TENDER REFERENCE
TE-01/MSME/INDCOM/CETL/LED/2019-20 DT. 28.01.2020

TENDER FOR SUPPLY AND INSTALLATION OF CHAMBERS, METERS AND IP TEST EQUIPMENTS FOR LED LIGHT MEASUREMENT AT CENTRAL ELECTRICAL TESTING LABORATORY, KAKKALUR, TIRUVALLUR DISTRICT, TAMIL NADU

LAST DATE OF RECEIPT OF TENDER: 14.02.2020 at 03.00 PM
NOT TRANSFERABLE
GOVERNMENT OF TAMIL NADU
DEPARTMENT OF INDUSTRIES AND COMMERCE

2nd & 3rd Floor, SIDCO Corporate Building, Thiru. Vi. Ka. Industrial Estate, Guindy, Chennai-600 032 Tamil Nadu
Telephones: (044) 22501007, 22505011, 22502018 & 22501073
E-mail: indcomeetn@gmail.com
Website: www.indcom.tn.gov.in

TENDER FOR SUPPLY AND INSTALLATION OF CHAMBERS, METERS AND IP TEST EQUIPMENTS FOR LED LIGHT MEASUREMENT AT CENTRAL ELECTRICAL TESTING LABORATORY, KAKKALUR, TIRUVALLUR DISTRICT, TAMIL NADU

<table>
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</thead>
<tbody>
<tr>
<td>TYPE OF TENDER</td>
<td>TWO COVER SYSTEM</td>
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<tr>
<td>DATE OF ISSUE OF TENDER DOCUMENTS</td>
<td>30.01.2020</td>
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<td>14.02.2020 Till 2.00 P.M</td>
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<tr>
<td>PLACE OF RECEIPT OF TENDERS</td>
<td>Joint Director – Engineering (Electrical &amp; Electronics) Department of Industries and Commerce, 3rd Floor, SIDCO Corporate Building, Thiru. Vi. Ka. Industrial Estate, Guindy Chennai -600 032, Tamil Nadu</td>
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<td>LAST DATE AND TIME FOR RECEIPT OF TENDERS</td>
<td>14.02.2020 @ 03.00 P.M</td>
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<tr>
<td>DATE AND TIME OF OPENING TENDERS</td>
<td>14.02.2020 @ 04.00 P.M</td>
</tr>
<tr>
<td>PLACE OF OPENING OF TENDERS</td>
<td>Conference Hall Department of Industries and Commerce, 3rd Floor, SIDCO Corporate Building, Thiru. Vi. Ka. Industrial Estate, Guindy Chennai -600 032, Tamil Nadu</td>
</tr>
<tr>
<td>ADDRESS FOR COMMUNICATION</td>
<td>Joint Director – Engineering (Electrical &amp; Electronics) Department of Industries and Commerce, 3rd Floor, SIDCO Corporate Building, Thiru. Vi. Ka. Industrial Estate, Guindy Chennai -600 032, Tamil Nadu</td>
</tr>
</tbody>
</table>
INVITATION FOR TENDERS

Sealed Tenders will be received till 03.00 p.m. of 14.02.2020 by the Joint Director - Engineering (Electrical & Electronics), Department of Industries and Commerce, 3rd Floor, SIDCO Corporate Building, Thiru. Vi. Ka. Industrial Estate, Guindy, Chennai – 600 032 for supply and installation of Chambers, Meters and IP Test Equipments for LED Light Measurements at Central Electrical Testing Laboratory, Kakkalur, Tiruvallur District, Tamil Nadu.

1. Interested and eligible entities may obtain further information from the Joint Director – Engineering (Electrical and Electronics), Department of Industries and Commerce, 3rd Floor, SIDCO Corporate Building, Thiru. Vi. Ka. Industrial Estate, Guindy, Chennai -600 032, Tamil Nadu.

2. Tender document can be directly downloaded free of cost from the following Websites: www.tenders.tn.gov.in & www.indcom.tn.gov.in

<table>
<thead>
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</tr>
</tbody>
</table>
3. The tender participants, who have downloaded the tender documents, shall be solely responsible for checking the website for any addendum/amendment issued subsequently to the tender document and take into consideration the same while preparing and submitting the tenders.

4. All tenders must be accompanied by a EMD as specified in the tender document and must be delivered to the above office on or before the date and time indicated above.

5. Tenders will be opened in the presence of the representative of the bidders who chooses to attend on the specified date and time.

I. ELIGIBILITY CRITERIA

1. The Tenderer should be either Equipment Manufacturer or Equipment Supplier or Authorised Dealer for the equipment tendered.

2. Each Tender must be accompanied by a deposit of 1% as Earnest Money Deposit (EMD) on the total cost of the equipment to be supplied in the form of Demand Draft, Bankers Cheque payable at any Bank in Tiruvallur drawn in favour of the Deputy Director (E&E), Central Electrical Testing Laboratory, Kakkalur in the Technical bid (i.e. envelope Marked as ‘A’).

   a) Any tender submitted without EMD in the technical bid cover, will be summarily rejected.

   b) Cash, Cheque and Postal Orders will not be accepted. The EMD of the unsuccessful tenders will be arranged to be refunded within a reasonable time, consistent with the rules and regulations. In this behalf, Government do not accept any liability to pay back the EMD within a definite time nor will any interest thereon be allowed.

3. The tenderer should not have been blacklisted by any State / Central Government and or any State/Central Public Sector Undertakings. Declaration to this effect shall be furnished in the technical bid as given in Annexure-I.

4. The Tenders should be accompanied by all the particulars requested in the schedule including service manual / catalogues / outlaying dimensions, drawings, foundation drawings etc. of the equipments quoted.

   a) The technical bid shall contain brouchers / catalogue of the product quoted. If brouchers / catalogue are not enclosed and if specific model number is not indicated in the tender, it will be summarily rejected.

   b) The make and model number specifically indicated in the technical bid alone will be considered. The details of other make and model numbers find place in the literature / catalogue / Brochures, will not be considered.
c) The technical specification indicated in the brouchers / catalogues of the
equipment specified in the technical bid alone will be considered.

d) The tenderers who propose to supply imported equipment shall invariably
produce the dealership certificate from the manufacturer.

5. The GST registered bidders are only eligible to participate in the tender.

6. Manufacturer Bidder
The bidder must have manufactured and supplied satisfactorily the similar model
quoted in Schedule of Requirements either directly or through any other
authorized dealer with no adverse report for at least one year preceding the date
of bid opening.

7. Non-Manufacturer Bidder
a) In the case of a Bidder offering to supply Goods under the Contract that the
Bidder does not manufacture or otherwise produce, the Bidder should be duly
authorized by the manufacturer of the Goods who meets the criteria under (1)
above (all supporting documents/information as asked above for manufacturer
shall be submitted with the Tender) and

b) The bidder, as authorized by the manufacturer, must have supplied and
provided after sales service to the extent of at least 3 Nos. of the quantities of
similar model in the Schedule of Requirements in any one of the last five (5)
years to Indian user, which must be in satisfactory operation at least for one
year on the date of bid opening.

8. Common to Both Manufacturer and Non-Manufacturer Bidder
a) The information on past supplies and satisfactory performance should be
given.

b) Documentary evidence (end users certificate) in support of the satisfactory
operation of the goods as specified above shall invariably be furnished.

c) Further, the manufacturer should be in continuous business of manufacturing
/ supplying and after sale services of products similar to that specified in the
‗Schedule of requirement‘ during the last 5 years prior to bid opening. In case
of non-manufacturer bidders, this condition should be satisfied by the
manufacturer of the product.

d) The legal status, place of registration and principal place of business of the
company or firm or partnership, etc.;

e) Notwithstanding anything stated above, the purchaser reserves the right to
assess the bidder’s capabilities and capacity to execute the contract
satisfactorily before deciding on award.

f) Even though the bidders meet the above qualifying criteria, they are subject to
be disqualified if they have made misleading or false representations in the
forms, statements and attachments submitted in proof of the qualification requirements; and/or record of poor performance such as, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.

9. Calibration Certificate: The rate should be quoted inclusive of cost of calibration, if any for all the instruments mentioned in the Annexure IV.

10. The tenders should reach this office on or before 03.00 P.M of 14.02.2020 in a sealed cover duly superscribed as specified in the Annexure-VI. Tender should be enclosed in two separate sealed envelopes, one with marking ‘A’ containing i) signed tender document ii) EMD iii) Technical bid specification with catalogue for every equipment separately iv) Supporting documents to fulfil tender conditions. Other envelope marking ‘B’ containing price bid alone. Both covers should be enclosed in a single sealed envelope distinctly marked as specified in the Annexure-VI. Price must be given only in the format as given in the Annexure V.

II – TERMS AND CONDITIONS AND INSTRUCTIONS TO TENDERERS

1. Tenders can be submitted in person on or before the due date and time specified in tender notice. Such tenders shall be dropped in the Tender Box kept at the Chamber of the Joint Director – Engineering (Electrical and Electronics), Department of Industries and Commerce, 3rd Floor, SIDCO Corporate Building, Thiru. Vi. Ka. Industrial Estate, Guindy, Chennai -600 032, Tamil Nadu.

   Alternatively, the tenderer who prefers to submit the tenders through post, can despatch them through Registered post or courier, so as to reach the address given below on or before the due date and time specified in the tender notice.

   The tenders must be addressed to the Joint Director – Engineering (Electrical and Electronics), Department of Industries and Commerce, 3rd Floor, SIDCO Corporate Building, Thiru. Vi. Ka. Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu.

2. Tenders received after the due date and time or unsealed or incomplete or by facsimile (Fax) or by electronic mail will be summarily rejected. The Tendering Authority will not be responsible for any delay or loss of document in transit due to any reason.

3. In the event of Tenders being submitted by a firm, it must be signed separately by each partner thereof or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney authorising him to do so or in the case of company, the tenders should be executed in the manner laid down in the company’s articles of association. The Tender accepting Authority reserves the rights of rejecting all or any of the tender without assigning any reason for the same and to split up the tenders as he may deem fit.
4. Rates quoted should be both in figures and words. The signature on tenders shall be made by the authorised signatories only.

The Prices should be quoted separately for each item of the equipment notified in the tender document.

5. The Tenderer must sign and affix his seal in every page of the tender document and the complete signed original tender documents must be submitted in the respective covers.

6. Successful Tenderers will be required to provide a security Deposit equivalent to 5% of the value of their tenders within 7 days after the receipt of purchase order and the deposit being in the form of Demand Draft or Bankers’ Cheque or where the procuring entity deems fit, irrevocable bank guarantee valid upto 60 days after the date of completion of performance obligations including the warranty obligations.

7. The sum deposited as Earnest Money Deposit as required in clause 2 of Eligibility criteria will be adjusted against the security deposit and the successful Tenderers should remit the balance in the form of Government Securities or Deposit Receipts of the State Bank of India as specified as the case may be. Securities furnished in the form of promissory notes of the Government Municipal Debenture or Port Trust Bonds will be accepted at 5% below the market price or at the value whichever is less and should be duly endorsed in favour of the Deputy Director (E&E), Central Electrical Testing Laboratory, Kakkalur payable at Tiruvallur. If the accepted tenderer fails to remit the security Deposit within the above said period, the Earnest Money Deposit already paid by him will be forfeited to the state Government and the Tender will be held void.

No interest will be paid on the Earnest Money Deposit mentioned in clause 2 of Eligibility criteria or on the security Deposit mentioned in clause 6 above. The Security Deposit will be returned after the expiry of the guarantee / warranty period.

8. The Tenderer must state while sending their Tenders that all the above conditions are / will be adhered to.

9. If the Tenderer fails to act as per the Tender document or backs out after his tender is accepted, his security deposit mentioned in clause 6 will be forfeited to Government.

10. The Purchaser will examine the bids to determine whether they are complete, whether any computational errors have been made, whether required securities have been furnished, whether the documents have been properly signed, and whether the bids are generally in order. Bids from Representatives, without proper authorisation from the manufacturer as per Clause 7 of Eligibility criteria, shall be treated as non-responsive.
Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If the supplier does not accept the correction of errors, the bid will be rejected. If there is a discrepancy between words and figures, the amount in words will prevail.

The **Purchaser** may waive any minor informality or non-conformity or irregularity in a bid which does not constitute a material deviation, provided such a waiver does not prejudice or affect the relative ranking of any bidder.

11. The price should be firm and kept open for acceptance for a period of at least ninety days from the date of opening of the Tender.

12. Whenever the instruments and equipments / stores offered do not confirm to the specifications detailed in the schedule fully or partially, particulars of the deviations must be specifically furnished.

13. The Brand name, Type, Model No., Name and Address of the manufacturer of the equipments and instruments should be specifically indicated in the tender.

    The list of customers containing the organisation, to which the specific product has been supplied by the tenderers, should be enclosed.

14. If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, the supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the force majeure event.

15. 100% of the cost will be paid through ECS as soon as the equipments are received in good working condition, installed and found to confirm to the specifications required by the purchaser along with a calibration certificate from a NABL accredited Laboratory, where ever applicable.

16. **Guarantee:** The supplier shall undertake to repair free of charge or replacement of any defective part of the equipment supplied due to defective materials or faulty design or workmanship during a period of at-least one year, following the date of supply / Installation of the equipment. Delivery of the full replacement or repaired parts should be effected free of cost at site without loss of time so that the down time will be minimized. The duration of down time shall be extended at the time of expiry of guarantee period.

17. Delivery: Earliest possible time of delivery should be indicated in the Tender.

18. **Test/CalibrationCertificate:** Independent Manufacturer’s valid calibration certificates traceable to National Standards (The details of reference used shall be clearly mentioned in the certificate) or calibration certificates from any NABL
Accredited Laboratories must be furnished for the instruments to be supplied. The certificate must contain the details of nature of the tests / calibrations conducted for all relevant ranges and parameters.

19. The Tender Accepting Authority shall carry out negotiation with the lowest tenderer (L1) as per evaluation.

20. At any time prior to the deadline for submission of bids, the Purchaser may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective bidder, modify the Bidding Documents by an amendment. All prospective bidders who have received the Bidding Documents will be notified of the amendment in writing or by cable which will be binding on them. In order to allow prospective bidders reasonable time in which to take the amendment into account in preparing their bid, the Purchaser may, at his discretion, extend the deadline for the submission of bids.

21. Clarification of Bids - During evaluation of bids, the Purchaser may, at his discretion, ask the bidder for clarification of his bid. The request for clarification and the response shall be in writing. Unless the purchaser asks for change in price due to the clarifications sought, the bidder is not permitted to alter the price furnished in the “Price bid” “Cover B”. The change in price shall be submitted in a separately sealed covers with marking in the cover “supplemental price bid” before opening of the “original price bid”.

22. The schedule of rates should contain the following details:
   a) Full description of the goods
   b) Tender’s rate per unit including Excise duty, custom duty
   c) GST
   d) Cost
   e) Number in each type
   f) Calibration charges if any
   g) Total cost
   h) Name and address of the Manufacturer / Supplier / Dealer

23. It should be specified whether the rate quoted is exclusive or inclusive of GST. Unless otherwise stated the rate quoted will be taken up as inclusive of GST. The rate of GST quoted by the authority thereof should also be mentioned indicating the clause of the GST under which the same is included.

24. If the prices are not quoted for F.O.R. destination the offer is likely to be summarily rejected.

25. The specification of the equipments required are furnished in Tender schedule appended (Annexure IV). The tender accepting authority can vary the quantity of equipments at the time of issue of purchase order.

26. The last date for submission of sealed Tender is on or before 03.00 p.m. of 14.02.2020 and the tenders in envelope ‘A’ will be opened on 14.02.2020 at 04.00 p.m. at Conference Hall, 3rd Floor, Department of Industries

Tenderer Signature
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and Commerce, SIDCO Corporate Building, Thiru. Vi. Ka. Industrial Estate, Guindy, Chennai 600 032. Tamil Nadu by the Joint Director – Engineering (Electrical & Electronics) or any other officer authorised on behalf of Tender Accepting Authority, in the presence of such of those Tenderers or their authorised representatives, such representative, who chose to be present at the time of opening of the tenders should bring a letter of authority from the Tenderers, which they represent to identify their bonafide.

27. The date of opening of price bid will be informed to the firms whose Technical specifications are found suitable as per the requirements by Fax / E-Mail.

28. If the date of opening of bids happens to be a holiday due to unavoidable circumstances, the Tender will be opened on the next working day at the same time.

29. Tenders are not transferable.

30. Before delivering the items, concerned experts shall be allowed to inspect the items to verify the suitability according to the specifications, if required.

31. The items supplied shall be provided with appropriate instructions / operating / service manual.

32. Training to the user / operator shall be provided wherever required.

33. The bidding document with all corrigendum duly signed at all pages by the authorised signatory should be submitted.

All the conditions and instructions are fully read by me, understood and accepted.

Signature of the Tenderer
Name of the Firm
(Seal of the firm)

Date:
Place:
ANNEXURE-I

DECLARATION

I / We having our office at

Declare that I / We have never been blacklisted by any state Government / Central Government / or any state / Central PSU.

Signature :

Date : Name :

Place : Designation :

Address of the Tenderer :

Seal of Tenderer :

ANNEXURE-II

DECLARATION

I / We................................................
Have our ............office at..............................................................and declare that I / We have carefully read all the conditions of tender sent to me/us by the Joint Director – Engineering (Electrical & Electronics). For the tenders floated by him vide reference No TE-01/MSME/INCOM/CETL/LED/2019-20 DT. 28.01.2020 for purchase of equipment. I/We shall abide all the conditions set forth therein.

Signature of the Tenderer
With seal and address

Date :
Place:
ANNEXURE-III

DECLARATION

I / We having office at
....................................................................................................................................................................

Declare that the tender forms downloaded from the website www.tenders.tn.gov.in / www.indcom.tn.gov.in have not been tampered with / modified in any manner. Incase, if the same is found to be tampered with / modified, I / We shall abide by all condition set forth therein.

Signature of the Tenderer
With seal and address

Date :
Place:
### ANNEXURE - IV
### EQUIPMENTS / INSTRUMENTS WITH DETAILED TECHNICAL SPECIFICATION

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Equipment / Instrument &amp; Specifications</th>
<th>Quantity (Nos.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Programmable Hot &amp; Cold Chamber</strong></td>
<td>01 (ONE)</td>
</tr>
</tbody>
</table>

**Scope:** Covers the basic guiding requirements for Hot & Cold Chamber to carry out Temperature cycling test for
- LED modules as per clause 10.3.2 of IS 16103 (Part 2):2012
- LED Lamps as per clause 11.3.2 of IS 16102 (Part 2):2017
- AC Static Watt Hour meter Clause 12.6.1 & 12.6.2 of IS 13779:1999
- AC Static transformer operated Watt hour and VAR hour meter as per clause 12.6.1 & 12.6.2 of IS 14697

**Test Requirement:** Temperature cycling test—The sample is placed in a test chamber in which the temperature is varied from −10°C to +50°C over a 4 h period and for a test duration of periods (1 000 h). A 4 h period consists of 1 h holding on each extreme temperature and 1 h transfer time (1K/min) between the temperature extremes.

**Design and construction:**

**Housing:**
- Shall be sturdy and with adequate mechanical stability
- shall be durable and free from rusting
- Shall be fabricated out of suitable material (such as galvanized steel, cold rolled steel, stainless steel, etc)
- Thickness 16 SWG, min.
- All exterior sheet metal surfaces shall be made scratch resistant through enamel or powder coating.
- Chamber doors shall be lockable and capable of full opening to ensure full access to the working space and shall be supported on robust hinges with gaskets to fully vapour seal the chambers to prevent losses

**Interior chamber:**
- Dimensions (W x D x H) : 0.75 m x 0.75m x 0.75m
- Shall be made of stainless steel (AISI-304 Grade, Min.)
- Thickness 16 SWG, min.
- Surfaces shall be matt finished.
- Corners and seams of the interior liners are to be so welded as to allow for expansion and contraction under all temperatures changes to prevent distortion and damage.
- No. of Trays: 2 min.

**Insulation:**
- The chamber shall be suitably and sufficiently insulated for the temperature range involved.
- The material used for insulation between the interior and the exterior shall be mineral glass wool, fiber glass or polyurethane foam.
Provisions required:
- Entry Port: Suitable provisions for connecting the product under test to an external source (50 mm dia.).
- Inspection window preferably of multi-pane toughened glass type for easily viewing the interior shall be provided on the door, hermetically sealed, with heaters to avoid condensation during low temperature. Size 200mm Width x 200 mm Height (Minimum).
- Lighting: Halogen/LED lighting for viewing the interior

Safety Provisions:
- Automatic over heat/over cool protection.
- Door safety interlocks
- Emergency stop button
- Compressor internal overload protection.
- Snap action switch to switch off the air circulation if the door is open

Operating Conditions:
- Input power supply: Single phase 240±10% or 3 phase 415V ± 10% 50 Hz.

Technical Specifications:
- Temperature Range: -25°C to + 100°C
- Chamber accuracy: ±1°C
- Uniformity: Better than ± 1°C
- Rate of heating: 1°C/min.
- Rate of Cooling: 1°C/Min.
- Recovery time: 5 min, Max.
- Cooling System: Refrigeration system using environmental friendly non-CFC refrigerants.
- Temperature Control – Microprocessor based PID temp. Controller.
- Real time Programmable for temperature cycling (Ramp up/down, soak, minimum temperature, maximum temperature, Rise and fall period, temperature holding period& Number of cycles) with recording facility.

- Control Panel / Display:
  - Digital display for present temperature, set temperature, time duration and temperature profile.
  - Display for programmed test hours and total running hours

Accessories: The equipment shall be supplied with all standard accessories.


Certificates of Calibration: Calibration certificates for relevant parameters from NABL accredited calibration agency shall be furnished along with the equipment.

2 DRAUGHT FREE TEST ENCLOSURE
Scope: Covers the basic guiding requirements for draught free test enclosure required for carrying out the following test:
- Cap Temperature rise test as per Cl. 10 of IS 16102(Part1)-2012.
**Test Requirement:**

The surface temperature rise (above ambient) of a lamp holder fitted to the lamp shall not be higher than that of the lamp type which is being replaced by the lamp. The cap temperature rise $A_{TS}$ (Ambient surface temperature) of the complete lamp shall not exceed 120 K. The value of $A_{TS}$ (Ambient surface temperature) corresponds to an incandescent lamp of 25 W maximum. The operating position and ambient temperature are detailed in IS 8913. Measurement shall be carried out at rated voltage. If the lamp is marked with a voltage range it shall be measured at the maximum voltage of that range.

**Design and construction of draught free test enclosure as per IS 8913**

- Rectangular metal cabinet with door should be used
- the top and at least three sides of which are double-walled,
- The gap between the inner and outer walls being approximately 150mm.
- The base of the cabinet is solid.
- The walls are made of perforated metal sheet (for example Zinc) with a matt surface.
- The maximum diameter of the holes (perforations) being 2mm
- Area of the apertures (perforations) being approximately 40 percent of the total wall area.
- The internal size of the enclosure should be not less than 1.75m x 1.0m x 1.0m (DxWxH).
- The outer size of the enclosure should be not less than 2.05m x 1.3m x 1.3m (DxWxH)
- Painting: Inner chamber - Black matt paint
- Door: 2 doors (open outwards)
- Suitable mounting arrangement to mount the lamps of various types at the middle of the enclosure.

**Accessories:** The equipment shall be supplied with all standard accessories.

**User Documentation:** The equipment shall be supplied with user’s manual. Manual shall include installation drawings and instructions, a functional description of the equipment with block diagrams, safety precautions, illustrations, step-by-step operating procedures, and routine Maintenance guidelines.

**Certificates of calibration:** Calibration certificates for relevant parameters from NABL accredited calibration agency shall be furnished along with the equipment.

**DIGITAL MULTI-METER (HAND HELD)**

**Scope:** Covers the requirements of Digital Multi-meter for the basic measurement needs of Voltage, Current, Resistance and Frequency parameters.

**Technical Specification**

**Range**
- DC Voltage: 0 - 1000V
- AC Voltage: 0 – 750Vrms, 50 HZ
- DC Current: 10 A
- AC Current: 10 Arms
- Resistance: Up to 40 MΩ
- Frequency: Up to 1 MHZ

**Accuracy**
- DC Voltage: ± (0.5% of reading) or better
- AC Voltage: ± (1.0% of reading) or better
DC Current : ± (0.5% reading) or better
AC Current : ± (1.0% reading) or better
Resistance : ± (1.5% reading) or better
Frequency : ± (0.5% reading) or better

Accessories: The equipment shall be supplied with all standard measuring probes, carrying case.


Certificates of Calibration: Calibration certificate for relevant parameters from NABL accredited calibration agency shall be furnished along with equipment.

4 GAUGES

Scope: Covers the basic guiding requirements for gauge required for carrying out the following tests:
➢ Cap inter-changeability of Cl.6.1 of IS 16102(Part1)-2012.

Test Requirements: Inter-changeability shall be ensured by the use of caps in accordance with IS 9206.
➢ Compliance is checked by the use of the relevant gauges specified in IS 9206.

Design and Construction
➢ As per data Sheets of IS 9206& IS15518(Part1)
➢ Material : Stainless steel

Technical specifications

<table>
<thead>
<tr>
<th>B15 cap type</th>
<th>‘NOT GO’ and ‘GO’ gauge to test inter-changeability for B15 lamp caps as per data Sheet No. 7006-10 and 7006-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>B15d cap type</td>
<td>Gauges for testing Insertion of caps in lamp holders for B15d caps as per data Sheet No.7006-4A</td>
</tr>
<tr>
<td>B15d cap type</td>
<td>Gauges for testing retention of caps in lamp holders for B15d caps as per data Sheet No.7006-4B</td>
</tr>
<tr>
<td>B22 cap type</td>
<td>‘NOT GO’ and ‘GO’ gauge to test inter-changeability for B22 lamp cap as per data Sheet No. 7006-10 and 7006-11</td>
</tr>
<tr>
<td>B22d cap type</td>
<td>Gauges for testing Insertion of caps in lamp holders for B22d caps as per data Sheet No.7006-4A</td>
</tr>
<tr>
<td>B22d cap type</td>
<td>Gauges for testing retention of caps in lamp holders for B22d caps as per data Sheet No. 7006-4B</td>
</tr>
<tr>
<td>E14 cap type</td>
<td>‘GO’ and ‘NOT GO’ gauge to test inter-changeability for E14lamp cap as per data Sheet No.7006-27F&amp;7006-28B</td>
</tr>
<tr>
<td>E14 cap type</td>
<td>‘GO’ gauge to check the dimensions ‘S1’ of E14 cap on finished lamps as per data Sheet No. 7006-27G</td>
</tr>
</tbody>
</table>

01 (ONE) from each type
E27 cap type 'GO' and ‘NOT GO’ gauge to test inter-changeability for E27 lamp cap as per data Sheet No. 7006-27B&7006-28A

E27 cap type ‘GO’ gauge to check the dimensions ‘S1’ of E27 cap on finished lamps as per data Sheet No. 7006-27C

**Calibration:** Calibration certificates for relevant parameters from NABL accredited calibration agency shall be furnished along with equipment

**TEST LAMP HOLDERS**

**Scope:** Covers the basic guiding requirements for Test lamp holders required for carrying out the following tests:
- Cap temperature rise Cl.10 of IS 16102(Part1):2012

**Test Requirements**: Cap temperature rise: The surface temperature rise (above ambient) of a lamp holder fitted to the lamp shall not be higher than that of the lamp type which is being replaced by the lamp. The cap temperature rise Ats (Ambient surface temperature) of the complete lamp shall not exceed 120 K. The value of Ats (Ambient surface temperature) corresponds to an incandescent lamp of 60 W maximum. The operating position and ambient temperature are detailed in IS 8913. Measurement shall be carried out at rated voltage. If the lamp is marked with a voltage range it shall be measured at the maximum voltage of that range.

**Technical Specification (detailed in IS 8913)**
Test lamp holders consisting of a metallic sleeve, fitted with a thermocouple for following caps.
- E27 cap (un-skirted)
- E14 cap (un-skirted)
- B22d
- B15d

**Design Details:**
- Thermocouple shall be permanently attached to the lamp holder sleeve; a spring wire shall be used around the outside of the sleeve.
- A flexible stranded copper wire of 0.66mm² effective cross section is attached to the top of the lamp holder.
- Thermocouple material Ni / NiCr or Fe/Constantan
- Material of lamp holder : rolled Nickel
- Thickness of lamp holder : 0.5mm ±2mm
- Spring material : 0.8 mm dia. 1 to1.5 turns around the sleeve
- Maximum thickness of the thermocouple wire shall be 200µm.
- Thermocouple wire shall be provided with an insulating outer layer (enamel, asbestos sheathing, etc.)
- Thermocouple wires shall be set on end at an angle of approximately 150° and spot welded.

**Certificates of Calibration:** Calibration certificates for relevant parameters as detailed in ARE 8913 from NABL accredited calibration agency shall be furnished along with equipment.
INGRESS OF PROTECTION AGAINST WATER – TEST SET UP (IPX1 to IP X8)

Scope: Covers the basic guiding requirements for Equipment for Ingress Protection Against Water (IP X1 to IP X8 ) required for carrying out the following test:
- Test for ingress protection against water (IP X1 to IP X8) as per Cl. 14.2.1 to 14.2.8 of IS /IEC60529:2001 and 10322 (Part 1)-2014.

Test Requirements:
Drip-proof Test specimen (second characteristic IP numeral 1) is subjected for 10 min to an artificial rainfall of 1 mm/min, falling vertically from a height of 200 mm above the top of the DUT. The turntable on which the DUT is placed has a rotation speed of 1 rev/min and the eccentricity (distance between turntable axis and specimen axis) is approximately 100mm. (fig.3a)

Drip-proof Test specimen (second characteristic IP numeral 2) are subjected for 10 min (2.5 min in each of four fixed positions of tilt) to an artificial rainfall of 3 mm/min, falling vertically from a height of 200 mm above the top of the enclosure in 4 fixed positions of 15 tilt. (fig.3b)

Rain-proof Test specimen (second characteristic IP numeral 3) are sprayed with water for 10 min by means of a spray apparatus as shown in Fig. 4 of IS/IEC 60529:2001.
- The radius of the oscillating tube is 1000 mm.
- The oscillating tube is provided with spray holes over an arc of 60 either side of the centre point. The support is not perforated.
- Number of open holes and total flow rate relevant to oscillating tube radius, shall be as specified in table 9 of IS/IEC 60529:2001. The total flow rate is adjusted with a flow meter.
- The water pressure at the inlet of the apparatus shall be approximately 80KN/m².
- The DUT to be tested is placed at the centre point of the semicircle. The tube shall be caused to oscillate through an angle of 120°, 60° on either side of the vertical, the time for one complete oscillation (2 × 120°) being about 4s and the test duration being 5 min. The DUT is then turned through an horizontal angle of 90 and the test is continued for further 5 min.
- The DUT shall be turned about its vertical axis during the test at a rate of 1 rev/min.

Splash-proof Test specimen (second characteristic IP numeral 4) are sprayed from every direction with water for 10 min by means of the spray apparatus shown in Fig. 4 of IS/IEC 60529:2001.
- The oscillating tube has spray holes over the whole 180 of the semicircle.
- Number of open holes and total flow rate relevant to oscillating tube radius, shall be as specified in table 9 of IS/IEC 60529:2001. The total flow rate is adjusted with a flow meter.
- The tube is caused to oscillate through an angle of almost 360,180 on either side of the vertical, the time for one complete oscillation (2x360) being about 12seconds. The DUT shall be turned about its vertical axis during the test at a rate of 1 rev/min.

Jet-proof Test specimen (second characteristic IP numeral 5) are subjected to a water jet for 15 min from all directions by means of a hose having a nozzle with the shape and dimensions shown in Fig. 6 of IS/IEC 60529:2001. The nozzle shall be held between 2.5 and 3m away the sample. The water pressure at the nozzle shall be adjusted to achieve a
water delivery rate of 12.5 l/min ± 5 percent. (Approximately 30KN/m², internal dia. of the nozzle: 6.3mm.

**Powerful water jet-proof Test specimen (second characteristic IP numeral 6)** subjected to a water jet for 3 min from all direction by means of a hose having a nozzle with the shape and dimensions shown in Fig. 6 of IS/IEC 60529:2001. The nozzle shall be held between 2.5m and 3 m away from the sample. The water pressure at the nozzle shall be adjusted to achieve a water delivery rate of 100 litre/min ± 5 percent (approximately 100 kN/m²). Internal dia. of the nozzle: 12.5mm.

**Water Immersion Test** is made by completely immersing the enclosure in water in its service position as specified by the manufacturer so that the following conditions are satisfied:

a) the lowest point of enclosures with a height less than 850 mm is located 1 000 mm below the surface of the water;
b) the highest point of enclosures with a height equal to or greater than 850 mm is located 150 mm below the surface of the water;
c) the duration of the test is 30 min;
d) the water temperature does not differ from that of the equipment by more than 5 K.

However, a modified requirement may be specified in the relevant product standard if the tests are to be made when the equipment is energized and/or its parts in motion.

**Strong Pressure Immersion water test** : Unless there is a relevant product standard, the test conditions are subject to agreement between manufacturer and user, but they shall be more severe than those prescribed for IPX7 and they shall take account of the condition that the enclosure will be continuously immersed in actual use.

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**FIG. 4 of IS/IEC 60529:2001 APPARATUS FOR TESTING PROTECTION AGAINST RAIN AND SPLASHING**

(All dimensions in milli-metres)
3.0 Design and Construction
3.1 IPX1 & IPX2
3.1.1 The test equipment for IP X1 & X2 shall be designed to produce a uniform flow of water drops falling vertically from a height of 200 mm above the top of the test specimen over the whole area with a water flow rate of $1 \pm 0.5$ mm/min and $3 \pm 0.5$ mm/min. An example of the test device is given in Fig.3 below:
3.1.2 The set-up shall basically consist of a drip box mounted on top of a support stand with flow control and shut off valve, water pump, piping and any connecting hose. The support stand shall be fabricated out of Stainless Steel (AISI-304 Grade, Min.) with adequate strength and rigidity. All the joints and corners shall be made with high quality TIG welding and buffing. Lockable castor wheels shall be provided for easy mobility. The design of the stand shall be suitable to place a turn-table carrying the test specimen below the drip box.

3.1.3 Drip tank shall be fabricated out of stainless steel (AISI-304 Grade, Min.) with removable nozzles. The design of the drip box shall provide easy access to the top for maintenance and cleaning.

3.1.4 Provisions shall be made for adjusting water flow rate of \( 1 \pm 0.5 \) mm/min and \( 3 \pm 0.5 \) mm/min through a flow meter and valve.

3.1.5 The water pump used to fill the drip tank shall be of reputed make and the water level in the drip tank shall be maintained through a water level control switch automatically.

3.1.6 The size of the drip tank shall be at least 800mm x 800mm to provide a minimum exposure area of 760mm x 760mm and shall be mounted on the support stand at a height of approximately 1.7m from the floor level.

3.1.7 The pipelines used to connect the various parts of the apparatus shall have adequate strength and shall be durable and free from rusting.

3.1.8 Instrumentation and Control
A control panel consisting of required instruments and controls shall be provided for ease of operation. It shall include the following:
- Mains on/off switch
- Mains on indicator lamp
- ON/OFF switch for operation of drip tank
- Hour meter
- Timer to set the test timing
- Protection for water pump against over load
- Protection for control circuits
- Low water level protection with an electrical float switch.
- Protection of the control circuits against input electrical surge and spike
- Earth terminal.
- Rain gauge

3.2 IPX3 & IPX4
3.2.1 The spray apparatus for IP X3 & X4 shall be designed and constructed with water flow rate meter according to Fig. 4 of IS/IEC 60529 :2001 given above.

3.2.2 The radius of the semicircular tube shall be 1000 mm. The tube shall be provided with spray holes of 0.4mm dia. for every 50mm distance.
   a) over an arc of 60° either side of the centre point for IP X3
   b) over the whole 180°of the semicircle for IP X4
so that jets of water are directed towards the centre of the circle and the water pressure as per IS/IEC 60529:2001.
Provision shall also be made to adjust the total flow rate equal to 0.07 liter / min ± 5% per hole multiplied by number of holes.
3.2.3 For IPX3, the tube shall be caused to oscillate through an angle of 120°, 60° on either side of the vertical, the time for one complete oscillation (2 × 120°) being about 4s. For IPX4, the tube shall be caused to oscillate through an angle of almost 360°, 180° on either side of the vertical, the time for one complete oscillation (2 × 360°) being about 12 s.

3.2.3 Test specimen shall be mounted above the pivot line of the tube so that the ends of the test specimen receive adequate coverage from the jets. The specimen shall be turned about its vertical axis during the test at a rate of 1 rev/min. The support for the equipment under test shall be of grid shaped in order to avoid acting as a baffle.

3.2.4 The set-up shall basically consist of semi-circular spray tube supported on electro motor carriers with built-in oscillating mechanism at both ends with fully automated features like inline pressure monitoring, automatic rotating table height adjustment, 360° clockwise and anticlockwise rotations with control& monitoring.

3.2.5 The semi-circular spray tube and the support carriers shall be fabricated out of stainless steel (AISI-304 Grade, Min.) with adequate strength and rigidity. All the joints and corners shall be made with high quality TIG welding and buffing. Lockable castor wheels shall be provided for easy mobility. The design of the equipment shall be suitable to place a rotating table carrying the test specimen at the centre point of the semicircle defined by the oscillating tube.

3.2.6 Oscillating tube will have fixed angle limit as specified above for rotation. It shall be coupled with geared motor in line with rotary joint to operate close to 360. Provision shall be made to automatically stop tube rotation and water flow at the precise test time. Manual mode shall also be provided for flexibility. Suitable provision shall be made in the oscillating tube to test the DUT according to IPX3 & IPX4.

3.2.8 Instrumentation and Control

A control panel consisting of required instruments and controls shall be provided for ease of operation. It shall include the following:

- Mains on-off switch
- Mains-on indicator lamp and display for all parameters.
- Flow meter, Pressure meter
- Single phase, phase reversal, under voltage and over voltage protection for main input power
- EMI protection for control circuit
- Protection for water pump against over load
- Protection of the control circuits against input electrical surge and spikes , ON and OFF switch for operation of Oscillating Tube
- Low water level protection with an electrical float switch, Earth terminal

3.3 IPX5 & IPX6

The apparatus for IP X5 & X6 shall be designed and constructed to subject the test specimen to a water jet for 15 min from all directions by means of a hose having a nozzle with the shape and dimensions shown in Fig.6 of IS/IEC60529:2001 given above.

Provisions shall be made to adjust the water pressure at the nozzle to achieve a water delivery rate of 12.5 litre/min ±5 percent (approximately 30 kN/m2) for IPX5 and 100 litre/min ±5 percent (approximately ) 100 kN/m2) for IPX6.
The nozzles shall be made out of stainless steel (AISI-304 Grade, Min.). The diameter of nozzle shall be 6.3mm for IPX5 and 12.5mm for IPX6 as specified above. Nozzles shall be held 3m away from the test specimen. The nozzles shall be suitably placed on a height adjustable stand-alone tripod stand made of Stainless Steel with a pressure gauge, ball valve and connecting flexible hose of adequate length with flow meter to monitor flow rate.

3.3.4 The electric pump used to feed water to the nozzles shall be of reputed make having adequate capacity to obtain the required rate of flow.

3.3.5 Instrumentation and Control
A control panel consisting of required instruments and controls shall be provided for ease of operation. It shall include the following:

- Mains on-off switch
- Mains-on indicator lamp
- ON and OFF switch for operation for Jet Spray Nozzles Hour meter
- Flow meter, Pressure meter
- Timer to set the test timing
- Single phase, phase reversal, under voltage and over voltage protection for main input power
- EMI protection for control circuit
- Protection for water pump against over load
- Protection of the control circuits against input electrical surge and spike Low water level protection with an electrical float switch
- Earth terminal

3.4 IPX7 & IPX8

3.4.1 Specification for Water Immersion test set up:
- Inside dimension: 600 x 600 x 1200 mm
- External dimension: 660 x 660 x 1400 mm
- Glass Thickness: 12 mm
- Maximum Depth: 1.2 m
- Water Level adjustment: Manual
- Water level display: SS ruler (resolution 1 mm)
- Frame material: Stainless steel
- Standard Compliance: IS/IEC 60529:2001

3.4.2 Specification for Strong Pressure water Immersion test set up:
- Pressure adjustment method: Automatic
- Control Accuracy: ±0.002 Mpa
- Pressure adjustment range: 0 – 0.3 Mpa
- Test water depth range: 0-30M
- Exhaust pressure of safety valve: 0.35 Mpa
- The Maximum limit of pressure: 0.4 Mpa
- Accuracy: 0.01 Mpa
- Thickness of the tank: 3 mm
- Thickness of flange: 20mm
- Diameter of the tank: 0.5 m
- Height of water level: 0.5 m
- Outer size: 500 x 600 x 1300 mm
- Control Time: 0 – 999 min
- Power: 100 W
4.0 Water Circulation System
4.1 Independent mono block pump of reputed make shall be used to circulate water for IPX1-2 tests.
4.2 Independent pump of reputed make shall be used for circulating the water for IPX3-IPX6 test system.
4.3 Suitable water filter system shall be used to prevent choking of water lines, nozzles, etc.

5.0 Power Supply Requirements
The test setup shall be capable of operating from an ac supply of 50 Hz either from single phase 240 V ± 10 percent or 3 phase 415V ± 10 percent.

6.0 Accessories
6.1 Rotating test table
6.1.1 A vibration-free rotating/turn table of at least 300mm dia. with variable speed control suitable for placing test specimen for IPX1 to IPX6 tests shall be provided.
6.1.2 The turn table shall be made out of stainless steel (AISI-304 Grade, Min.). Provision shall be made for fixing of test specimen on the table and shall rotate according to the requirements of various IP tests described above so that water can be directed on all sides of the test specimen.
6.1.3 The rotating table shall have a provision for tilting 15.
6.1.4 The turn table shall be auto-height adjustable with regulated rotation speed. Automatic control of clockwise or anti-clockwise rotation with provision for controlling the angle of rotation shall also be incorporated.
6.1.5 Provision of Timer control to adjust the test duration up to 30 minutes.

7.0 User Documentation: The equipment shall be supplied with one user’s manual. Manual shall include installation drawings and instructions, a functional description of the equipment with block diagrams, safety precautions, illustrations, step-by-step operating procedures, and routine maintenance guidelines.

8.0 Certificates of Calibration: Calibration certificates for relevant parameters from NABL accredited calibration agency shall be furnished along with the equipment

7 AXIAL PULL TEST APPARATUS

Scope: Covers the basic guiding requirements for axial pull test apparatus required for carrying out the following test:

Test Requirement: The lamp construction shall withstand externally applied axial pull as per measurement method of IS 15687(Part1).

Design and construction: The digital instrument should be firmly fitted or mounted on a platform and a hook is attached to the sensor of this instrument. Separate holders for B22, B15, E27, and E14 lamps are to be supplied and these holders can be attached to the hook which is connected to the sensor of instrument. The test lamp should be fitted to the holders and manually pull the entire lamp assembly till the required Newton force (or equivalent force in kg) by gently pulling the lamp (manual pulling).

Technical specifications

**Digital scale**
- **Range**: 0-40.0 N (4.077kg)
- **Least count**: 0.001 kg
8 BENDING MOMENT MEASUREMENT TEST EQUIPMENT

Scope: Covers the basic guiding requirements for Bending Moment test apparatus required for carrying out the following test:

Bending Moment Clause 6.2 IS 16102(Part1):2012

Test requirement:
The value of the bending moment, imparted by the lamp at the lamp holder shall not exceed the given value in table2 of IS 16102(part1):2012. The bending moment shall be determined by measuring the weight of the lamp for example by means of a balance at the tip of the bulb of horizontally held lamp and multiplying this force by the distance between the tip of the bulb and the pivot line. The pivot line shall lie at the bottom end of the cylindrical part or at the end of the contact pins (for pin caps). It shall be supported by an upright held thin metal sheet or similar means.

Design and construction
The equipment should be direct reading type on a graduate scale, where in a known weight is fitted at a pre-determine distance to get the required range of equipment (3 Nm).

The unit can be fitted with B22, B15, E22, E14 lamp holders. The test lamp is to be inserted on this holders and the bending test can be done by moving the lamp either left side / right side as per the requirement.

Technical specifications
Digital weighing scale
- Range : 0-9.999 kg
- Least count : 0.001 kg
- Sensitivity : 0.001 kg
- Accuracy : ± 0.5%
- Type : Portable battery operated
- Sliding arrangement: Provision to move lamp as well as digital weighing scale both in horizontal and vertical direction.

BENDING TEST EQUIPMENT
- Range : 0-3.0 Nm
- Least count : 0.5 Nm
- Accuracy : ± 1% or better
- Type : Table top fixing type, analogue graduated scale, mechanical item.

Fabricated using CRCA plate, CRCA stand with partial nickel chrome plated and powder coat finish.
Accessories: The equipment shall be supplied with all standard accessories.


Certificates of calibration: Calibration certificates for relevant parameters from NABL accredited calibration agency shall be furnished along with the equipment.

9 LIFE TEST RACKS FOR LED LAMP / MODULE / LUMINAIRE

Scope: Covers the basic guiding requirements for life test apparatus required for carrying out the following test:
- Lumen maintenance & Accelerated Operational life test for LED lamps as per Clause 11.2 & 11.3.4 of IS 16102(Part2):2017
- Lumen maintenance & Accelerated Operational life test for LED modules as per Clause 10.2 & 10.3.4 of IS 16103(Part2):2012
- Lumen maintenance & Accelerated Operational life test for LED Luminaire as per Clause 10.2 & 10.3 of IS 16107(Part2/Sec1):2012
- Lumen maintenance & Accelerated Operational life test for LED street light Luminaire as per Clause 10.3 & 10.4 of IS 16107(Part2/Sec2):2017

Test requirement:
1) Lumen maintenance: The sample shall be operated without switching at test voltage and at an ambient temperature between 15°C to 45°C until at least period equal to 25 percent or the rated lamp life (with a maximum of 6000 h) has passed. At the end of this time, and after cooling down to room temperature, the lamp shall remain alight for at least 15 min.

2) Accelerated Operational life test: The sample shall be operated without switching at test voltage and at an ambient temperature corresponding to 10°C above the maximum specified operating temperature if declared by the manufacturer and over an operation time of 1000h. If there is no declared value, then the test shall be performed at 50°C

Design and construction:
Electrically heated chamber/cabinet:
The unit should be constructed of double walled, with 3 compartments, inner and outer part of the chamber is made out of CRCA sheet, and in-between gap is filled with good quality insulation materials. Front and rear sides shall be provided with sliding type clear glass doors for each compartment.

Temperature of individual chamber shall be pre-settable (Ambient to 80°C). Required temperature shall be uniformly maintained inside each compartment.

In First and second compartment 40 LED holders in each compartment are to be provided (Totally 80 holders are provided in this cabinet).

Third compartment: one larger compartment to accommodate luminaire and provided provision for 40 LED Lamps + LED Luminaires / Streetlight
Each compartment should have temperature controlling system, air circulating fan, air ventilation system on either side and overshoot thermostat etc provided along with ON/OFF switch, load indicator lamp etc.

The interior of the cabinet should be finished with silver paint and exterior part is given a powder coat finish.

A suitable stand is also to be provided to mount this cabinet for easy access of handling the bottom compartment.

Holders used are suitable for B15d/ B22d / E14/E27 type lamp caps, which are ceramic type with plunger contacts. All holders are mounted in CRCA channels with concealed wiring using heat resistant fibreglass wires.

**Control unit:**

The control unit for the above electrically heated chamber should consists of Digital Voltmeter, Time totalizer, Digital Cyclic Timer to set ON time and OFF time, Contactors, Autotransformer to set the test voltage, Isolator ON/OFF switch, MCB, HRC fuse etc.

All these controls are used four numbers each to enable to control and test lamps in each compartment separately and independently.

**Technical specifications**

**A. Digital Voltmeter – AC**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>0 – 750 V AC</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>1 V</td>
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<tr>
<td>Resolution</td>
<td>1 V</td>
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<tr>
<td>Accuracy</td>
<td>1% or better</td>
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<tr>
<td>Display</td>
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<tr>
<td>Quantity</td>
<td>3 Nos</td>
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<tr>
<td>Aux. Supply</td>
<td>230V, 50 Hz mains</td>
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</table>

**B. Time Totalizer**

<table>
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<tr>
<th>Parameter</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Range</td>
<td>0 – 9999.9 Hours</td>
</tr>
<tr>
<td>Resolution</td>
<td>36 seconds.</td>
</tr>
<tr>
<td>Accuracy</td>
<td>better than 0.5%</td>
</tr>
<tr>
<td>Type</td>
<td>Non re-settable, battery back-up, digital type</td>
</tr>
<tr>
<td>Quantity</td>
<td>3 Nos</td>
</tr>
<tr>
<td>Aux. Supply</td>
<td>230V, 50 Hz AC 5%</td>
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**C. Digital Cyclic Timer**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>0 – 999 minutes ‘ON’ time and 0 – 999 minutes ‘OFF’ time</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 minute</td>
</tr>
<tr>
<td>Accuracy</td>
<td>better than 0.2%</td>
</tr>
<tr>
<td>Type</td>
<td>Digital with battery back – up</td>
</tr>
<tr>
<td>Quantity</td>
<td>3 Nos</td>
</tr>
<tr>
<td>Aux. Supply</td>
<td>230V, 50 Hz mains</td>
</tr>
</tbody>
</table>

**D. Contactors**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>16 Amps on each line</td>
</tr>
<tr>
<td>Coil volt</td>
<td>220 – 240 V 50 Hz</td>
</tr>
</tbody>
</table>
Type - 3 phase with 3 ‘NO’
Quantity - 3 Nos

E. Autotransformer
Output Volt - 100 – 400V (1 no.), 0 – 300V (1 no.), 0 – 270V (1 no.)
Rated Current - 15A
Type - Air-cooled type to set the required test voltage
Quantity - 3 Nos for 3 compartments

F. Temperature Controller
Range : Ambient to 80°C (in 3 compartments)
Resolution : 0.1°C
Accuracy : 0.7% or better
Display : 3 ½ Digit Red LED
Type : RTD sensor (PT – 100 or equivalent)
Quantity : 3 nos.

MCB (miniature circuit breaker) is to be provided in the input side and also in the output side for every 10 lamps.

HRC fuse is also to be provided in the input side of suitable rating.

Master main ON/OFF switch is also to be provided there in the main input of suitable rating.

The control cabinet cover plate (rear) should have hinge on one side to open and locking knobs on other side.

Accessories: The equipment shall be supplied with all standard accessories.


Certificates of calibration: Calibration certificates for relevant parameters from NABL accredited calibration agency shall be furnished with the equipment.

10 HIGH FREQUENCY SPARK GENERATOR

Scope: Covers the basic guiding requirements for High frequency spark generator required for carrying out Fault conditions test as per Clause 13.0 IS 16102(Part1):2012

Test Requirement: To check if gases liberated from component parts are flammable or not, a test with a high-frequency spark generator is made.

Design and construction: High frequency Spark Generator is to be made of a Tesla coil in which an Electrical Resonant Transformer is used to produce high frequency alternating current and transmission of electrical energy without wires.

Technical Specifications
- Power ON/OFF switches with indicator.
High frequency adjust knob.
Coil type: High frequency coil.
Input voltage: 230V, 50Hz
Grounding: Proper grounding pin.
Cord length: minimum 1.5m.
Spark operation: continuous.
Knob operation: Adjustable knob to vary the spark voltage will be provided

**Accessories:** The equipment shall be supplied with all standard accessories.

**User Documentation:** The equipment shall be supplied with user’s manual. Manual shall include installation drawings and instructions, a functional description of the equipment with block diagrams, safety precautions, illustrations, step-by-step operating procedures, and routine Maintenance guidelines.

**Certificates of calibration:** Not applicable

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11 DIGITAL STORAGE OSCILLOSCOPE

**Specifications**

<table>
<thead>
<tr>
<th>Analog channels</th>
<th>Minimum 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth</td>
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<tr>
<td>Bandwidth upgrade facility</td>
<td>To be provided</td>
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<tr>
<td>Sampling rate</td>
<td>1 Gsa/s minimum</td>
</tr>
<tr>
<td>Display size</td>
<td>8.5-inch minimum (colour display)</td>
</tr>
<tr>
<td>Display Format</td>
<td>YT and XY</td>
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<tr>
<td>Spectrum analysis</td>
<td>Yes</td>
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<td>Hardware bandwidth limit (approximate)</td>
<td>20 MHz</td>
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<tr>
<td>Automated measurements</td>
<td>Minimum 32</td>
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<tr>
<td>Triggers</td>
<td>Edge, Pulse, Runt</td>
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</tbody>
</table>

**Vertical system analog channels**

<table>
<thead>
<tr>
<th>Input Coupling</th>
<th>AC, DC,GND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input sensitivity range</td>
<td>Minimum 2 mV/div to 5 V/div</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>1MΩ</td>
</tr>
<tr>
<td>Vertical resolution</td>
<td>8 bits</td>
</tr>
<tr>
<td>Maximum Input voltage</td>
<td>300v rms</td>
</tr>
</tbody>
</table>

**Horizontal system analog channels**

| Time base range | 2 ns/div to 50 s/div |
| **Record length** | Minimum 15 Mpts on all channels |
| **Advanced waveform math** | Yes |
| **Connectivity** | Standard USB 2.0 (LAN/Video option) (GPIB option) |
| **Probes** | Suitable 10X passive probes (one per channel) |
| **Accessories** | 1) Hard transit case 2) Front panel cover |

**User Documentation**
The instrument shall be supplied with user’s manual. Manual shall include installation drawings and instructions, a functional description of the equipment with block diagrams, safety precautions, illustrations, step-by-step operating procedures, and routine Maintenance guidelines.

**Certificates of calibration**
Calibration certificates for relevant parameters from NABL accredited calibration agency shall be furnished along with the equipment.
Tender for the supply of...........................................

Description of the Equipment with full specification, make and model:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Details</th>
<th>Rate Quoted (In Rupees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Price per unit, Basic price including Excise duty, Education Cess any other Central taxes, temporary registration for transit insurance.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>GST</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IGST</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SGST</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CGST</td>
</tr>
<tr>
<td>3</td>
<td>Total price per unit, all-inclusive for delivery on F.O.R. Destination.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>In words</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Calibration charges if any</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Total price for ..........Nos.</td>
<td></td>
</tr>
</tbody>
</table>

Signature of the Tenderer
With seal and address

Note: Multiple copies of this form can be taken to quote price independently for each item.
# ANNEXURE-VI

<table>
<thead>
<tr>
<th>ITEMS TO</th>
<th>CENTRAL ELECTRICAL TESTING LABORATORY, KAKKALUR – 602 003</th>
</tr>
</thead>
</table>

**COMMON ENVELOPE**  
**CONTENTS: ENVELOPE – A & ENVELOPE – B**  
**Tender Notice No.**  
DEPARTMENT OF INDUSTRIES AND COMMERCE  
Tender for Supply and Installation of Chambers, Meters and IP Test Equipments for LED Light Measurements at Central Electrical Testing Laboratory, Kakkalur

NAME OF THE TENDERER: ...................................................

NAME OF THE ITEMS:  
1)  
2)  
3)  

SIGNATURE & SEAL OF THE TENDERER

## ENVELOPE - A

**Tender Notice No.**  
**TECHNICAL BID**  
NAME OF THE TENDERER: ...................................................

NAME OF THE ITEMS:  
1)  
2)  
3)  

SIGNATURE & SEAL OF THE TENDERER

## ENVELOPE - B

**Tender Notice No.**  
**PRICE BID**  
NAME OF THE TENDERER: ...................................................

NAME OF THE ITEMS:  
1)  
2)  
3)  

SIGNATURE & SEAL OF THE TENDERER
ANNEXURE – VII

GOVERNMENT OF TAMILNADU
DEPARTMENT OF INDUSTRIES AND COMMERCE
GUINDY, CHENNAI – 600032.

Tender Notice No.
TE-01/MSME/INDCOM/CETL/LED/2019-2020 DT. 28. 01.2020

For and on behalf of the Governor of Tamil Nadu, sealed Tenders are invited for Supply and Installation of Chambers, Meters and IP Test Equipments for LED Light Measurements at Central Electrical Testing Laboratory, Kakkalur as per the Terms and conditions and detailed specification listed as in the Tender document.

EMD payable shall be 1% of the total cost of each equipment.

Tender document can be directly downloaded free of cost from the following websites www.tenders.tn.gov.in & www.indcom.tn.gov.in

The Department is not responsible for the delay in postal transit.

Last date and time for issue of Tender documents 14.02.2020 till 2.00 pm

Last date and time for receipt of Tender document 14.02.2020 till 3.00 pm

Opening of Tender documents 14.02.2020 at 4.00 pm

Office of the Industries commissioner and Director of Industries and Commerce, Guindy, Chennai – 600 032.

Joint Director - Engineering
(Electrical & Electronics) / TENDER INVITING AUTHORITY

sd/-ANU GEORGE
Industries Commissioner
and Director of Industries and Commerce

for Industries Commissioner
and Director of Industries and Commerce