BUREAU OF INDIAN STANDARDS
(CENTRAL LABORATORY)
SAHIBABAD (U.P.) 201010.

Ref: CL/PP/BID-18 (06-07) **Date : 30 March 2007**

OPEN TENDER NOTICE NO.4

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

BID Sl. No.	Equipment/ Spcn. Code	Name of Equipment	Location*	Qty
1.	AEM02CP ABM02 CP AWM01 ASM01	Universal Tensile Testing Machine -------do-------- -------do-------- -------do--------	EROL BNBOL, WROL, SROL,	01 No. Each
2.	BCM-05 ACE-05 ASE01 AEM05CP AWE01 ASE03	Tensile Testing Machine- -------do-------- -------do-------- -------do-------- -------do-------- -------do--------	CL(Mech) CL(Elec.) SROL(Elec.) EROL(Mech.) WROL(Elec.) SROL(Elec.)	01 No. Each
3.	BCM04 BSM01 ABM03 AEM04	Compressive Testing Machines -------do-------- -------do-------- -------do--------	CL SROL BNBOL EROL	01 No. Each
4.	ACC02	Weather-O-Meter	CL	01 No.
5.	AWC01	Atomic Absorption Spectrophotometer	CL SROL EROL	01 No.Each
6.	ACE01	Life Test Equipment for GLS Lamps	CL	01 No.

For detailed specifications, please click on individual item Name.

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 Ghaziabad 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.

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2. TENDER DOCUMENT : No printed tender documents will be issued by BIS, CENTRAL LAB. Bidders are requested to download the **Tender Notice(P-I to P- II)**, **Terms & Conditions (P-1toP- 8), Specifications(Please see P- 9 to P-37)** and for each bid 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 Ghaziabad.

3.Unsigned, Incomplete tenders or Tenders without 'EMD', Bid Fee shall be summarily rejected. No Exemption shall be permitted.

***Last date for receipt of Bids is : 14-05-2007 (1700h)**

***Date of opening of Technical Bids is : 15-05-2007 (1100h)**

***Please refer to corrigendum hosted on BIS Web-site and advertisement published in the Indian Express dated**

N.B: 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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Head (Planning & Purchase)
Central Laboratory (BIS)
Plot No.20/9, Site-IV
Sahibabad Industrial Area
Distt. Ghaziabad-201010 (U.P.)

Phone No:0120-2770416
Fax No:0120-2776663

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

CL – Central Lab, Plot No.20/9, Site-IV,
Sahibabad Industrial Area, Sahibabad, 201 010 (U.P.) Distt. Ghaziabad.

EROL – ERO Lab, P-230, CIT Scheme-VII M, Block-W, Kankurgachi,
Kolkata-700 054. FAX No.033-23555300, Phone No.033-23556587.

SROL- SRO Lab, CIT Campus, IV Cross Road, Taramani, Chennai-600 113,
FAX No. 044-22541087, Phone No. 044-22541208

WROL- Manakalaya, E-9,MIDC, Behind Marol Telephone Exchange,
Andheri (East), Mumbai-400 093 Fax: 022-28262057,Ph: 022-28327856

BNBOL- Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road,
Bangalore. FAX No.080 -28398841, Phone No.080 - 23721442

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BUREAU OF INDIAN STANDARDS
(CENTRAL LABORATORY)
Sahibabad, District Ghaziabad - 201010

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.

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, CENTRAL LAB. 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 Ghaziabad. 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 locations 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), New Delhi 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**

   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 CL/PP/BID-18(06-07) for** ……..... (**Item/Name**) due on **----------14-May 2007** and duly sealed.

Contd...p/2.....

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 in India with complete postal address to whom the similar equipment has been supplied,
   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).**

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 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 together with the prices eventually or finally paid.

    (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.

Contd...p/3.....

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 State Bank of India/Punjab National Bank for the order value excluding the Indian Agency Commission. However, the detailed payment for Sight Draft / Letter Credit is mentioned at clause No. 23 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 Labs 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 insure 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.**

Contd...p/4.....

25. (A) The successful bidder shall furnish with in 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 within 15 days of placement of the order. 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 the firm will forfeit the EMD, 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 Punjab National Bank, Daryaganj, New Delhi, 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 One 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 wherever applicable 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 ninety (90) 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.

Contd.p/5-.

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 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 Ghaziabad/New Delhi, 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 whatsoever** 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.**

Contd...**p/6**....

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 **HEAD (** Purchase & Planning), Central Laboratory, Bureau of Indian Standards, Sahibabad, Distt Ghaziabad 2010101 **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, Central Laboratory, Bureau of Indian Standards, Sahibabad, Distt Ghaziabad 2010101 up to **1700 h on 14-May -2007.**

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 Office of Director, Purchase & Planning, Central Laboratory, Bureau of Indian Standards, Sahibabad, Distt Ghaziabad 2010101.

53. **Date and Time of opening of Tenders**: The Tenders (Part – A Technical Bid only) will be opened at **1100 h on 15-May-2007** 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 at a later date.

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 Delhi 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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Head(Planning & Purchase)
Bureau of Indian Standards
Central Laboratory,
Sahibabad(U.P)

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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 _____ 2007 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 _____ 2007.

Signature and Seal of Guarantors

Date ----------May 2007
Address ----------

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EQUIPMENT /SPECIFICATION CODE : AEM 02 CP

NAME OF THE EQUIPMENT : UTM (600 KN)

PROPOSED FOR BIS LABS : EROL

TOTAL QUANTITY REQUIRED : ONE No.

Purpose: TO carry out tensile, Compression, Bend, and other mechanical tests of steel Products, HSD Bars, Conductor wires, MS pipes as perIS:210, 280, 318, 320, 398, 1161, 1239, 1786, 1856, 2062, 2141, 3601, 6003, 6006, 6603, 10748, 12776 etc.

Technical Requirements:

Computer: Test parameter should be input through computer, output of load, extension, stress strain graphical recording, Extensometer/automatic recorder should be done through computer.

Range: Complete range: 0-600 KN preferably divided into four load scales as below:

i) 0-40 KN with Least Count of 10 N
ii) 0-120 KN with Least Count of 100 N
iii)0-300 KN with Least Count of 200 N
iv) 0-600 KN with Least Count of 1 KN

Rate of traverse should be adjustable as per requirement.

Accessories: Besides standard accessories, electronic extensometer/automatic recorder, Grips of different shapes suitable for holding samples (like flat/round)up to 40mm dia, mandrels of different sizes and graphical recording arrangement, supplied with machine.

Accuracy: ± 1.0 %

The machine should be preferably be supplied with Calibration certificate from a NABL accredited laboratory.

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Contd....p/10

EQUIPMENT /SPECIFICATION CODE : ABM02CP

NAME OF THE EQUIPMENT : UTM (600 KN)

PROPOSED FOR BIS LABS : BNBOL

TOTAL QUANTITY REQUIRED : ONE No.

Testing Machine:

1. **Structure and Base**: Made of cast steel and hardened surface treatment. High strength, resistance to shock.
2. **Capacity:** 600 KN
3. **Min. Resolution**: 0.01 KN
4. **Accuracy:** ± 1.0 %
5. **Driving Mechanism**: Hydraulic System
6. **Testing Speed (mm/min):** 50 to 250
7. **Effective column interval (mm):** 750

Control Unit:

1. **Setting Range (mm/min):** 0.5 to 70
2. **Constant speed load control**: 5 to 100% of full scale load
3. **Constant speed strain control range**: 5 to 100% of full scale Strain
4. **Emergency shut down button & over load protection (auto Stop)**
5. **Display of testing parameters:** Value and real-time curve

Computer System:

Computer System:

Windows software, CPU: Intel Pentium 4,2.55GHz,RAM 256 MB, Std. 1.44 MB FDD, Hard Disk Drive 20GB,52X high speeds CD-ROM, Monitor Type-Flat Screen 17”, Printer.

Attachments and Grips:

Plywood grips, static bending, Screw grip, Mechanical wedge grip, wedge type self tightening grip.

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Contd....p/11

EQUIPMENT /SPECIFICATION CODE : AWM 01

NAME OF THE EQUIPMENT : UTM (100 KN)

PROPOSED FOR BIS LABS : WROL-Mech. Lab.

TOTAL QUANTITY REQUIRED : ONE No.

1. Purpose: To carry out tensile & elongation tests on cables, conductors, cotton fabric,surgical gloves,conveyer belt etc.

2. Technical requirements:

2.1 Computer: Test parameter should be input through computer, output of load ,extension,stress-strain graphical recording, and extensometer/automatic recorder should be done through computer.

2.2 Range:
Complete range: 0-100 KN preferably divided into three scales as below:

i) 0-10 KN with Least Count of 10 N
ii) 0-50 KN with Least Count of 50 N
iii) 0-100 KN with Least Count of 100 N

2.2.2 Rate of traverse should be variable as per requirement.

2.3 Accessories:
Besides standard accessories, Grips of different shapes suitable for holding samples (like flat/round)upto 25 mm ,mandrels of different sizes, supplied with machine. It should have electronic extensometer/automatic recorder.

i) Flat grips 0-10 mm and 10-25 mm
ii) Round grips 2-5 mm,5-10 mm,10-18 mmand 18-25 mm.

2.4 Accuracy class: 1.

2.5 Service & Calibration Requirements: The equipment should be purchased from a local agency who would be able to provide after sales service including calibration of the equipment from NABL accredited agency.

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Specifications for UTM 1000 KN

EQUIPMENT /SPECIFICATION CODE : ASM 01

NAME OF THE EQUIPMENT : UTM (1000 KN)

PROPOSED FOR BIS LABS : SROL-Mech. Lab.

TOTAL QUANTITY REQUIRED : ONE No.

Name of the equipment : UNIVERSAL TESTING MACHINE – 1000KN
Application : To carry out Tensile test, Bend test, Compression test, Brinell hardness test etc.

Accuracy : ± 1.0% or better
: Universal Testing Machines shall comply with Grade "A" of BS 1610 (Part 1):1992 and class 1 of IS 1828 : (Part1) : 1991

Other Features required : Completely PC Controlled

Interface : RS232C
Software : Window Based
Graph – Zooming, Scaling, Load Vs Elongation, Proof stress calculation
: Overload protection

Maximum capacity	1000	KN
Measuring Range	0-1000	KN
Resolution	50	N
Clearance for tensile at fully descended working piston	50-850	mm
Clearance for compression test at fully descended working piston	0-850	mm
Clearance between columns	750	mm
Ram stroke	250	mm
Straining/piston speeds (at no load)	0-80	mm/min
Power supply	400-440 V, 3 Φ, 50 Hz, AC	
ACCESSORIES FOR TENSION TEST	-	-
Clamping jaws for specimens diameter	10-25 25-45 45-70	mm
Clamping jaws for flat specimens thickness width	0-25	mm
FOR COMPRESSION TEST	-	mm

Pair of compression plates of diameter	300	mm
Table with adjustable rollers width of rollers	160	mm
Diameter of rollers	50	mm
Maximum clearance between supports	800	mm
SPECIAL ACCESSORIES :		
Brinell test Attachment	It shall consist of an indenter having a steel ball of 10±0.005 mm dia. and hardness not less than 850 $HV_{10.}$ The ball should be polished and free from defects. The machine shall also be capable of holding the test load at 29.42 KN (3000kgf) for 15 seconds.	
Mandrels for Bend and Re-bend test	18, 24, 30, 36, 48, 50, 56, 64, 70, 100, 112, 125, 140, 175	
Extensometer with interfacing hardware	Extension 0 – 7 mm, Specimen dia. 3 to 25 mm 7 ply strand dia. 15.2 mm Gauge length 25 – 600 mm	

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CENTRAL LABORATORY

EQUIPMENT SPECIFICATION

EQUIPMENT / SPECIFICATION CODE: BCM-05

NAME OF THE EQUIPMENT: TENSILE TEST MACHINE

PROPOSED FOR BIS LABS: CL/MECH

TOTAL QUANTITY REQUIRED: ONE

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1. Purpose: For tensile test in Timber Section

2. Reference: IS 4990:1993 and IS 710:1976

Capacity: 25 KN

Digital Load Display: (Duly Calibrated by NABL accredited Laboratory)

Digital Speed Display:

Rate of traverse: Adjustable for wider range

L.C.: 5N

Accuracy: **± 1.0%**

Jaws: Plain Teeth

Jaws Clearance: Suitable for Glue Shear Strength test of timber as per Amendment No. 3 to IS 1734 (Part 4):1983

3 Service/repair back up of the equipment should be available in and around Delhi.

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Contd....p/15

BUREAU OF INDIAN STANDARDS
CENTRAL LABRATORY
EQUIPMENT SPECIFICATION

EQUIPMENT /SPECIFICATION CODE : ACE 05

NAME OF THE EQUIPMENT : TTM (25 KN)

PROPOSED FOR BIS LABS : CL ELECTRICAL

TOTAL QUANTITY REQUIRED : One

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Type of Equipment : Tensile Testing Machine (25 KN)

Reference : IS 10810 (Part-7):1984

SPECIFICATIONS :

Capacity : 25 KN (With ranges stated below)

Size : Suitable for a normal height operator.

Power supply : 3 phase ,50 Hz. ,440 Volts A.C.

Range : Load Cell-I 0-5 KN

Sub range : a) 0-0.5 KN (0-500 N) ,L.C. = Less than or equal to 1 N
Suitable for PVC,XLPE, Elastomer tubular & dumb-bell specimens.

b) 0-1 KN ,L.C . = Less than or equal to 2 N
Suitable for Al. conductors.

c) 0-2 KN , L.C . = Less than or equal to 2 N
Suitable for Al. conductors & Steel wires.

Load Cell-II 0-10 KN ,L.C. = Less than or equal to 5 N
Suitable for Al. conductors & Steel wires.

Load Cell-III 0-25 KN , L.C. = 0.01 KN
Suitable for Steel wires.

Rate of separation of jaws:- 0-600 mm./minute

Normal used ranges :- 100 , 250 & 500 mm./minute

Accuracy : 1 % or better

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Features :-

i) M/C shall be automatic along with required Hardware and Software,UPS and printer.

ii) Shall have digital display of load and RAM run.

iii) Shall have non-contact type extensometer in compatible with M/C software.

iv) Shall be programmed to calculate area, Tensile strength & % age elongation of tubular & dumb-bell specimens.

v) Shall have provision for automatic change of load cells.

vi) Shall be able to print out the values of Breaking Load, T.S. & % age elongation as per Cl. 10 of IS:10810(Part-7)-1984.

vii) Shall have minimum RAM run of one meter (i.e. displacement of separation of jaws).

viii) M/C shall have manual mode of operation also.

ix) Shall be supplied with suitable jaws for gripping PVC, Elastomer, Aluminium, Copper and steel specimen.

x) Test parameters measuring devices shall be supplied with calibration certificates from NABL approved agency.

xi) Supplier shall give three years comprehensive warranty from date of commissioning .

xii) Service/repair backup shall be available in/around Delhi.

NOTE- 1. With the mandatory Buy-back arrangement for the existing TTM, Model FPZ -10, Range 10 KN with three load cells of 40 N, 400 N and 10 KN, Make- Heckert, Manufactured by Rauenstein Veb Thuringer Industriewerk, Marketed by Blue Star Ltd. on "As is where is basis".

2. The existing TTM installed at Cable Section may be inspected by the prospective bidder and will be removed from the existing section at the time of commissioning of new machine at his own cost.

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Specification for TTM 50 KN

EQUIPMENT /SPECIFICATION CODE : ASE 01

NAME OF THE EQUIPMENT : TTM (50 KN)

PROPOSED FOR BIS LABS : SROL-Elec. Lab.

TOTAL QUANTITY REQUIRED : ONE No.

Name of the equipment : TENSILE TESTING MACHINE-50 KN

Application : To carry out Tensile test on Aluminum and steel wires.

Accuracy : ± 1.0% or better

: Tensile Testing Machines shall comply with Grade"A" of BS 1610 (Part 1) : 1992 and class 1 of IS 1828: (Part1)1991

Other features required : : Completely PC Controlled
Interface : RS232C
Software : Windows based
Graph- Zooming, Scaling , Load Vs Elongation ,% elongation, Braking Load , Proof Stress calculation
: Overload Protection

Maximum capacity	50	kN
Measuring Ranges	3 (0-10-20-50)	kN
Resolution in all the ranges	0.01	kN
Straining/position speeds (at no load)	0-500 adjustable	mm/min
Load measuring accuracy in all ranges	±1% or better	
Maximum cross head stroke	1000	mm
Clearance between columns	450	mm
Cross head displacement measurement	0.01	mm
Power Supply	230 V, ac ,50Hz single phase	
ACCESSORIES FOR TENSION TEST		
Clamping jaws for specimens diameter	1.0-5.0 (separate flats jaws for aluminum and steel wires)	mm

**

Contd....p/18

EQUIPMENT /SPECIFICATION CODE : AEM 05 CP

NAME OF THE EQUIPMENT : TTM (20 KN)

PROPOSED FOR BIS LABS : EROL

TOTAL QUANTITY REQUIRED : ONE No.

Purpose: Primarily to test strength, modulus of elasticity (MOE), modulus of rupture (MOR)of plywood with the provision for tests for other products such as cables, conductors, cotton fabrics, threads, polymers etc.

Technical Requirements:

Computer: Test parameter should be input through computer, output of load, extension, stress, strain, modulus of elasticity, modulus of rupture, graphical representation should be done through computer directly.

Range: 0-20 KN: The whole range shall preferably be divided into four Scales with load cells:

I. 0-05 KN, Resolution: 0.1 N II. 0-10 KN, Resolution: 0.1 N III. 0-15 KN, Resolution: 1.0 N IV. 0-20 KN, Resolution: 1.0 N	Or better

Rate of traverse: 0 to 1000 mm/min adjustable or better.

Accessories: Besides standard accessories, accessories for MOR and MOE and extensometer without duplication supplied with machine.

Accuracy class: ± 1.0 %

The machine should be preferably be supplied with Calibration certificate from a NABL accredited laboratory.

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Contd..p/19

EQUIPMENT /SPECIFICATION CODE : AWE 01

NAME OF THE EQUIPMENT : TTM (10 KN)

PROPOSED FOR BIS LABS : WROL-Elect. Lab.

TOTAL QUANTITY REQUIRED : ONE No.

1. Purpose: To carry out tensile & elongation tests on cables, conductors, cotton fabric,surgical gloves,conveyer belt etc.

2. Technical requirements:

2.1 Computer: Test parameter should be input through computer, output of load ,extension,stress-strain graphical recording, and extensometer/automatic recorder should be done through computer.

2.2 Range:
Complete range:0-10 KN preferably divided into three scales as below:

a. 0-0.5 KN with Least Count of 0.01 N
b. 0-1.0 KN with Least Count of 0.01 N
c. 0-10 KN with Least Count of 0.1 N

2.2.1 Three different load cells for the above ranges shall be supplied with the equipment.

2.2.2 Rate of traverse should be variable up to 500 mm/min. or better.

2.3 Accessories:
Besides standard accessories, Grips suitable for holding samples of conductors(copper/aluminum),flat/round PVC insulated/sheathed cable samples, Cotton, rubber etc. It should have electronic extensometer/automatic recorder.

2.4 Accuracy class: 1.

2.5 Service & Calibration Requirements: The equipment should be purchased from a local agency who would be able to provide after sales service including calibration of the equipment from NABL accredited agency.

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Contd..p/20

Specification for TTM 2.5 KN

EQUIPMENT /SPECIFICATION CODE : ASE 03

NAME OF THE EQUIPMENT : TTM (2.5 KN)

PROPOSED FOR BIS LABS : SROL-Elec. Lab.

TOTAL QUANTITY REQUIRED : ONE No.

Name of the equipment : **TENSILE TESTING MACHINE-2.5kN**

Application : To carry out Tensile test on PVC Cable material & Aluminum wires

Accuracy : ± 1.0% or better

: Tensile Testing Machines shall comply with Grade "A" of BS 1610 (Part 1) : 1992 and class 1 of IS1828:(Part1)1991

Other features required : : Completely PC Controlled
Interface : RS232C
Software : Windows based
Graph- Zooming, Scaling , Load Vs Elongation ,% elongation, Braking Load , Proof Stress calculation
: Overload Protection

Maximum capacity	2.5	kN
Measuring Ranges	3 (0-0.5-1.0-2.5)	kN
Resolution in all the ranges	0.01	kN
Straining/position speeds (at no load)	0-500 adjustable	mm / min
Load measuring accuracy in all ranges	±1% or better	
Maximum cross head stroke	800	mm
Cross head displacement measurement	0.01	mm
Power Supply	230 V, ac ,50Hz single phase	
ACCESSORIES FOR TENSION TEST		
Clamping jaws for specimens diameter	0.5-5.0 (suitable self tightening grips to hold PVC material and aluminum wires)	mm

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CENTRAL LABORATORY

EQUIPMENT SPECIFICATION

EQUIPMENT SPECIFICATION CODE: **BCM-04**

NAME OF THE EQUIPMENT: Compressive Strength Test Machine

PROPOSED FOR BIS LABS: CL/MECH

TOTAL QUANTITY REQUIRED: 1 No.

PURPOSE : For checking the Compressive Strength of Cement

REFERENCE : IS 269:1989, IS 8112:1989 etc

1 Automatic Compression Testing Machine 3000 KN with Computer and Software

The Automatic Compression Testing Machine should be a fully automated Compression Testing Machine with provision for automatically turning the pump on and off, controlling the set pace rate and switching the machine off under predetermined conditions. The Control to release the pressure at the end of every run and reinitialize the machine at the beginning of every test. Data acquisition, storage, management and analysis should have all fully automatic. The load resolution should have **0.5 KN**. Suitable for operation on 220 V , 50 HZ, Single phase AC supply.

2 Special Features :

- Automatic Pace Rate Control at a preset value.
- Automatic Data Logging.
- Logged Data Printing Facility.
- Multifunctional LCD interface.
- Menu Driven interface.
- Auto shutdown facility.
- Load-hold facility.
- Manual emergency stop button.
- Peak load record
- Bar Graph Display for on – line monitoring of the quality of control.
- Automatic control of the pump motor.

Contd....p/22

- Automatic display of breaking load at the end of the test.
- Real Time Clock to keep automatic track of the date, time & runs.
- Calibration checking facility.
- Facility to enter the required pace rate, at the beginning of the run.

3 Software:

A powerful Analysis and Reporting Software Tools with the following features:

- An intuitive and easy to use graphical user interface.
- Facility to list all the runs stored in the digital head
- Facility to download and plot the data for a selected run.
- Facility to save test-data along with other information about the sample such as age, sample number and batch name.
- On-line graph of Load Vs Time.
- Numerical display of the instantaneous value of the load.
- Automatic display of a breaking load at the end of the test.
- A facility for creating users and enabling / disabling their log-in permissions.
- A sophisticated reporting tool which can be used to generate reports for individual samples with data in graphical or tabular form.
    - Load Vs Time Plot.
    - Stress Vs Time Plot.
    - Calibration Report.
    - Batch Summary Report.
    - Selective deletion of individual and multiple sample records.

Online Help Manual

4 Service/repair back up of the equipment shall be available in and around Delhi.

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Contd....p/23

Specifications for Compression Testing Machine

EQUIPMENT /SPECIFICATION CODE	**:**	**BSM 01**
NAME OF THE EQUIPMENT	**:**	**CTM (500 KN)**
PROPOSED FOR BIS LABS	**:**	**SROL-Mech. Lab.**
TOTAL QUANTITY REQUIRED	**:**	**ONE No.**

Name of the equipment : Computer controlled Automatic Compression Testing Machine (ACTM).
Application :Testing of Cement cubes according to IS 4031:part 7:1988.
Capacity/Range : 0-500KN (L.C: 0.5KN or better)

Specifications

Indicating devices : Load scale indicators / Digital displays.
Accuracy :±1.0% of the indicated load or better.
Type of operation : Servo controlled & electrically operated.
Rate of loading : 2.9KN/sec (should be controllable)
Speed of moving head : 1.3mm/min
Temperature : The equipment shall be suitable for working in the ambient temperature range of 20-40°C. The temperature coefficient (variation in the accuracy of reading) shall be specified from a reference temperature.

Design requirement

Type of instrument : Totally welded /4 pillar type/2 pillar type / latest available Model (whichever is better with justification)

a) Bottom bearing block

Thickness : Minimum 25mm

b) Auxiliary platens

Hardness value : Minimum 550 HV (As per IS 1501)

Distance between contact faces of the platen : Minimum 23mm

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c) Safety requirement

: Test data shall be automatically recorded in the machine recorder and transferred to the computer and saved for future reference(Interface RS 232C,Window based software).

: It shall not be possible to alter the data in the Computer.

: The equipment shall meet the safety standards applicable to ensure the safety of the operator and provided with overload protection

d) Power supply : 3 Phase,400-440V,50HZ AC

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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Contd....p/25

EQUIPMENT /SPECIFICATION CODE : ABM03

NAME OF THE EQUIPMENT : CTM (500 KN)

PROPOSED FOR BIS LABS : BNBOL

TOTAL QUANTITY REQUIRED : ONE No.

Testing Machine:

Design: Machine shall be power operated and shall apply the load Continuously without shock. The space provided for test specimens shall be large enough to accommodate ,in the readable position, an elastic calibration device of sufficient capacity to cover the potential loading range of the testing machine.

Relevant IS NO. IS 14858

Load Control: The machine shall be capable of applying the load at specified rate, uniformly, without shock using automatic control.

Load Scale Indicators: Electrical load indicators with a visual display. A resettable device for registering the maximum load sustained by the specimen. Width of the needles shall be less than the width of the graduation.

Capacity: 500 KN

Accuracy: ± 1.0 %

Driving Mechanism: Hydraulic System

Rate of Loading: At a rate of movement corresponding to a loading rate on the specimen within the range of 0.14 or 0.324MPa/s.

Machine Platens: Two steel bearing blocks, one with spherically seated block will bear on the upper surface of the specimen and the other a solid block on which the specimen rests. Both the bearing blocks shall have hardened face not less than 550 vickers hardness.
Dimensions of the bearing blocks: 152mm

Bottom Bearing Blocks: Thickness 25mm Min
The max. dia of bearing face shall be not more than 105mm.

Computer System:
Windows software, CPU: Intel Pentium 4,2.55GHz,RAM 256 MB, Std. 1.44 MB FDD, Hard Disk Drive 20GB,52X high speeds CD-ROM, Monitor Type-Flat Screen 17”, Printer.

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Contd....p/26

EQUIPMENT /SPECIFICATION CODE : AEM 04

NAME OF THE EQUIPMENT : CTM (500 KN) with Proving Ring

PROPOSED FOR BIS LABS : EROL

TOTAL QUANTITY REQUIRED : ONE No.

Purpose: TO determine the compression strength of cement cubes as per IS:269,455,650,1489(Pt-1&2),8112,12269 & IS:4031(Pt6-7)

Technical Requirements:

i) Range: Complete range: 0-500 KN with digital display.

ii) Rate of Loading: 0-100 N/mm^2/min adjustable.

iii) Digital Display
iv) shall be provided with compression proving ring of 500 KN with Dial gauge least count:0.001 mm

Accuracy: 1% or better

The machine should be preferably be supplied with Calibration certificate from a NABL accredited laboratory.

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BUREAU OF INDIAN STANDARDS
CENTRAL LABORATORY
EQUIPMENT SPECIFICATION

EQUIPMENT /SPECIFICATION CODE :____ACC02_____

NAME OF THE EQUIPMENT : WEATHER O METER
PROPOSED FOR BIS LABS : CL CHEM

TOTAL QUANTITY REQUIRED : ONE

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SPECIFICATION :

Microprocessor based light fastness & Weatherability testing system with air-cooled Xenon Lamp, non-aging filter & rack rotating system technology (rack arranged symmetrically around the source).

- Adjustable power of Xenon lamp capable to maintain range of Irradiance 100 $\pm$ 25 W/m^2 in the range of 310 to 400 nm. Wavelength shorter than 310 nm shall not exceed 0.5 W/m$^{2.}$
- Test Chamber : Shall have a ventilated encloser at the centre of which the source or radiation shall be situated.

Facility to maintain & display:

- Test chamber temperature - 30 to 70 ^{0}C, readable L. C. - 1^{0}C (Calibration Certificate from NABL accreditated lab).
- Black Panel temperature - 40 to 100 ^{0}C, readable L. C. - 1^{0}C (Calibration Certificate from NABL accreditated lab).
- Relative Humidity - 30 to 90 %, readable L. C. – 1% (Calibration Certificate from NABL accreditated lab).
- Suitable arrangement to control temperature difference between test chamber & Black Panel
- Ultrasonoic Humidification system and Rain spray system (with integrated minimum 50 litre water reservoir)
- 180^0 rotation of sample panel holders.
- Digital Display of programmed & actual/set parameters

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NAME OF THE EQUIPMENT : WEATHER O METER (ACC02)

- Rotating sensor for measuring Irradiance between 310 to 400 nm
- The encloser shall be so constructed that any Ozone produced by the radiation source does not come into contact with the test panels
- Provision to mount samples on both side of sample holder.
- Sample holders – 10 (min).
- Sample dimension 135x 45 mm
- Exposed area 120x 35 mm
- PC interface of RS - 232

Accessories :

- Card boards of rigid quality and of 0.5 mm thickness (approx.) for mounting of dyed wool calibration standards.
- Set of cover sheet – of Aluminium foil to cover half of the test panel
- Filter system
- Geometric Gray scale - complying with IS 768 : 1982
- Calibration standards – Wool scale pattern complying with IS 686 : 1985
- Three phase automatic voltage stabilizer
- Colour matching cabinet
- Other assesories including above needed as per clause 5.2 & 5.3 of IS 101 (Part-4/Sec-3):1988 to monitor the performance of the equipment within the specified limits of irradiance.
- Voltage stabilizer of suitable capacity (preferably 10 KVA)

Consumables :

- All filters
- Xenon Lamps
- IR filters

Spares :

Essential spare parts for maintenance of equipment for five years

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Addenda to Specification for WEATHER-O-METER

One existing Weather-O-meter (Atlas make ,Model) , which is 25 years old and spare parts (list given below) be replaced with new instrument on Buy-back basis and "As is where is basis". Removal of old instrument along with spare parts shall be sole responsibility of Instrument supplier.

SPARE PARTS OF WEATHER-O-METER

Sl. No.	Parts	Quantity	Part No.
1	Carbon arc assembly	1	19-5272-00
2	Pyrex Gloves	2	19-1233-00
3	Xenon burner 2500W	5	12-2881-00
4	Gasket O ring	5	12-2890-00
5	Carbon electrode 70core	50	06-1238-00
6	Carbon electrode 20core	20	06-1237-00
7	Borosilicate filter outer	7	12-5613-01
8	Bearing CS-791 for cooling pump	3	1269-16-00
9	D. M. Filter	1	1232-25-00
10	Bearing CS-1313	3	12-7367-00
11	Borosilicate filter	39	12-5613-01
12	Heating filament	2	

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BUREAU OF INDIAN STANDARDS
CENTRAL LABORATORY
EQUIPMENT SPECIFICATION

EQUIPMENT /SPECIFICATION CODE :____AEC02_____

NAME OF THE EQUIPMENT : ATOMIC ABSORPTION SPECTRO-PHOTO METER
PROPOSED FOR BIS LABS : EROL , SROL , WROL

TOTAL QUANTITY REQUIRED : ONE EACH

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Description: Atomic Absorption Spectrophotometer with Auto-Sampler, Graphite Furnace and High Sensitivity Nebulizer along with Hydride Generator.

Feature of the Specification are as follows:

*Optical double beam spectrophotometer with wave length range 190-900nm.

*Diffraction grating used as dual blazed with ruling density of around 1200/1800 lines/nm, RLD (Reciprocal Linear dispersion) 1.6nm/mm and High monochromator efficiency.

*Spectral band widths of 3 different types programmable through software using auto slit selection mode.

*Minimum 6 lamps position automatic turret with computer controlled lamp selection, its alignment and automatic optimization of energy using coded lamps. Built in power supply for EDL/ Super/ Ultra lamp to enhance lamp capability. Lamps should be as per GCP compliance.

*Double Beam System for automatic compensation for changes in instrumental parameters for high signal stability and performance to offer excellent signal-to-noise ratio.

*The system with preferably independent Atomizer for both Flame and Graphite Furnace and user can select any one of them through software.

*AC Zeeman background correction using 0.8 Tesla magnetic field. The furnace tube shall be transversely/longitudinal heated type.

*The Detector used shall be solid-state Detector/PMT.

- A built in graphite tube mirror for viewing the tip of probe.
- The range of temperature up to 3000 ^{0}C.

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***Sensitivity-** 5ppm of aqueous Cu shall be able to give at least 0.7 absorbance with less than 0.5% RSD.

*Total Gas Flow control system maintains gas flow (Ratio of fuel/oxidant) at set levels to ensure excellent Flame stability and performance.

*Automatic Gas Flow adjustment during change over between air C_2H_2 and N_2O.

*All safety interlock, Nebulizer /End cap Interlock, and Drain Interlock to be built-in.

*Computer controlled motorized burner adjustments with highest precision and reproducibility for adjustment of Flame position in light path as well as fully automatic adjustment of Burner Head. The height of Burner Head to be stored with method file.

*Built in computer /software controlled Integrated Graphite Furnace to utilize fully latest Technology like STPF i.e. Pyrolitically coated Tubes with integral platform , fast heating rates , fast electronics, Argon gas stop flow during atomization, Automatic feedback mechanism through out entire temperature range, Automatic Baseline offset correction for obtaining accurate peak area measurements to be built-in.

*Adjustable Nebulizer which can take analysis with acids, corrosive samples including HF.

*Inert spray chamber compatible to analyze all types of samples, aqueous organic as well as acids.

*Integral furnace Auto-sampler with Graphite furnace for at least 50 samples, sample delivery up to 50uL (micro-litre) with increment of 0.1 uL (micro-litre) automatic replicate analysis and automatic dilution.

*Various Hollow cathode Lamp to be included with offer as detailed in next page.

*The AAS should also included various accessories like Flow injection Atomic spectroscopy or fully computer controlled hydride/vapor generation system to estimate As, Se, etc. in ppb level.

*Fully programmable auto sampler with auto dilution operation for flame and vapor generation system.
*Windows based software for system function including control of major accessories, both of single element or multi-elements methods for flame/graphite furnace. Auto parameter selection for method development, automatic selection of stored methods, automatic selection of flame conditions, graphite furnace and Mercury Hydride Generation System. Burner head position is stored with method, auto optimization of flame, on line sensitive context help, user selectable statistics for SD/RSD, built-in reporting user format, mouse operation, software available in CD form etc and Data Control System.

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* Fully Computer Controlled Spectrophotometer and all major accessories including Graphite Furnace, Burner heads, Hydride Generator, Auto-sampler, Auto-dilutor etc under software control.

*Atomic Absorption Spectrophotometer with Auto-sampler, Graphite furnace, Hydride Generator and Auto-dilutor.

* 5cm Nitrous oxide or oxy rich air-acetylene burner head.

*Nitrous oxide gas pressure regulator if Nitrous oxide is used.

*Air Compressor.

*Air Filter assembly.

* 2EDL driver assembly.

*Ultra super /Electrode less Discharge Lamp for As, Sb, Sn, Hg, Se.

*Coded Hollow Cathode Lamp for Co, Cr, Cu, Fe, Mn, Ni, Ca, K, Na, Mg (the HCL lamps with Quartz window to be provided).

*Coded Hollow Cathode Lamps for Cd, Bi, Pb, Zn, Ag, Ba, Si, Al, Ti, W, Mo, V, P.

*Working Manual for all the parts of the instrument should be provided.

***UPS** of suitable capacity and Compatible with **30 minutes Back-up**.

*Sufficient quantity of graphite tubes (20 No.) may be provide as spares.

* SRMs shall be supplied with 24 months Validity after commissioning.

*Training on application and routine maintenance shall be provided in Users lab.

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BUREAU OF INDIAN STANDARDS
CENTRAL LABRATORY
EQUIPMENT SPECIFICATION

EQUIPMENT /SPECIFICATION CODE	**:**	**ACE 01**
NAME OF THE EQUIPMENT	**:**	**PROGRAMMABLE MODULAR AUTOMATED TEST SYSTEM FOR LIFE TEST OF GLS LAMPS**
PROPOSED FOR BIS LABS	**:**	**CL ELECTRICAL**
TOTAL QUANTITY REQUIRED	**:**	**One**

SPECIFICATIONS FOR PROGRAMMABLE MODULAR AUTOMATED TEST SYSTEM FOR LIFE TEST OF GLS LAMPS AS PER IS 418:2004 AND IS 15518(PART I):2004

(As per Clause 5.3, 10 and Annex F as per IS 418:2004 and Clause 4.11 and annex. H of IS 15518:2004)

The required automated test system, connected to a computer through windows based programme, shall be able to perform following functions:

i) Controlling the test voltage
ii) Monitoring and recording the test voltage
iii) Recording the operating time
iv) Printing of measured test voltage at the time of failure of a lamp or switching action of supply during the testing.

The system shall consist of:

- Test racks / panels / sets with control panels
- Computer, minimum Pentium-IV based, with software to run the system, and a printer
- Servo stabilizer
- UPS for computer and printer

The details of the specific requirements of the system and its components are as follows:

SPECIFIC REQUIREMENTS:

(A) TEST SYSTEM:

1. The test systems should be designed and constructed to monitor the various life test data of 540 lamps (9 sets of samples each of 60 lamps). It should be designed in modular form for easy maintenance.
2. The particulars of GLS lamps to be tested in the proposed test systems are:
    i. Rating: 230, 240 250 Volts and 15 to 100 watts
    ii. Cap size: B-22d
    iii. Finish: Clear, Frosted or equivalently coated finish, or white finishes
    iv. Shapes: A, K M & PS shapes as per IS 418:2004

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3. The parameters to be monitored by the system are as follows:
    - Burning time of each lamp
    - Mean effective value of test voltage during the life test

4. The burning of lamps in Zigs shall be monitored by reliable current sensing device (each for individual lamp), which will not affect the impedance of the test rack circuit characteristics. It is also desirable that the current sensor should be installed using a CT.
5. The monitored data should be scanned by the system at user programmable scan intervals and shall be provided with validation certificate of the software installed.
6. The system should display, record and print the following data at the time of failure of any lamp:
    a. Date & time of failure
    b. Burning time at test and rated voltage in hours and minutes
    c. Mean effective value of voltage applied across the lamp till the failure of the lamp
    d. Address of the lamp

7. The system should be able to test 540 bulbs (GLS lamps) at a time. It shall consist of 9 sets of 60 lamps each. The system shall be so designed that life test quantity of lamps less than 60 lamps can also be tested without affecting the quality of testing.

8. Operating position of lamps: The Lamps shall be operated in a vertical position, cap up. The lamp holder's axis on a test rack shall not deviate from the vertical by more than 5°.

9. The system should be designed in such a manner that it shall be possible to start or stop the testing of any lamp set (of 60 lamps) at any instant. Also for each lamp set, there should be a program name, a start condition, a stop condition at 750 or Set Hours of burning time at rated or set voltage & an end condition at 1250 or Set Hours of burning time at rated voltage. At accelerated voltage, these time periods shall be correspondingly reduced (calculated as per clause A-4.6 of IS 418:2004).

10. The system should have the option of selecting burning time even after 1250 hrs of burning, till the time all the lamps in the rack / set/ batch burns out. The average burning time of each lamp shall be displayed and printed.

11. The system should have the facility of controlling the test voltage in such a way that it should first be switched 'ON' at the rated voltage and then immediately raised to a variable preset value of voltage between 100% and to variable up to 110% of the rated voltage within preset time (Minimum 5 seconds.)

12. The system should have in built program to minimize the effect of transients on the life test voltage during start up after each power failure. There should be no HV short duration surge at the start of the test or when the power resumes after switching off during 'off' period.

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13. The system should be provided with timer facility to **switch off** the each set (of 60 lamps) for 15 minutes after every 11:45 hrs of operation. The off period should not be considered as a part of the burning hours of the lamp. The 'OFF' time period should be adjustable.

14. Lamps shall not operate at excessive temperatures nor there be undue heating of a lamp by others. The temperature of the cap during operation shall not exceed the maximum cap operating temperature 210°C when measured as per cl. 4.11 of IS 15518 (part-1):2004.

15. The lamps shall operate free from noticeable vibration. No vibration or shocks shall be perceptible when touching the lamp holders, either during operation or when switching ‘on’ and ‘off’.

16. Not more than one lamp set should be switched at a time. The switching 'OFF' and 'ON' of the lamps should be through relays / triacs.

17. Control for each lamp shall be provided.

18. The system shall be designed to withstand the temperature & humid conditions of Delhi.

(B) TEST VOLTAGE:

1. The system should calculate and measure mean effective value of test voltage supplied to each set/ batch of GLS Lamps during the life test. The voltage module used for the measurement should measure and record the test voltage at regular interval throughout the life testing. The variation in the power supply under steady state conditions shall be within ± 0.5% and the meters used to measure the voltage shall be 0.5 class or better.

2. Voltage compensation: Usually, fine voltage control for each group of lamps / set / batch under test is necessary for small voltage variations due to changes in load. The terminal voltage shall be auto-adjust whenever any lamp fails during the life test.

3. The lamps should be operated on alternating current at a frequency of a nominal value 50 Hz. The voltage variations of the test racks shall not exceed 1% of the test voltage.

4. The system should operate on 3 phase, 415 volts ac input, with 3 sets in each phase.

5. Each set shall have separate fine voltage control of ±1 volt. Each lamp shall be protected through 10 Ampere slow acting fuses.

6. The voltmeters provided on the control panel for each set shall be detachable / portable to facilitate its calibration & replacement / repairs.

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(C) LAMP HOLDER:

1. The lamp holders on the test racks shall be of sturdy construction and shall be so designed to ensure adequate electrical contact and to prevent overheating.

2. The lamp holders shall be so designed that the torque necessary to insert or extract a lamp shall not exceed the values given in annex-C and cl. 4.5 of IS 15518(part-I):2004.

3. The lamp holder should be of **contact type** (not plunger type), earthed and such that the cap temperature does not exceed 210°C. The undue heating of a particular lamp shall not be there due to other lamps in the vicinity.

4. For bayonet lamp holders, the cap shall be substantially at the same potential as the contact which is not connected to the fused main supply lead.

5. The voltage drop between the point of measurement on the supply line and the cap contacts shall not exceed 0.1 % of the test voltage.

6. Bayonet lamp holders shall have earthed metal barrel.

(D) TEST RACKS:

1. The life test racks shall be protected from the bugs & flies.

2. Test rack circuit for 230V to 250V lamps shall have the characteristics as given below:

Parameter	**230V to 250V**
Resistance (ohms)	0.5 ± 0.1
Inductance (micro Henries)	500 ± 100 **
Individual external lamp fuse (Ampere)	10 slow- acting
Surge limit(Volts)	600 #

** : The maximum lamp current loading that may be switched on simultaneously is 16A, for 230 V to 250 V test racks.

: This information is given for surge operating means, of correct rating, to be selected. A 600 V average value is chosen to take into account practical tolerances on surge limiting means to ensure that incidental peaks greater than 900 V are suppressed.

For method of measuring mains impedance, kindly refer Annex-H of IS 15518 (part-I):2004.

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(E) ACCESSORIES:

UPS: It is for the computer and printer of Life test System. It shall be online and shall have backup power of 2 hours **at least** and shall give ac output in sine wave form at 50 Hz frequency.

SERVO STABILIZER: It is to run the Life test system. It should be 3 phase, 40 KVA oil cooled with accuracy class 0.5.

(F) PRINTER OUTPUT:

1. The printer output shall contain the following output:
    a) Sample no. : it shall have one alphabet and seven numerals (In the form E- 0222220 or E-02222__)
    b) Rack no. / Lamp set no.
    c) Start date and time
    d) End date and time
    e) Set time (125 % of rated life), On time and off time of 11:45 Hrs and 00:15 hrs (all items selectable)
    f) Status of the test
    g) Rated voltage
    h) Mean test voltage (it may be accelerated voltage)
    i) Test hours (at accelerated or rated voltage)
    j) Average life observed
    k) Sample details of individual lamp (of all 60 or less lamps): it shall contain lamp address, status at the end of the test (125% of rated life), mean voltage during the test, burning time period, date and time of fusing or the report, if not fused.
    l) The printer output shall have the heading: Bureau of Indian Standards, Central Laboratory.
    Life test on GLS Lamps, Date and time of print out.

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