maintaining the pressure at $2.1 \pm 0.1$ MPa corresponding to a temperature of $215.7 \pm 1.7^{\circ}\text{C}$	
8.	It shall be equipped with a vent valve for allowing the escape of air during the early part of the heating period and for releasing any steam pressure remaining at the end of the one-hour cooling period.	
9.	Three fold safety mechanism for the equipment & the operator. Must be equipped with Spring loaded safety valve.	
10.	Supply : 220V, 50Hz, 1 phase	
11.	It must be supplied with eight test bar holders and special rack to hold the specimens above water level in the autoclave.	
12.	The apparatus shall have good finish without sharp edges.	

**Conditions :**

- 1) Calibration by NABL Accredited agency shall be part of commissioning by the supplier.
- 2) Each of the above specification and design requirement shall be clearly replied while quoting.

Doc. No. NROL/SPEC/CTM/CEM/15-16/004

**Specifications of Compression Testing Machine**

**Equipment description:** Specifications of Micro processed control based Compression Testing Machine (MUCTM).

**1. Application** : Testing of Cement cubes according to IS 4031:part 6:1988

Sno.	Parameter	Technical Specification	Confirmation By Supplier (Y/N)
1)	Capacity/Range	0-500KN (Least Count: 0.02 KN or better)	
2)	Indicating devices	Digital displays	
3)	Accuracy	±1.0% of the indicated load or better.	
4)	Type of operation	Microprocessor controlled & electrically operated.	
5)	Rate of loading	Automatic pace rate control capable to maintain at 0-35 N/mm <sup>2</sup> / minute	
6)	Type of instrument	Latest available Model (whichever is better with justification) with one of the platens carried on a base and self adjusting as per IS 4031:part 6:1988	
7)	Power supply	1 Phase, 220- 230V, 50HZ AC	
8)	Key features	Automatic pace rate control at a preset value. i. Pace deviation bar graph. ii. Automatic strength calculation and display. iii. Overload safety protection. iv. Self aligning platen with fast accessory change capability. v. Configurable Engg. Units for machine selection. vi. Peak load, peak stress, unique record no. display. vii. CVT for constant voltage supply. viii. Gap between platens adjustable to zero or suitable for purposes specified above. ix. Data storage for records to be viewed and print. x. Peak stress calculation based on sample type and shape.	

**Conditions :**

- 1) Calibration by NABL Accredited agency shall be part of commissioning by the supplier.
- 2) Each of the above specification and design requirement shall be clearly replied while quoting.