



भारतीय मानक ब्यूरो  
**BUREAU OF INDIAN STANDARDS**

**Open e-tender Document for Supply, Installation and Commissioning of PPE Test Equipments for  
BIS Central Laboratory  
(Tender Reference No. LPPD/28/2020/PPE)**

INVITED BY

**BUREAU OF INDIAN STANDARDS (BIS)**

**Scientist F & Head, Laboratory Policy and Planning Department (LPPD)**  
9, BSZ Marg, New Delhi-110002  
Email: [clpolicycell@bis.gov.in](mailto:clpolicycell@bis.gov.in)  
Phone: **011-23230860**

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**Bid opens on 28-05-2020 at 1100h**

**Bid closes on 17-06-2020 at 1530h**

## GLOBAL E-TENDER NOTICE

Bureau of Indian Standards ( Laboratory Policy and Planning Department ) invites bids, under **two bid system (Technical bid and Financial bid)** from bonafide experienced Manufacturers/Suppliers/Dealers / Agencies/ Direct Importers for the job defined in this tender, as per details given below:

<b>DESCRIPTION</b>	SUPPLY, INSTALLATION AND COMMISSIONING OF ..... test Equipment for..... <b>(Please refer Annex-3 for Technical Specifications of the equipment)</b>
<b>Type of Tender</b>	OPEN
<b>EMD Amount (in INR)</b>	Please see point No 1 Below
<p>i. The bidder can bid for one or more than one equipment. The EMD amount for each equipment is, as detailed in Annex 3. The bidder has to bid for each equipment separately and provide EMD amount mentioned for each equipment separately for which he is submitting his bid. The EMD is to be submitted through payment online in an acceptable form (the bidder shall have to upload scanned copy of the transaction document showing transaction code/RTGS No. etc.) in favour of Bureau of Indian Standards, New Delhi, payable at New Delhi. A scanned copy of EMD submitted also needs to be uploaded along with the bid at the Central Public Procurement Portal. For the purpose of online payment of EMD, the bank details of the BIS are as follows:</p> <ul style="list-style-type: none"> <li>Syndicate Bank, Bureau of Indian Standards, 9 Bahadur Shah Zafar Marg, New Delhi.</li> <li>IFSC/NEFT Code: SYNB0009084, Account No.: 90841010000018, Email id: dac@bis.gov.in, PAN No. AAATB0431G, GSTIN : 07AAATB0431G1ZD</li> </ul> <p>ii. Proof of payment of EMD should be submitted along with Technical Bid.</p> <p>iii. No interest shall be payable for the sum deposited as Earnest Money Deposit.</p> <p>iv. EMD of the unsuccessful bidders would be returned to them after expiry of the final bid validity and latest on or before the 30 days after the award of the contract.</p> <p>v. The EMD shall remain valid for a period of forty-five days beyond the final bid validity period.</p> <p>vi. If EMD is forfeited for any reason, the concerned bidder may be debarred from participation in the RFPs/tenders floated by BIS in future as per its sole discretion.</p> <p>vii. Registered MSEs &amp; Start-ups (Micro and Small enterprises (MSEs) as defined in MSE procurement policy issued by Department of MSME or are registered with the Central Purchase organisation or the concerned ministry or department or start-ups as recognised by the Government) are exempted from payment of EMD provided proof of registration is submitted.</p> <p><b>PERFORMANCE SECURITY DEPOSIT</b></p> <p>viii. The successful bidder will have to submit a Performance Security equivalent to 10% of the total order in the form of online payment in an acceptable form; in favour of BIS, New Delhi. Performance Security should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. For the purpose of online payment of Performance Security, the bank details of the BIS are as follows:</p> <ul style="list-style-type: none"> <li>Syndicate Bank, Bureau of Indian Standards, 9 Bahadur Shah Zafar Marg, New Delhi.</li> </ul>	

<ul style="list-style-type: none"> <li>IFSC/NEFT Code: SYNB0009084, Account No.: 90841010000018, Email id: dac@bis.gov.in, PAN No. AAATB0431G, GSTIN : 07AAATB0431G1ZD</li> </ul> <p>ix. The successful bidder has to renew the performance security on the same terms and conditions for the period up to the contract including extension period, if any.</p> <p>x. Performance Guarantee would be returned only after successful completion of job assigned to them after adjusting/recovering any dues recoverable/payable from/by the Supplier on any account under the contract.</p>	
<b>Address of the issuing Authority</b>	<b>Sc F &amp; Head, Laboratory Policy and Planning Department (LPPD)</b> 9, BSZ Marg, New Delhi-110002 Email: <a href="mailto:clpolicycell@bis.gov.in">clpolicycell@bis.gov.in</a> Phone: <b>011-23230860</b>
<b>Download Start &amp; Bid Submission Start Date &amp; Time</b>	28-05-2020 at 11:00 h
<b>Download End &amp; Bid Submission End Date &amp; Time</b>	17-06-2020 at 15:00 h
<b>Technical Bid opening date &amp; Time</b>	18-06-2020 at 15:30 hrs

1. Bureau of Indian Standards reserves the right to amend or with draw any terms and conditions contained in the tender document or to reject any or all bids without giving any notice or assigning any reason. The decision of issuing authority in this regard shall be final.
2. The bidder can submit his technical and financial bid along with applicable EMD for one or more number of equipments separately. The evaluation of technical and financial bid for each equipment will be carried out separately and L1 bidder will be determined for each equipment separately. The selection process for one equipment will not have any effect on other equipments. BIS reserves the right to proceed with one or more equipments as mentioned in the tender document while cancelling the purchase of one or more number of equipments.
3. Performance security deposit for each equipment will have to be submitted separately by the selected bidder in the manner as detailed above.

-Sd-  
Sc F & Head (LPPD)

## **TENDER DOCUMENT**

### **PART-I: TECHNICAL BID**

#### **A: PRE-QUALIFICATION CRITERIA (PQC)**

1. The bidder shall be PSU/ autonomous / public /private limited / Partnership/ Proprietorship / any other firm having been in business in India for the last three calender years for supply of the same/similar equipment. The documents authenticating the establishment of the firm shall be submitted.
2. The bidder shall have supplied, installed and commissioned at least three such same/ similar equipment in India and one of them should be in the last three years. Additionally, the list of customers shall also be enclosed.
3. The bidder shall enclose copies of purchase orders/letters of satisfaction from buyers or any other document as a proof of supply of same / similar equipment to Govt. or private customers with the minimum value of order.
4. The bidder shall submit copies of audited balance sheets of last three years.
5. The bidder shall enclose valid proof of tax registrations as applicable to them such as GST/ PAN or any other registration for taxation purpose (for Indian Bidders). In case of foreign companies, bidders shall enclose valid proof of tax registrations from their own country.
6. The bidder should not have been blacklisted.
7. The bidder should not have earlier withdrawn from any tendering process of BIS.
8. The Bidder shall be willing to provide after sales support through a combination of warranty and comprehensive annual maintenance contract for a period of 6 years as per mutually worked out terms and conditions

**Note:** The bidder shall enclose all requisite documents self attested as specified in the **checklist**. The bidder must fill the checklist enclosed with relevant details.

### **Checklist for Pre-Qualification Criteria (PQC)**

Bidders must fill this check list with a **tick (√)** in the boxes in the right hand column. Relevant document, as per the checklist, shall also be enclosed with the technical bid.

<b>S No.</b>	<b>Requirement</b>	<b>Document submitted</b>	<b>Check box</b>
1.	Bidder is	1. Original Equipment Manufacturer 2. Dealer/ agency/ supplier/ Direct Importer	1. <input type="checkbox"/> 2. <input type="checkbox"/>
2.	Bidder is based in	1. India 2. Abroad	1. <input type="checkbox"/> 2. <input type="checkbox"/>
3.	The bidder is a public undertaking/ autonomous body/ public limited / private limited / Proprietorship Company / firm	1. PSU/Autonomous 2. Limited/ Private Limited 3. Proprietary / Partnership firm/LLP 4. Others (specify .....)	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/>
4.	Enclose applicable documents of establishment of firm - Certificate of Incorporation - Authorization letter from Principals - Partnership Deed/LLP - Proprietary Details - Others (specify .....)	1. Yes, details enclosed 2. No, details not enclosed	1. <input type="checkbox"/> 2. <input type="checkbox"/>
5.#	Enclose applicable documents of Tax Registration: - GST - PAN - Others (specify .....)	1. Yes, details enclosed 2. No, details not enclosed	1. <input type="checkbox"/> 2. <input type="checkbox"/>
6	Enclosed statements of turnover per year for last three successive years.	1. Yes, details enclosed 2. No, details not enclosed	1. <input type="checkbox"/> 2. <input type="checkbox"/>
7.	Enclose copies of audited Balance Sheet for last three years	1. Yes, details enclosed 2. No, details not enclosed	1. <input type="checkbox"/> 2. <input type="checkbox"/>
8.	List of customers attached	1. Yes, details enclosed 2. No, details not enclosed	1. <input type="checkbox"/> 2. <input type="checkbox"/>
9.	Enclosed letter of satisfaction from buyers or purchase orders or any other document from customers whom same / similar equipment was supplied.	1. Yes, details enclosed 2. No, details not enclosed	1. <input type="checkbox"/> 2. <input type="checkbox"/>
10	Whether Bidder is willing to provide after sales support through a combination of warranty and comprehensive annual maintenance contract for a period of 6 years as per mutually worked out terms and conditions	1. Yes, willing to provide 2. No, not willing to provide	1. <input type="checkbox"/> 2. <input type="checkbox"/>
11	Whether withdrawn from tendering process of BIS on an earlier occasion	1. Yes 2. No	1. <input type="checkbox"/> 2. <input type="checkbox"/>
12	Whether blacklisted	1. Yes 2. No	1. <input type="checkbox"/> 2. <input type="checkbox"/>

13.##	Had earlier supplied equipment/ service to BIS	1. Yes 2. No	1. <input type="checkbox"/> 2. <input type="checkbox"/>
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**# - This is for Indian bidders. In case of foreign companies, bidders shall enclose valid proof of tax registrations from their own country.**

**## - This is an additional information.**

## **I Availability of Tender Document:**

The Tender document may also be downloaded from the website of the Bureau ([www.bis.gov.in](http://www.bis.gov.in)) and the CPP Portal.

The bidder shall bear all costs associated with the preparation and submission of its tender. The Bureau shall, in no case, be responsible or liable for these costs, regardless of the conduct or the outcome of the Bidding process.

## **II Language of Bid/Contract:**

The language of the Bid shall be in English/Hindi and all correspondences etc. shall conform to English/Hindi language.

## **III Last Date for Submission**

Tenders have to be submitted online on CPP Portal (<https://eprocure.gov.in/eprocure/app>). It shall be the responsibility of the bidder / tenderer to ensure that tender is submitted on before the deadline of submission prescribed.

Submission of Tenders shall be closed on CPP Portal mentioned earlier at the date & time of submission prescribed after which no bidder shall be able to submit the Tender.

It shall be the responsibility of the bidder / tenderer to ensure that his tender is submitted online on the CPP Portal (<https://eprocure.gov.in/eprocure/app>) before the deadline of submission. BIS will not be responsible for non-receipt of tender documents due to any delay or loss etc.

## **IV Manner of Submission of Bid**

Bids shall be submitted online only at CPP Portal.

Bidders are advised to follow the instructions provided in the 'Instructions to the Contractors/Bidder for the e-submission of the bids online through the Central Public Procurement Portal. A set of instructions for online bid submission are enclosed.

Bid documents may be scanned with minimum 100 dpi with black and white option which helps in reducing size of the scanned document.

Bidder who has downloaded the tender from the BIS website and the Central Public Procurement Portal shall not tamper/modify the tender form including downloaded price bid template in any manner. In case if the same is found to be tempered/modified in any manner, bid will be completely rejected and EMD would be forfeited and Bidder may be banned from doing business with BIS.

E-mail or fax submission shall not be considered.

## **V Contents of the bid document**

The bidders shall submit their bids in two parts, one part of the bid shall be **Technical Bid** and second part **Financial Bid**.

## **VI BID Format**



a) Price Schedule(s) as per the BoQ format filled up with all the relevant information to be uploaded in the form of BOQ\_PriceBid.xls.

The price bid format is provided as BoQ\_PriceBid.xls along with this Tender Enquiry Document at <https://eprocure.gov.in/eprocure/app>. Bidders are advised to download this BoQ\_XXXX.xls as it is and quote their offer/rates in the permitted column and upload the same in the commercial bid. The wages quoted shall be inclusive of the bonus payable by the contractor to the technical persons and the administrative charges (if any) deployed in the Bureau. **Bidder shall not tamper/modify downloaded price bid template in any manner.** In case if the same is found to be tempered/modified in any manner, tender will be completely rejected and tenderer is liable to be banned from doing business with the Bureau.

b) The authorized signatory of the bidder must digitally sign the bid. Bid sent by fax/email shall not be considered.

## **B: INSTRUCTIONS TO BIDDERS (FOR STRICT COMPLIANCE)**

### **I DISCLAIMER**

The information contained in the Tender Document, provided by the Bureau, is for information of the Bidders to assist them in formulation of their bids. Each Bidder can conduct their own investigation and analysis before submission of the bid. The Bureau shall not incur any liability, whatsoever, with regard to the completeness of the information contained in the Tender Document that the Bidder may require for submission of the bid. The Bureau reserves the right to amend any condition of the Tender Document through publication of a Corrigendum, besides rejection of any or all the bids received, if the Competent Authority of the Bureau decides so.

### **II ONLINE BID SUBMISSION**

The bidder can bid for one or more than one equipment. The bidder has to bid for each equipment separately and provide EMD amount mentioned for each equipment separately for which he is submitting his bid.

The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal. More information useful for submitting online bids on the CPP Portal may be obtained at: <https://eprocure.gov.in/eprocure/app>.

Bidder should be responsible for registering his company at Central Public Procurement Portal and seeking all necessary approvals required to upload the bid.

The THE BUREAU reserves the right to amend the document, tentative schedule and critical dates. It is the sole responsibility of prospective bidders to go through Central Public Procurement Portal / THE BUREAU Website from time to time for any updated information.

### **III REGISTRATION ON CPP PORTAL**

- i. Bidders are required to enrol on the e-Procurement module of the Central Public Procurement Portal (URL: <https://eprocure.gov.in/eprocure/app>) by clicking on the link “Online bidder Enrolment” on the CPP Portal which is free of charge.
- ii. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- iii. Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
- iv. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra etc.), with their profile.
- v. Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
- vi. Bidder then logs in to the site through the secured log-in by entering their user ID /password and the password of the DSC / e-Token.

#### **IV SEARCHING THE TENDER DOCUMENT**

- i. There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.
- ii. Once the bidders have selected the tenders they are interested in, they may download the required documents / tender Annexes. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.
- iii. The bidder should make a note of the unique Tender ID assigned to each tender; in case they want to obtain any clarification / help from the Helpdesk.

#### **V PREPARATION OF BIDS**

- i. Bidder should consider any corrigendum published on the tender document before submitting their bids.
- ii. Bidder should go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.
- iii. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / Annex and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.
- iv. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. GST/PAN, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" or "Other Important Documents" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

#### **VI SUBMISSION OF BIDS**

- i. Bidder should log into the site well in advance for bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
- ii. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
- iii. Bidder has to select the payment option as "offline" to pay the EMD as applicable and enter details of the instrument. Bidder should pay the EMD as per the instructions specified in the tender document. The details of the NEFT/online instrument, should tally with the data entered during bid submission time. Otherwise the uploaded bid will be rejected. The EMD amount will be returned to the unsuccessful Bidders as per the provisions of GFR. It will be returned to the successful Bidder after receipt of the Performance Security.

**Forfeiture of EMD:** The Bid Security / Earnest Money deposited is liable to be forfeited if the tenderer withdraws or amends or impairs or derogates the offer in any respect within the period of

validity of the tender or if the successful Bidder does not pay the Performance Security in the prescribed time limit or fails to sign the Agreement after the award of Contract.

- iv. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it, enable Macro in the excel sheet and complete the coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.
- v. The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
- vi. All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128-bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- vii. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- viii. Upon the successful and timely submission of bids (i.e. after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
- ix. The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

## **VII ASSISTANCE TO BIDDERS**

- i. Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
- ii. Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk Nos. 0120-4200462, 0120-4001002

## **VIII TERMS & CONDITION**

- i. The Invitation for Bids is to be uploaded on two bids basis i.e. Technical Bid and Financial Bid. The bidder can bid for one or more than one equipment. The EMD amount for each equipment is, as detailed in Annex 3. The bidder has to bid for each equipment separately and provide EMD amount mentioned for each equipment separately for which he is submitting his bid.
- ii. It is the responsibility of the Bidder to ensure that the bids are up loaded on time within the deadline through [www.eprocure.gov.in](http://www.eprocure.gov.in) A scanned copy of the EMD submitted needs to be uploaded at the Central Public Procurement Portal and the original instrument of EMD shall be submitted before the closing date and time 17-06-2020, till 15:00 h. to Sc F & Head (LPPD), 9, Bahadur Shah Zafar Marg, New Delhi-110002. Registered Micro & Small Enterprises (MSEs) as defined in MSEs Procurement Policy, 2012 issued by Department of Micro, Small & Medium Enterprises (MSME) or as registered with the Central Purchase Organisation or the concerned Ministry or Department or Start-ups recognized by Department of Industrial Policy and Promotion (DIPP) are exempted from

payment of EMD on production of valid certificate of registration with the authority/agency as indicated in the policy.

- iii. All bids shall remain valid for 180 days from the last date of submission of bids.
- iv. The BIS reserves the right to solicit additional information from Bidders.
- v. The THE BUREAU reserves the right to accept the whole, or part of or reject any or all bids without assigning any reasons and to select the Bidder(s) who, in the sole opinion, best meet the interest of the THE BUREAU.
- vi. Although negotiations are severely discouraged, the THE BUREAU also reserves the right to negotiate with the bidders placed as L1 bidder in the interest of the THE BUREAU.
- vii. The THE BUREAU reserves the right not to accept bid(s) from agencies resorting to unethical practices or on whom investigation/enquiry proceedings have been initiated by Government investigating Agencies/Vigilance Cell.
- viii. All information contained in this tender/bid, or provided in subsequent discussions or disclosures, is proprietary and confidential. No information shall be shared by the bidder with any other organizations/agencies.
- ix. The successful bidder will submit the supply plan to THE BUREAU.
- x. The **Financial bid will be opened** on a date, to be fixed later, for the successful bidders in the technical bid. Authorized representative of the bidder with an authority letter may remain present on the scheduled date and time.
- xi. The bid along-with all requisite documents must **be signed and stamped by the authorized person**, failing which the bid shall be liable for rejection.
- xii. The Head (LPPD/ Laboratory), THE BUREAU reserves the right to accept or reject any bid or all the bids without assigning any reason thereof.
- xiii. **Process to be confidential:**  
Information relating to the examination, evaluation and comparison of Bids and the award of a Contract shall not be disclosed to Bidders or any other person not officially concerned with such process until the award to the successful Bidder has been announced.
- xiv. Any kind of canvassing in regard to the offered equipment after submitting bid shall be treated as disqualification.
- xv. **Special Conditions:** The Indian Agent, if submitting the quotation on behalf of their Principal (i.e. Foreign Supplier), shall ensure and submit the following:
  - i) Copy of the Agency Agreement with the foreign Principal.
  - ii) The firm shall take care of after sales service and requisite spares made available during the lifetime of the equipment, after expiry of the Guarantee / Warranty period, also.
  - iii) The bank charges for opening of the Letter of Credit out side India are to be borne by the supplier.
- xvi. **Rates how to be quoted:**  
Cost of the items should be mentioned clearly in the **Part-II: Financial Bid** only. The following details need to be included:
  - a. Price break-up of main equipment, accessories. Consumables, spares, fixtures (whichever is applicable) to be supplied by the bidder. Please quote unit rate for each item in Indian Rupees/ USD/ EURO (whichever is applicable). The rates quoted shall be on CIF basis (cost insurance and freight) on door delivery basis.
  - b. Rates quoted should specifically mention GST/other taxes-duties, as applicable. In absence of any such stipulation, it will be presumed that the prices include all Taxes/charges and no claim for the same shall be entertained.
  - c. Please quote your rates, other charges, applicable taxes and duties in the format prescribed in **Part-II: Financial Bid** (Please refer page 18).
  - d. The equipment is required to be supported for performance for six years, i.e., three years of warranty plus three years of **CAMC** (Comprehensive Annual Maintenance Contract). If the warranty offered by the bidder is less than three years, then the bidder shall quote the CAMC charges, year wise, for the remaining period of warranty, plus for fourth, fifth and sixth years. Please refer (B) of **Part-II: Financial Bid**

*Financial bid shall be evaluated on the total price quoted, which is a combination of unit price of the equipment and CAMC charges upto six years of operation of equipment. The payment will be made for unit price of the equipment which will cover the warranty period also. The CAMC charges as quoted in the financial bid at (B) of Part -II shall be payable on yearly basis after CAMC starts.*

e. Prices shall be quoted in Indian Rupees (INR)/ USD/ EURO (whichever is applicable). In case the rates are quoted in the foreign currency, **the conversion rate to INR (Reserve Bank of India rate) shall be applicable as on the last date of submission of tender.** Evaluation of the financial bid shall be done on the basis of price in INR on the bid closing date.

f The rates quoted shall be **valid for a period of one year** from the date of opening of the financial bid of the tender.

g. The successful bidder is responsible for Packing, Forwarding, Freight & Insurance, Customs Clearance, Delivery at site and Installation, Commissioning and Training of THE BUREAU personnel (at least 2 personnel per instrument) in a satisfactory manner.

h. The Agency Commission to the Indian Clearing Agent will not be paid by the THE BUREAU and the same would be borne by the supplier. THE BUREAU shall not provide Custom Duty Exemption Certificate at the time of Custom Clearance and the supplier has to obtain customs clearance and deliver the goods at specified location (s).

i. The bidder is expected to work out his rates keeping in view the technical specifications as per Annexure-3 of Technical bid & conditions mentioned clearly and arrive at the amount to be quoted. The bidder shall be deemed to have satisfied itself before bidding as to the correctness and sufficiency of its bid and of the rates and prices quoted in the attached form for financial bid (Part-II), which rates and prices shall, except as otherwise provided, cover all its obligations under the Tender and all matters and things necessary for proper fulfilling his obligations under the Tender. The financial bid shall clearly indicate all taxes including local taxes, etc. to be paid by the bidder for the goods to be supplied at specified places and any claim for extra payment on any such account shall not be entertained.

j. **The price quoted by the bidder shall be applicable for the repeat order(s), if repeat orders are placed with the supplier.** However, THE BUREAU reserves the right, not to place the repeat order.

xvii. **Execution of Agreement:** It shall be incumbent on the successful bidder to execute the Agreement, as per Annexure 6, on a non-judicial stamp paper of appropriate value to be purchased in New Delhi before commencement of the supply of the laboratory equipment and pay stamp duty, legal and statutory charges for the Agreement, if any, as applicable on the date of the execution. Please read carefully, the conditions of contract as given in **Part-III: Conditions of contract.**

xviii. The bidder can submit his technical and financial bid along with applicable EMD for one or more number of equipments separately. The evaluation of technical and financial bid for each equipment will be carried out separately and L1 bidder will be determined for each equipment separately. The selection process for one equipment will not have any effect on other equipments. THE BUREAU reserves the right to proceed with one or more equipments as mentioned in the tender document while cancelling the purchase of one or more number of equipments.

xix. In case, more than one bidder becomes L1 jointly and there are more than one equipment of that kind to be supplied, the purchase order will be split in the successful bidders.

xx. Customs Duty Drawback- If any of the contracted stores are, on exportation, entitled to a drawback of customs duty in respect of themselves or the raw materials involved in their manufacture, the price to be charged by the Seller should be the net price after the deduction of all the entitled custom duty drawbacks.

xxi. Country of Origin: All goods and services to be supplied and provided under the contract shall have the origin in India or in the countries with which the Government of India has trade relations. The

word “origin” incorporated in this clause means the place from where the goods are mined, cultivated, grown, manufactured, produced or processed or from where the services are arranged.

xxii. The insurance cover shall be obtained by the Supplier in its own name and not in the name of the Purchaser or its Consignee.

xxiii. Software and Software Upgrades :

The Supplier shall agree to provide copies of as-built software in executable code that are installed in the system at all levels. It shall also state the Hardware that needs to be in place for implementation ensuring that the Equipment/ Instrument un-availability is minimal. The Supplier shall also comply and guarantee software upgrades for the service life of the Equipment/ Instrument. Taking into account the operational requirements of the Purchaser, there may be a need to customize some portion of the software. Supplier should agree for such customization, which is expected to be limited, at no extra cost. Any software upgrades developed by the Supplier during the warranty and the post warranty period should be made available to the Purchaser at no extra cost and should be delivered and installed in a prompt and efficient manner. The Supplier should install and train the operator with software upgrades. The software provided should be able.

xxiv. **Force Majeure:** Force Majeure (FM) means extraordinary events or circumstance beyond human control such as an event described as an act of God (like a natural calamity) or events such as a war, Strike, riots, crimes (but not including negligence or wrong-doing, predictable/ Seasonal rain and any other events specifically excluded in the clause). An FM clause in the contract frees both parties from contractual liability or obligation when prevented by such events from fulfilling their obligations under the contract. An FM clause does not excuse a party's non-performance entirely, but only suspends it for the duration of the FM. The supplier has to give notice of FM as soon as it occurs and it cannot be claimed ex-post facto. There may be a FM situation affecting Bureau of Indian Standards only. In such a situation, the Bureau of Indian Standards is to communicate with the supplier along similar lines as above for further necessary action. If the performance in whole or in part or any obligation under this contract is prevented or delayed by any reason of FM for a period exceeding 90 (Ninety) days, either party may at its option terminate the contract without any financial repercussion on either side.

xxv. **Preference to ‘Make in India’:** The process will also be subjected to the provisions of ‘Public Procurement (Preference to Make in India) Order 2017 and the same will be followed. The bidder, however, shall meet the requirements of technical bid for availing preference under the make in India order.

xxvi. **Integrity Pact:** For successful supplier, it is essential to sign the integrity pact with the THE BUREAU, given at annexure-7. The pact essentially envisages an agreement between the prospective suppliers/ bidders and the buyer, committing persons/ officials on both sides, not to resort to any corrupt practices in any aspect/ stage of the contract. Only those suppliers/ bidder, who commit themselves to such a pact with the buyer, would be considered competent to participate in the bidding process. In other words, entering into this pact is a preliminary qualification.

**C: STANDARD FORMS TO BE UTILIZED BY THE BUREAU AND THE BIDDERS.**

- a. **Annexure-1**                      **Details to be furnished by  
Bidders Details to be furnished by the bidders**
- b. **Annexure-2**                      **Statement regarding the deviations from the clauses of  
  
the tender document**
- c. **Annexure-3**                      **Technical Specification**
- d. **Annexure-4**                      **Technical compliance statement by the bidder**



## **Annexure-1**

### **Details to be furnished by the bidders**

- i. Name of the bidder:
- 2 Details Registration/Import licence if any with validity date:
  - i. Address for Communication:
  - i. Telephone No.:  
Landline:..... Mobile:.....
  - i. E-mail:
  - i. Manufacturers Name and Address (if different);
7. Bank Account Details:  
Name of the bank:..... A/c no. ....  
IFSC code ..... Type of A/c.....
- i. Name and designation of the person authorized to sign the documents:
7. PAN, TIN Number of the bidder:
- 8 Service Tax Registration No.:
  - i. Details of EMD  
Draft Number :..... Date: .....  
Name of the Bank: ..... Payable at: .....

This is to certify that the above facts are true to the best of my/our knowledge and belief. I/We have read and understood the terms and conditions of the Tender document.

I/We give an undertaking to abide by these terms and conditions of the tender document.

Name and Signature of the bidder

Seal of the Bidder

Date

**Annexure-2**

**Statement regarding the deviations from the clauses  
of the tender document:**

<b>S No.</b>	<b>Tender clause no.</b>	<b>Details of deviation</b>	<b>Justification, if any</b>

**Annexure-3**

**List of equipment**

<b><u>S No.</u></b>	<b><u>Equipment</u></b>	<b><u>EMD (INR)</u></b>	<b><u>Number of equipment required</u></b>	<b><u>THE BUREAU lab where supply is to be made</u></b>	<b><u>Technical Specification</u></b>
<b><u>1</u></b>	Sub-micron Particle Filtration Efficiency Testing equipment for surgical masks (IS 16289:2014)	Rs. 60,000/-	1	Central Laboratory, Sahibabad	Annexure-3A
<b><u>2</u></b>	Leakage Testing Equipment for filtering half masks (IS 9473:2002)	Rs. 3,50,000/-	1	Central Laboratory, Sahibabad	Annexure 3B
<b><u>3</u></b>	Bacterial filtration efficiency apparatus for surgical masks (IS 16289:2014)	Rs. 72,000/-	1	Central Laboratory, Sahibabad	Annexure 3C

<b><u>4</u></b>	Impact Penetration Tester for Surgical gowns and drapes and shoe covers (IS 17334:2019 and IS 17349:2020)	Rs. 6,000/-	1	Central Laboratory, Sahibabad	Annexure 3D
<b><u>5</u></b>	Penetration Test Cell with Air Pressure Source for Surgical gowns and drapes and shoe covers (IS 17334:2019 and IS 17349:2020)	Rs. 12,000/-	1	Central Laboratory, Sahibabad	Annexure 3E
<b><u>6</u></b>	Particle Release tester for Surgical gowns and drapes and shoe covers (IS 17334:2019 and IS 17349:2020)	Rs. 14,000/-	1	Central Laboratory, Sahibabad	Annexure 3F
<b><u>7</u></b>	Non-Contact type Extensometer compatible with existing TTM	Rs. 24,000/-	1	Central Laboratory, Sahibabad	Annexure 3G
<b><u>8</u></b>	Bursting Strength Tester for Surgical gowns and drapes and shoe covers (IS 17334:2019 and IS 17349:2020)	Rs. 10,000/-	1	Central Laboratory, Sahibabad	Annexure 3H
<b><u>9</u></b>	Wet Microbial Penetration Test Setup for Surgical gowns and drapes and shoe covers (IS	Rs. 8,000/-	1	Central Laboratory, Sahibabad	Annexure 3I

	17334:2019 and IS 17349:2020)				
<b><u>10</u></b>	Vapour Transmission Rate test Setup for Surgical gowns and drapes and shoe covers (IS 17334:2019 and IS 17349:2020)	Rs. 16,000/-	1	Central Laboratory, Sahibabad	Annexure 3J
<b><u>11</u></b>	Blender for Surgical gowns and drapes and shoe covers (IS 17334:2019 and IS 17349:2020)	Rs. 10,000/-	1	Central Laboratory, Sahibabad	Annexure 3K
<b><u>12</u></b>	Centrifuge for Surgical gowns and drapes and shoe covers (IS 17334:2019 and IS 17349:2020)	Rs. 12,000/-	1	Central Laboratory, Sahibabad	Annexure 3L
<b><u>13</u></b>	Differential Pressure test for surgical masks (IS 16289:2014)	Rs. 20,000/-	1	Central Laboratory, Sahibabad	Annexure 3M
<b><u>14</u></b>	Splash Resistance test for surgical masks (IS 16289:2014)	Rs. 20,000/-	1	Central Laboratory, Sahibabad	Annexure 3N
<b><u>15</u></b>	Carbon Di Oxide Content Test for filtering half masks (IS 9473:2002)	Rs 24,000/-	1	Central Laboratory, Sahibabad	Annexure 3O
<b><u>16</u></b>	Optical Requirements for eye protection gears (IS 5983: 1980)	Rs. 12,000/-	1	Central Laboratory, Sahibabad	Annexure 3P

<b><u>17</u></b>	Stability Test for eye covers (IS 5983: 1980)	Rs. 10,000/-	1	Central Laboratory, Sahibabad	Annexure 3Q
<b><u>18</u></b>	Transmittance Test for eye covers (IS 5983: 1980)	Rs. 12,000/-	1	Central Laboratory, Sahibabad	Annexure 3R

**Annexure 3A (KINDLY SEE AT THE END OF DOCUMENT)**

**Technical Specification of ..... test equipment for .....**

<b>S.No.</b>	<b>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</b>	<b>Requirement</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
1.		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

**Annexure-4**

**Technical compliance statement by the bidder for ..... Test equipment for  
.....**

<b>Sl.No.</b>	<b>Technical Specification (Annexure 3)</b>	<b>Quoted details by the bidder</b>	<b>Deviation from col (2), if any</b>	<b>Remarks</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>

**Note:**

**Do not mention “We Comply or Complied with or yes” in your response at col (3),  
Quote the actual specifications of equipment to be supplied in col (3).  
Deviations, if any, from col (2) be quoted in col (4).**

## PART-II: FINANCIAL BID

- i) The financial bid will be submitted in the following form which can be downloaded from CPPP website. Bidders are advised to quote their offer/ rates in therelevant column and and upload the same in the financial/ commercial bid.
- ii) Financial bid shall be evaluated on the unit price quoted + custome duty + surcharge/ cess on custom duty+ CAMC charges upto six years of operation of equipment+ other taxes including IGST (for foreign suppliers) and unit price quoted + CAMC charges upto six years of operation of equipment + other taxes including GST (for 24unctionin suppliers). The payment will be made for unit price of the equipment (which will cover the warranty period also), custome duty with surcharge/ cess on custom duty (if applicable) and IGST / GST. The CAMC charges as quoted in the financial bid at (B) of Part -II shall be payable on yearly basis after CAMC starts.
- iii) The format for submitting **Financial Bid** is given below:

### (A) UNIT PRICE

S No.	Item description and item code	Component As per Technical Specification (Annexure –3)	Unit Price (in INR/ USD/EURO) Exclusive of all Taxes at designated Delivery Point	Price in words	Custom Duty, in % of unit price to be entered by bidder	Surcharge on Custom Duty, to be entered by the bidder	IGST (for imported item) in % of unit price+ Custom duty+ Surcharge or GST (for indigenous item) in % of unit price to be entered by the bidder	Total Unit Price 24uncti oni of taxes (in INR/ USD/ EURO)	Period of Warranty (1/2/ 3 years)
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	[=(iv)+(v)+(vi)+(vii)+(viii)] (ix)	(x)
1.									
2									
3									

### (B) Comprehensive Annual Maintenance Contract (CAMC) Charges (in INR):

S No.	Component	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year	5 <sup>th</sup> year	6 <sup>th</sup> year
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1	CAMC *					
2.	Applicable Taxes					
3.	Total					

**Total Price of Bid (A+B) (Inclusive of taxes) (In Words)**

.....  
.....  
....

**Signature of bidder**

**Name & Address**

**Date**

**Note:**

- i) Discount or any other offers affecting the package price must be mentioned here only. Discount or any other offers affecting the package price mentioned at any other place of the bid will not be considered.*
- ii) Bids shall be evaluated based on total price (in INR) with taxes as applicable on the date of closing of Bid in case financial bid is filled in USD/Euro.*
- iii) \* CAMC for 2<sup>nd</sup> and 3<sup>rd</sup> year to be quoted if the warranty period is for one year*

### **PART-III: CONDITIONS OF CONTRACT**

#### **a) CONTRACTOR:**

‘Contractor’ shall mean the individual or firm or company whether incorporated or not, has qualified in bidding process and undertaking the Contract and shall include legal representatives of such individual or persons composing such firm or unincorporated company or successors of such firm or company as the case may be and permitted assigns of such individual or firm or company.

#### **b) PARTIES TO THE CONTRACT:**

The parties to the contract shall be the Supplier/ Contractor (whose offer is accepted by THE BUREAU) and THE BUREAU.

The person signing the offer or any other document forming the part of Contract on behalf of other persons of a firm shall be deemed to have due authority to bind such (person/s) or the firm as the case may be, in all matters pertaining to the Contract. If it is found that the person concerned has no such authority, THE BUREAU may, without prejudice to any other Civil/Criminal remedies, terminate the Contract and hold the signatory and / or the firm liable for all costs and damages for such termination.

#### **c) PERFORMANCE SECURITY**

**i) For Foreign Supplier:** The successful bidder shall furnish within 15 days of placement of the order an unconditional Performance Bank Guarantee from a Nationalized/ scheduled Bank for 10% of the order value. Performance Security should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. On acceptance of this condition and submission of Bank Guarantee, the Letter of Credit will be opened for 100% order value at THE BUREAU HQ/ by concerned lab. If the firm fails to submit the same, the Contract shall be deemed as terminated and the firm’s EMD will be forfeited. Performance Security will be furnished in the form of DD/PO favouring BUREAU of INDIAN STANDARDS (payable at .....)/Performance Bank Guarantee as per format indicated in Annexure-5.

**ii) For Indian Supplier:** The successful bidder shall submit, within 15 days of the placement of the order, an unconditional Performance Bank Guarantee from a Nationalized/ scheduled Bank for 10% of the order value, as per format indicated in Annexure-5. Performance Security will remain **valid for a period of sixty days beyond** the date of completion of all contractual obligations of the supplier including warranty obligations.

Any amount due/recoverable from the Supplier/ Contractor under the terms of this Contract or any other account, may be deducted from the amount of Performance Security. In case, the amount of Performance Security is reduced by reason of any such deduction, the Supplier/ Contractor shall, within fifteen (15) days of receipt of notice of demand from THE BUREAU, make good the deficit. In case, security is deposited by way of bank guarantee by the Supplier/ Contractor, then any penalty for damages liquidated or un-liquidated or for any breach or failure or determination of Contract, not previously paid to THE BUREAU, shall immediately on demand be paid by the said bankers to THE BUREAU under and in terms of the said guarantee.

If during the term of this Contract, the Contractor is in default of the due and faithful performance of its obligations under this Contract, or any other outstanding dues by the way of fines, penalties and recovery of any other amounts due from the Contractor, THE BUREAU shall, without prejudice to its other rights and remedies hereunder or at the Applicable Law, be entitled to call in, retain and appropriate the Performance Security.

Nothing herein mentioned shall debar THE BUREAU from recovering from Contractor by a suit or any other means any such losses, damages, costs, charges and expenses as aforesaid, in case the same shall exceed the amount of the Performance Security.

The Performance Security shall be retained until all disputes, if any, between both the parties have been settled to the entire satisfaction of THE BUREAU. The Performance Security shall be returned to the Contractor by THE BUREAU within sixty days following the Completion Date or Termination Date of this Contract provided that there are no outstanding claims of THE BUREAU on the Contractor.

**d) CONTRACT DOCUMENTS:**

The several Contract documents forming the Contract shall be taken as mutually explained to one party by the other, but in case of ambiguities or discrepancies the same shall be explained and harmonized by the Authorized Officer of THE BUREAU who shall issue to the Contractor necessary instruction thereon and in such event unless otherwise provided in the Contract the priority of the documents forming the contract shall be as follows:

- i) The Agreement
- ii) The terms and conditions of the Contract
- iii) Tender Notice and Tender Document
- iv) Purchase order or Letter of Acceptance
- v) Any other correspondence exchanged between the parties in connection with the contract.
- vi) The Contractor's Offer

**5. QUANTITY OF GOODS or PLACE OF SUPPLY or PERSONS WHO CAN PLACE ORDERS**

The **Testing Equipments** shall be supplied at Central Lab, Sahibabad, at the address(s) given below:

- a) Head, Central Laboratory,  
Bureau of Indian Standards  
20/9, Site IV, Sahibabad Industrial Area,  
Sahibabad, District Ghaziabad, (U P.) PIN 201010

Goods Central Laboratory can be ordered by Head of that Central Laboratory only, who is authorized by THE BUREAU to place orders against this Contract. However, the Authorized Officer reserves right not to place repeat orders.

Immediately on receipt of the purchase order (leats within one week of receipt of the purchase order), the contractor or supplier shall intimate the concerned laboratory about the consumables or other additional articles required for correct functioning of the instrument or equipment, so that timely installation and commissioning can be done, and no time is lost in completion of such formalities after receipt of the instrument or equipment.

**6 TRANSPORTATION:**

The supplier is required to ensure having an import license for the equipment quoted where applicable as per GOI guidelines. The Goods shall be delivered at the destinations specified in Clause 8 below and shall include loading, unloading and transportation. **The Goods damaged during transportation shall have to be replaced at Contractor's cost.** THE BUREAU will not provide Customs Duty Exemption Certificate for imported items as applicable and the successful bidder shall be responsible for necessary customs clearance.

**7. QUALITY OF GOODS:**

All Goods to be supplied by the Contractor shall be in conformity with the Technical specifications as laid down in Annexure-3 of this bid.

## **8 CONSIGNMENT DESTINATION:**

**For the destination mentioned in the purchase order:**

Head, Central Laboratory,  
Bureau of Indian Standards  
20/9, Site IV, Sahibabad Industrial Area,  
Sahibabad, District Ghaziabad, (U P.) PIN 201010

**9. INSTALLATION AND COMMISSIONING:** Installation and commissioning of the equipment will be done by the supplier **FREE OF CHARGE** at the consignee's premises. The supplier has to arrange for labour and others.

## **10 WARRANTY**

10.1 The equipment along with all critical components or accessories is to be guaranteed for trouble free performance for a **minimum period of three years after installation**. If the warranty period is less than three years, the Comprehensive Annual Maintenance Contract Charges for the remaining period (three years – the actual warranty period quoted) shall be added to the cost of equipment for the purpose of evaluation of the financial bid.

10.2 The defects, if any, during the warranty period shall be rectified free of charge by arranging free replacement at site, wherever necessary. **The last six months of the warranty period shall be free of complaints, failing which the warranty period will get extended by another six months.**

## **11. FREE TRAINING**

Training, free of cost will be provided by the supplier to **at least two Bureau officials** for testing, routine maintenance and smooth running of the equipment, after installation and commissioning at the location.

## **12. INSPECTION or PRE-DELIVERY INSPECTION**

THE BUREAU reserves the right to carry out predelivery inspection or inspection at the time of delivery. The obligation to supply goods conforming to specification and its successful installation and commissioning shall be on the supplier.

The Authorized Officer shall be entitled to inspect and examine goods intended to be supplied to THE BUREAU either at the factory, godown or at any place(s) where these are lying or from which these are being obtained and the supplier shall provide such facilities as may be required for such inspection and examination. If goods are not found as per specified requirements, purchase order will be revoked and thereafter THE BUREAU shall be free to purchase the goods from the open market. THE BUREAU will not make any payment for any such non-conforming goods.

All goods shall be inspected by THE BUREAU preferably in the presence of supplier or his authorized representative, when the packages are opened in THE BUREAU Labs on delivery and prior to installation. The decision of THE BUREAU shall be binding. Rejected items or goods or 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 or disapproved goods or items or stores. In case of default on the part of the supplier in removing the rejected goods, the

Authorized Officer of THE BUREAU shall be at liberty to have them removed by other means. The Authorized Officer shall have full powers to procure other goods through other means for substituting the rejected goods. All costs, which may be incurred upon such removal and/or substitution, shall be borne by the supplier.

The Authorized Officer shall have full powers to decide about removal of any or all of the goods supplied which are not in accordance with the contract specifications or which do not conform to the samples, if any, approved by THE BUREAU.

### **13. TIME FOR SUPPLY, INSTALLATION AND COMMISSIONING.**

- 13.1 The time allowed for delivery, successful installation and commissioning shall be 8 weeks from the date of purchase order (PO). In case of foreign suppliers, the date of delivery, successful installation and commissioning shall be within 8 weeks of opening of Letter of Credit (LOC).
- 13.2 **Liquidated Damages For Delayed Supply Installation and Commissioning:** Time and date of **Supply Installation and Commissioning of equipments** as stipulated in the order shall be deemed to be the essence of the contract. In case of delay in execution of the order beyond the date of delivery as stipulated in the order or any extensions sanctioned by the Authorized Officer, THE BUREAU may at its option either:-
- 13.3.1 Accept delayed delivery at prices reduced by a sum equivalent to one percent (1%) of the value of any goods not delivered for every week of delay or part thereof limited to a maximum of 10% of the total order value.
- 13.3.2 Cancel the order in part or full and purchase such cancelled quantities from elsewhere on account and at the risk of the bidder, without prejudice to its rights in respect of goods delivered.

### **14. RISK PURCHASE**

In case the Contractor fails to deliver the quantity as stipulated in the delivery schedule, THE BUREAU reserves the right to procure the same or similar Goods from alternate sources at the risk, cost and responsibility of the Contractor.

### **15. IMPOSITION OF FINES or PENALTY**

Subsequent to an order being placed against the quotation received in response to this enquiry if it is found that the goods supplied are not of the right quality or not according to specifications required by THE BUREAU or received in damaged or broken condition or otherwise not satisfactory owing to any reason of which THE BUREAU shall be the sole judge, THE BUREAU shall be entitled to reject the goods, cancel the contract and buy its requirements in the open market and recover the loss, if any, from supplier reserving to itself the right to forfeit the security deposit, if any, furnished by the supplier against the contract. The supplier will make his own arrangements to remove the rejected goods within 30 days of instruction to do so. Thereafter, they will lie entirely at the suppliers risk and responsibilities and storage charges along with any other charges applicable will be recoverable from the supplier.

### **16. TERMS OF PAYMENT:**

A) The Terms of Payment are: The successful bidder shall furnish with in 15 days of placement of the order a Performance Security, from a Nationalized or Scheduled Bank for 10% of the order value. Performance Security should remain valid for a period of 60 days beyond the date of completion of all contractual

**obligations of the supplier including warranty obligations.** On acceptance of this condition and submission of Performance Security, as given in 3 of Part-III, 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's EMD will be forfeited. The Performance Security shall be furnished in the bank account of BUREAU of INDIAN STANDARDS (payable at.....) or Performance Bank Guarantee as per format indicated in Annexure-5.

B) Payment to foreign suppliers:

- i) **Payment for imported items:** 80% payment shall be made by an Irrevocable Letter of Credit established in favour of the supplier at THE BUREAU HQ or by concerned THE BUREAU laboratory, for the order value against the presentation of original shipping documents provided that the Performance Security for 10% of the order value within 15 days of placement of the order is given to THE BUREAU. 20% of the order value of goods received shall be paid within 30 days of receipt of the goods and successful installation, **commissioning & training** upon submission of claim supported by the acceptance certificate issued by the Purchaser along with the Performance Security.
- ii) **Payment for indigenous items:** 100% payment shall be made against delivery, installation, commissioning, training at site and on acceptance as per Purchase Order provided, that the Performance Security for 10% of the order value, within 15 days of placement of the order is given to THE BUREAU.

C) **Payment for Indian Suppliers:** 100% payment shall be made against delivery, installation, commissioning, training at site and on acceptance as per Purchase Order provided, that the Performance Security for 10% of the order value, within 15 days of placement of the order is given to THE BUREAU.

## 17. TAXES

Taxes will be deducted by THE BUREAU wherever applicable.

## 18. INDEMNITY:

The Contractor shall indemnify and keep indemnified THE BUREAU against all losses and claims for injuries or damage to any person or any property whatsoever which may arise out of or in consequence of the Contract and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto under the provisions of various labour laws as amended from time to time.

The Contractor shall indemnify, protect and save THE BUREAU against all claims, losses, costs damages, expenses, action suits and other proceeding, resulting from infringement of any patent, trademarks, copyrights etc. or such other statutory infringements.

## 19. CORRUPT OR FRAUDULENT PRACTICES

THE BUREAU requires that the Bidders under this Bid observe the highest standards of ethics during the procurement and execution of such Contracts.

THE BUREAU will reject a proposal for award if it determines that the Contractor has engaged in corrupt or fraudulent practices before, during or after the period of contract; THE BUREAU will hold the Contractor ineligible to be awarded a contract, either indefinitely or for a period of 24 months from the date of declaring the contractor ineligible if it at any time determines that the Contractor has engaged in corrupt and fraudulent practices in competing for, or in executing the Contract.

## **20. THE BUREAU MAY TERMINATE THE ORDER, IF**

- (a) The Contractor becomes insolvent;
- (b) A receiver, administrator, trustee or liquidator is appointed over a substantial part of its assets;
- (c) Any act is done or event occurs with respect to the Contractor or its assets, which, under any applicable law has substantially similar effect to any of the foregoing acts or events;
- (d) Serious discrepancy in the quality of the Goods is noticed during the inspection.
- (e) Delays in delivery beyond the scheduled date of delivery as stipulated in the order or any extensions sanctioned.
- (f) Delays in installation and commissioning beyond the period stipulated or any extensions sanctioned.
- (g) If the Contractor is in breach of any law or statute governing the supply of Goods or Services;
- (h) The Contractor, in the judgement of the THE BUREAU, has engaged in corrupt or fraudulent practices in competing for or in carrying out the Services under the Contract.
- (i) The Contractor enters into voluntary or involuntary bankruptcy or liquidation.

It shall also be lawful for THE BUREAU to terminate the Agreement at any time without assigning any reason and without being liable for loss or damage which the Contractor may suffer by reason of such termination, by giving the Contractor 15 days notice in writing by THE BUREAU for such termination. Any such termination shall be without prejudice to any other right of the THE BUREAU under the Contract.

If the Contractor decides to terminate the Contract before the end of contract period, the Contractor has to give an advance intimation of at least 60 days. If the Contractor terminates the agreement without prior notice of 60 days, then the entire security deposit will be forfeited.

## **21. PUBLICITY**

Any publicity by the Contractor in which the name of THE BUREAU is to be used, should be done only with the explicit written permission of THE BUREAU.

## **22. JURISDICTION**

No suit or other proceedings relating to performance or breach of Contract shall be filed or taken by the Contractor in any Court of law except the competent Courts having jurisdiction in New Delhi, where headquarter of THE BUREAU is located.

**23. DISPUTE RESOLUTION** - In case of any dispute that cannot be resolved amicably, the same shall be referred to the sole Arbitrator appointed by Director General, Bureau of Indian Standards, whose decision shall be final and binding upon both the Bureau as well as the Applicant. The provisions of the Arbitration and Conciliation Act, 1996, as amended from time to time, shall be applicable

## **24. MODE OF SERVING NOTICE**

Communications between Parties which are referred to in the Contract are effective only when in writing. A notice shall be effective only when it is delivered. All notices shall be issued by the authorized officer of THE BUREAU unless otherwise provided in the Contract. In case, the notice is sent by registered post or speed post to the last known place or abode or business of the Contractor, it shall be deemed to have been served on the date when in the ordinary course of post these would have been served on or delivered to it.

## **25. GOVERNING LANGUAGE**

Governing language for the entire contract and communication thereof shall be English and or Hindi only. In case of any dispute, the English version shall prevail.

**26. LAW:**

The contract shall be governed and interpreted under Indian Laws.

**27. STAMP DUTY**

The Contractor shall bear and pay any stamp duty and registration charges if any, in respect of the agreement to be signed.

**28. AUTHORIZED OFFICER:**

**The Authorized Officer on behalf of THE BUREAU shall be the Head, of the Central Laboratory giving the purchase order. In case of repeat orders by any other BUREAU Laboratory, the Head of concerned BUREAU Laboratory placing the repeat order shall be deemed to be the Authorized Officer in respect of the said order.**

**29. STANDARD FORMS TO BE UTILIZED BY THE THE BUREAU AND THE CONTRACTOR:**

Annexure-5	BANK GUARANTEE BOND
Annexure-6	CONTRACT AGREEMENT FORM

**30. CONFIDENTIALITY**

The bidder shall not divulge or disclose proprietary knowledge obtained while delivering Goods and services under this Contract to any person, without the prior written consent of the Bureau.



**ANNEXURE-5**  
**FORM OF BANK GUARANTEE BOND**

1. In consideration of Bureau of Indian Standards (hereinafter called 'The THE BUREAU') having agreed to exempt \_\_\_\_\_

(hereinafter called "the said Contractor(s)') from the demand under the terms and conditions of an Agreement dated \_\_\_\_\_ made between \_\_\_\_\_ and \_\_\_\_\_ for \_\_\_\_\_

\_\_\_\_\_ (hereinafter called "the said Agreement of **Performance Security** for the due fulfillment by the said Contractor (s) of the terms and conditions contained in the said Agreement, on production of a Bank Guarantee for Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ -

\_\_\_\_\_ Only)  
we, \_\_\_\_\_ {hereinafter referred to as ( indicate the name of the bank)'the bank'} at the request of \_\_\_\_\_

[(Contractor (s))] do hereby undertake to pay THE BUREAU an amount not exceeding Rs. \_\_\_\_\_ against any loss or demand caused to or suffered or would be caused to or suffered by the THE BUREAU by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.

2. We \_\_\_\_\_ do hereby indicate the name of the bank)undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the THE BUREAU of Indian Standards stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by THE BUREAU by reason of breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement or by reasons of the Contractor (s) failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ....
3. We, undertake to pay to THE BUREAU any money so demanded notwithstanding any dispute or disputes raised by the Contractor (s) or Supplier (s) in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor (s) or Supplier (s) shall have no claim against us for making such payment.

4. We, \_\_\_\_\_ further agree that the Guarantee

(indicate the name of Bank)

herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of THE BUREAU under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till the authorized officer of the THE BUREAU (.....Laboratory) certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said

Contractor (s) and accordingly of the said Agreement have been fully and properly carried out by the said Contractor (s) and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the .....we shall be discharged from all liability under this guarantee thereafter.

5. We .....further agree with the THE BUREAU that

(indicate the name of Bank)

THE BUREAU shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time to performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by THE BUREAU against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor (s) or for any forbearance, act or commission on the part of THE BUREAU or any indulgence by THE BUREAU to the said Contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s) or Supplier (s).

7. We, ..... lastly undertake not to revoke this

(Indicate the name of bank)

guarantee during its currency except with the previous consent of THE BUREAU in writing.

Dated the..... day of..... 20

For .....

(indicate the name of bank)

**Annexure-6**

**CONTRACT FORM or AGREEMENT**

THIS AGREEMENT made on this day of between Mors\_\_\_\_\_ (Name and Address of the Contractor) (hereinafter referred to as the CONTRACTOR, which expression shall, unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors and assigns) of the ONE PART and the THE BUREAU of Indian Standards, 9-Bhadurshah Zafar Marg, New Delhi-110002 (hereinafter referred to as the THE BUREAU, which expression shall, unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors and assigns) of the OTHER PART.

WHEREAS the Contractor is a manufacturer or mill or authorized distributor or dealers (Details of business)

AND WHEREAS THE BUREAU is a body corporate, enacted by Parliament . THE BUREAU intends to purchase \_\_\_\_\_, therefore, invited bids through Open Tender enquiry dated \_\_\_\_\_

WHEREAS the Contractor (successful bidder) submitted his bid vide \_\_\_\_\_ in accordance with the bid document and was selected as 'successful bidder' pursuant to the bidding process and negotiation on contract prices, awarded the 'Letter of Acceptance' (LoA) No. \_\_\_\_\_ to the Contractor on \_\_\_\_\_.

BOTH THE PARTIES HERETO agree to abide the terms and conditions as mentioned in:

**“Part-III (Conditions of Contract) of Tender Document”.**

\_\_\_\_\_

(Signature of Contractor or  
Authorized Representative)

Name \_\_\_\_\_

Designation \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

**Seal of the Firm or Company**

**Witness:**

\_\_\_\_\_

(Signature)

Name of Witness \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

(Signature of Authorized Officer of THE BUREAU)

Name \_\_\_\_\_

Designation \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

**Seal of THE BUREAU**

**Witness:**

\_\_\_\_\_

(Signature)

Name of Witness \_\_\_\_\_

Address \_\_\_\_\_

## **Annexure -7**

### **INTEGRITY PACT GUIDELINES**

"The Bureau" and "The supplier" hereby agree not to indulge in any corrupt practices including without limitation any activity or action to influence the transaction on any aspect of contract and commit to take all measures necessary to prevent corruption maintaining complete transparency and fairness in all activities related to the Bureau. Users agree to follow and adhere with the Integrity Pact guidelines as under:

#### **Preamble**

The Bureau values full compliance with all relevant laws of the land, regulations, economic use of resources and of fairness or transparency in its relations with its Contractor (s).

#### **Section 1 Commitments of the Bureau.**

1. The Bureau commits itself to take all measures necessary to prevent corruption and to observe the following principles:

- (a) No employee of the Bureau, personally or through family members, will in connection with the bid for, or the execution of a person, any material or immaterial benefit which the person is not legally entitled to.
- (b) The Bureau will during the bid process treat all bidders with equity and reason. The Bureau will in particular, before and during the bid process, provide to all Contractor(s) the same information and will not provide to any supplier(s) confidential or additional information through which the supplier(s) could obtain an advantage in relation to the process or the contract execution.
- (c) The Bureau will exclude from the process all known prejudiced persons.

2. If the Bureau obtains information on the conduct of any of its employees which is a criminal offence under the IPC or PC Act, or if there be a substantive suspicion in this regard, the Bureau will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

#### **Section 2 Commitments of the supplier(s)**

1. The supplier(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the bid process and during the contract execution.

- (a) The supplier(s) will not, directly or through any other persons or firm, offer promise or give to any of the Bureau's employees involved in the bid process or the execution of the contract or to any third person any material or other benefit which he or she is not legally entitled to, in order to obtain in exchange any advantage before or during the execution of the contract.
- (b) The supplier(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- (c) The supplier(s) will not commit any offence under the relevant IPC or PC Act; further the supplier(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the the Bureau as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

(d) The supplier(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2. The supplier(s) (s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

### **Section 3 Disqualification from bid process and exclusion from future contracts**

1. If the supplier(s), before award or during execution has committed a transgression through a violation of Section 2, above or in any other form such as to put his reliability or credibility in question, the Bureau is entitled to disqualify the supplier(s) from the bid process or take action as per the related provisions of the RFP document.

### **Section 4 Compensation for Damages**

1. If the Bureau has disqualified the supplier(s) from the bid process prior to the award according to Section 3, the Bureau is entitled to demand and recover the damages equivalent to Earnest Money Deposit.

2. If the Bureau has terminated the contract according to Section 3, or if the Bureau is entitled to terminate the contract according to Section 3, the Bureau shall be entitled to demand and recover from the supplier damages of the amount equivalent to Performance Bank Guarantee.

### **Section 5 Previous Transgression**

1. The supplier declares that no previous transgressions occurred in the last three years with any Government Organization that could justify his exclusion from the bid process.

2. If the supplier makes incorrect statement on this subject, he can be disqualified from the bid process and action can be taken as per the related provisions of the RFP document.

BUYER	BIDDERor SUPPLIER
BUREAU OF INDIAN STANDARDS,	SIGNATURE & SEAL
NEW DELHI	

**Annexure 8**

**TENDER ACCEPTANCE LETTER**  
**(To be given on Company Letter Head)**

**Date:**

**To,**

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**Sub: Acceptance of Terms & Conditions of Tender.**

**Tender Reference No:** \_\_\_\_\_

**Name of Tender or Work: -**

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**Dear Sir,**

**1. I or We have downloaded or obtained the tender document(s) for the above mentioned 'Tender or Work' from the web site(s) namely:**

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**As per your advertisement, given in the above mentioned website(s).**

**2. I or We hereby certify that I or we have read the entire terms and conditions of the tender documents from Page No. \_\_\_\_\_ to \_\_\_\_\_ (including all documents like annexure(s), schedule(s), etc.), which form part of the contract agreement and I or we shall abide hereby by the terms or conditions or clauses contained therein.**

**3. The corrigendum(s) issued from time to time by your department or organization too have also been taken into consideration, while submitting this acceptance letter.**

**4. I or We hereby unconditionally accept the tender conditions of above mentioned tender document(s) or corrigendum(s) in its totality or entirety.**

**5. I or We do hereby declare that our Firm has not been blacklisted or debarred by any Govt. Department or Public sector undertaking.**

**6. I or We certify that all information furnished by the our Firm is true & correct and in the event that the information is found to be incorrect or untrue or found violated, then your department or organization shall without giving any notice or reason therefore or summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.**

**Yours Faithfully,**

**(Signature of the Bidder, with Official Seal)**

### **Annexure-3A**

#### **Micron particulate filtration efficiency at 0.1 $\mu$**

The portable equipment/setup which is able to meet the test method requirement and has been validated with requirement of IS 16289: 2014 or equivalent ASTM/ISO/EN / standards can be quoted.

The quoted setup /device shall be able to meet the principal as detailed below:

#### **PRINCIPLE**

Filtered and dry air is passed through an atomizer to produce an aerosol containing suspended latex spheres. This aerosol is then passed through a charge neutralizer.

The aerosol is then mixed and diluted with additional pre-conditioned air to produce a stable, neutralized and dried aerosol of latex spheres to be used in the efficiency test.

#### **APPARATUS**

Aerosol test system consisting of clean, dry compressed air supply, HEPA filters, aerosol generator, charge neutralizer, humidifier, test filter holder and duct assembly, pressure drop measuring device, air flow rate measuring device, temperature and humidity detectors and optical particle counters.

It is device to determine the sub-micron particulate filtration efficiency of mask. It is widely used in quality control, research and development, certification, manufacturing or testing industry, etc.

Micro-computer controlled system, Multi-point calibration, Equipped with aerosol generator.

<b>Item</b>	<b>Detail</b>
Flow rate	8-95L/min
Pressure resistance	0-500Pa
Pressure differential	0-100Pa/cm <sup>2</sup>
Test period Pre-set	min 30s
Particle range	0.1 $\mu$ m

Particle	suspended latex spheres
Particle counter	Six channel for suitable particle range or better
Power supply	220V 50-60 Hz

### **Annexure-3B**

#### **Leakage Test**

It Consists of two tests.

- a) Total inward leakage test (Details given below)
- b) Particle filter penetration (Details given below)

#### **a) Total Inward Leakage**

##### **List of Equipment**

#### **Set Up 1**

- 10 persons – clean shaven, different facial structures (but not with abnormalities) and capable of walking on treadmill
- Test subjects shall be allowed to pick the most acceptable filtering half mask from a sufficient number of filtering half mask models and sizes so that filtering half mask is acceptable to and correctly fits, the user.
- Prior to selection process, the test subject shall be shown how to put filtering half mask, how it should be positioned on the face, how to set strap up tension and how to determine acceptable fit.
- Treadmill – capable of working at 6 km/h
- Enclosure for the treadmill and person
- Flowmeter for measuring flow velocity
- Atomizer (Fig. 4 of ISS) and 2% NaCl solution
- Particle size distribution analyzer (capable of analyzing particle sizes from 0.02 – 2  $\mu\text{m}$ ) (preferably condensation particle counter)
- Ducting and Baffle for aerosol distribution in enclosure
- Flame photometer – specifically designed for NaCl, range between 15  $\text{mg}/\text{m}^3$  to 5  $\text{ng}/\text{m}^3$ , response time less than equal to 500 ms, sample requirement less than 15 l/min, band pass width of the interference filter not greater than 3 nm and all necessary side-band filters included( capable of measuring mass concentration in the expected ranges)
- Sampling pump
- Sampling probes
- Pressure detection probe and change over valve
- Filter for additional air
- Pulsed sampling interface – to detect the negative pressure inside mask and signal the change over valve to open

**OR**



Automated instrument to determine total inward leakage, validated against test method given below

#### Test Details:

##### 1. *Total Inward Leakage*

A total of 10 test specimens shall be tested; 5 as received and 5 after temperature conditioning. The inward leakage shall be tested using a solid aerosol. The reference method is the sodium chloride aerosol test. Prior to the test, there shall be visual examination to ensure that the filtering half mask is in good working condition and that it can be used without hazard.

For the test, persons shall be selected who are familiar with using such or similar equipment. A panel of ten clean-shaven persons (without beards or sideburns) shall be selected covering the spectrum of facial characteristics of typical users (excluding significant abnormalities). It is to be expected that exceptionally some persons cannot be satisfactorily fitted with a filtering half mask. Such exceptional subjects shall not be used for testing filtering half masks.

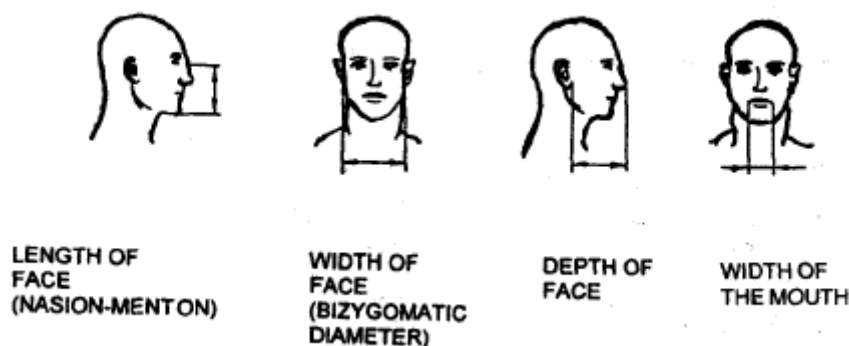
Assessment of comfort shall include following points with test subjects & allowing the test subject adequate time to determine the comfort of the filtering half mask:

- a) Position of the mask on the nose.
- b) Room for eye protection
- c) Room to talk
- d) Position of mask on Face and Cheeks

The following criteria shall be used to help determine the adequacy of the filtering half mask fit:

- a) Chin properly placed;
- b) Adequate strap tension; not overly tightened
- c) Fit across nose bridge
- d) filtering half mask of proper size to span distance from nose to chin
- e) Tendency of filtering half mask to slip
- f) Self-observation in mirror to evaluate fit and filtering half mask position.

In the test report, the faces of the ten test subjects shall be described (for information only) by the four facial dimensions (in mm) illustrated in Fig. 1.



## Figure 1 Facial Dimensions

### 2. Apparatus

**2.1 Treadmill:** A level treadmill required which is capable of is working at 6 km/h.

#### 2.2 Test Atmosphere

The test atmosphere shall preferably enter the top of the enclosure through a flow distributor and be directed downwards over the head of the test subject at a minimum flow rate of 0.12 m/s, but not exceeding 0.2 m/s. The concentration of the test agent inside the effective working volume shall be checked to be homogeneous. The flow rate should be measured close to the subject's head.

### 3. Test Procedure

The test subjects shall be asked to read to manufacturer's fitting instructions and if more than one size of filtering half mask is manufactured, the test subject shall be asked to select the size deemed by him to be the most appropriate. If necessary, the subjects shall be shown by the test supervisor how to fit the filtering half mask correctly in accordance with the fitting instructions.

The test subjects shall be informed that if they wish to adjust the filtering half mask during the test they may do so. However, if this is done, the relevant section of the test shall be repeated having allowed the system to resettle.

The test subjects shall have no indication of the results as the test proceeds. After fitting the filtering half mask each test subject shall be asked 'Does the mask fit'? If the answer is 'Yes', continue the test. If the answer is 'No', take the test subject off the panel, report the fact and replace with another test subject. The test sequence shall be as follows:

- a) Ensure the test atmosphere is OFF.
- b) Place the test subject in the enclosure. Connect up the face piece sampling probe. Have the test subject walk at 6 km/h for 2 min. Measure the test agent concentration inside the filtering half mask to establish the background level.
- c) Obtain a stable reading.
- d) Turn the test atmosphere ON.
- e) The subject shall continue to walk for a further 2 min or until the test atmosphere has stabilized.
- f) Whilst still walking the subject shall perform following exercises:
  - 1) Walking for 2 min without head movement or talking.
  - 2) Turning head from side to side (approximately 15 times), as if inspecting the walls of a tunnel for 2 min.
  - 3) Moving the head up and down (approximately 15 times), as if inspecting the roof and floor for 2 min.
  - 4) Reciting the alphabet or an agreed text out loud as if communicating with a colleague for 2 min.

5) Walking for 2 min without head movement or talking.

g) Turn off the test atmosphere and when the test agent has cleared from the enclosure, remove the subject. After each test the filtering half mask shall be replaced by a new sample.

#### 4. Results

Record the following as test results:

- a) Enclosure concentration.
- b) The leakage over each exercise period.

### 5. Sodium Chloride (NaCl) — Method

#### 5.1 Principle

The subject wearing the filtering half mask under test walks on a treadmill over which is an enclosure. Through this enclosure flows a constant concentration of NaCl aerosol. The air inside the filtering half mask is sampled and analyzed during the inhalation phase of the respiratory cycle to determine the NaCl content. The sample is extracted by punching a hole in the filtering half mask and inserting a probe through which the sample is drawn. The pressure variation inside the filtering half mask is used to actuate a change-over valve so that inhaled air only is sampled. A second probe is inserted for this purpose.

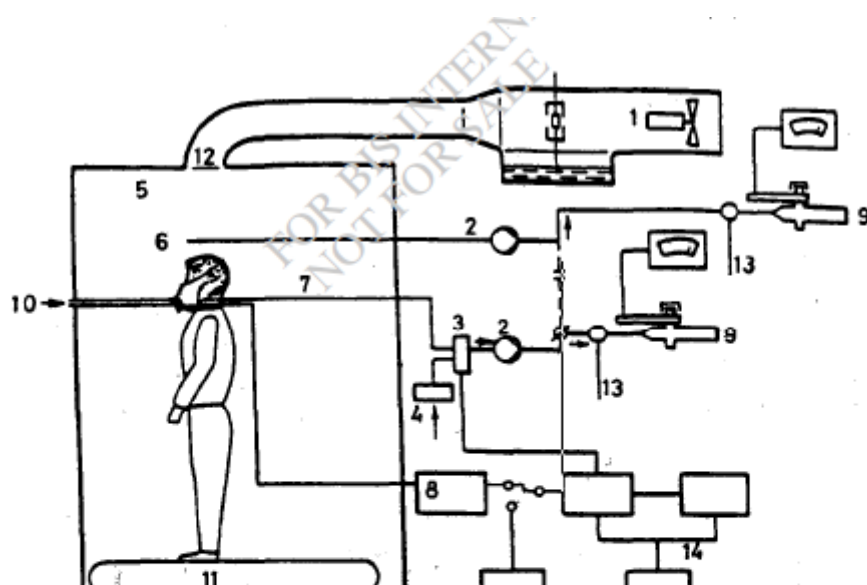
#### 5.2 Apparatus

##### 5.2.1 Test equipment (see Fig. 2)

**5.2.2 Aerosol generator:** The NaCl aerosol shall be generated from a 2 percent solution of reagent grade NaCl in distilled water. An atomizer equivalent to the type described should be used (*see Fig.3*). This requires an air flow rate of 100 l/min at a pressure of 7 bar. The atomizer and its housing shall be fitted into a duct through which a constant flow of air is maintained. It may be necessary to heat or dehumidify the air in order to obtain complete drying of the aerosol particles.

##### 5.2.3 Test agent

The mean NaCl concentration within the enclosure shall be  $8 \pm 4 \text{ mg/m}^3$  and the variation throughout the effective working volume shall be not more than 10 percent. The particle size distribution shall be 0.02 to 2  $\mu\text{m}$  equivalent aerodynamic diameter with a mass median diameter of 0.6  $\mu\text{m}$ .

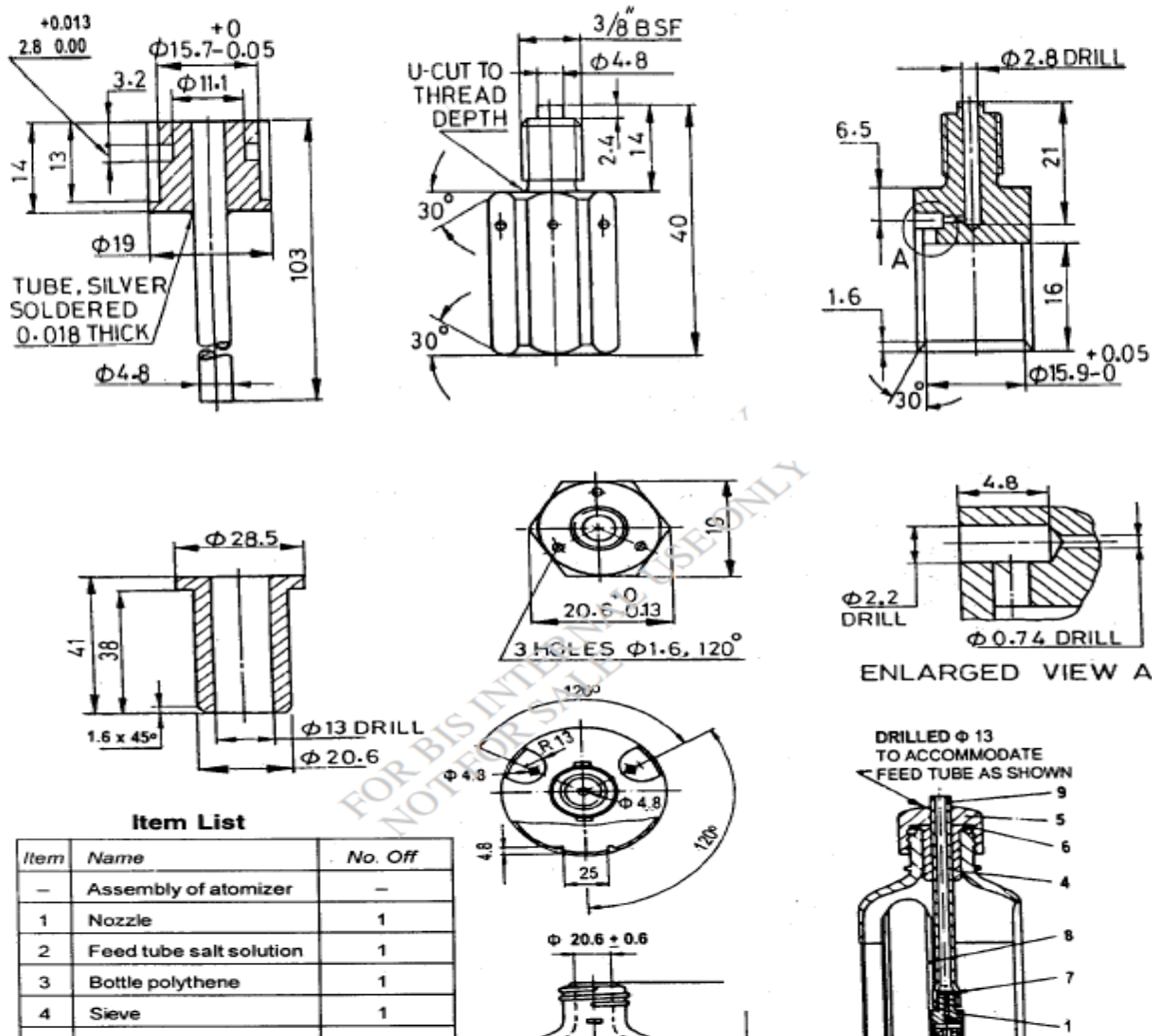


**Figure 2 Typical Apparatus used in the Determination of Inward Leakage using Sodium Chloride**

#### 5.2.4 Flame photometer

A flame photometer shall be used to measure the concentration of NaCl inside the filtering half mask. Essential performance characteristics for a suitable instrument are as follows:

- It should be a flame photometer specifically designed for the direct analysis of NaCl aerosol.
- It should be capable of measuring concentrations of NaCl aerosol between  $15 \text{ mg/m}^3$  and  $5 \text{ ng/m}^3$ .
- The total aerosol sample required by the photometer should not be greater than  $15 \text{ l/min}$ .
- The response time of the photometer, excluding the sampling system, should not be greater than 500 milliseconds.
- It is necessary to reduce the response to other elements, particularly carbon, the concentration of which will vary during the breathing cycle. This will be achieved by ensuring that the band pass width of the interference filter is not greater than 3 nm and that all necessary side band filters are included.



NOTE – All burns and sharp edges to be removed. MAT. Stainless steel

All dimensions in millimeters.

**Figure 3 Assembly of Atomizer**

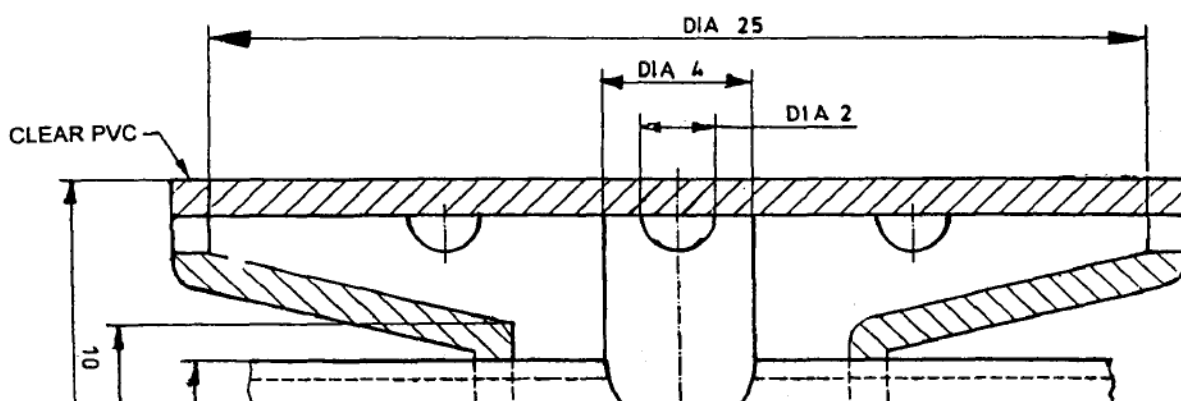
#### 5.2.5 Sample selector

A system is required which will switch the sample to the photometer only during the inhalation phase of the respiratory cycle. During the exhalation phase, clean air shall be fed to the photometer. The essential elements of such a system are as follows:

- a) An electrically operated valve with a response time of the order of 100 ms. The valve should have the minimum possible dead space compatible with straight-through, unrestricted flow when open.
- b) A pressure sensor which is capable of detecting a minimum pressure change of approximately 0.05 mbar and which can be connected to a probe inserted in the cavity of the filtering half mask. The sensor shall have an adjustable threshold and be capable of differential signaling when the threshold is crossed in either direction. The sensor shall work reliably when subjected to the accelerations produced by the head movements of the subject.
- c) An interfacing system to actuate the valve in response to a signal from the pressure sensor.
- d) A timing device to record the proportion of the total respiratory cycle during which sampling took place.

#### 5.2.6 Sampling probe

The probe shall be fitted securely in an air-tight manner to the filtering half mask as near as possible to the centre line of the filtering half mask. A multiple hole sampling probe is strongly recommended. Measures shall be taken to prevent the influence of condensation in the sampling probe on the measurement (by supplying dry air). Figure 5 shows a design that has been found suitable. The probe is adjusted so that it just touches the wearer's lips.



## MATERIAL PVC

All dimensions in millimetres

Figure 5 Sample probe

### 5.2.7 Sample pump

If no pump is incorporated into the photometer, an adjustable flow pump is used to withdraw an air sample from the filtering half mask under test. This pump is so adjusted as to withdraw a constant flow of 1 l/min from the sample probe. Dependent on the type of photometer, it may be necessary to dilute the sample with clean air.

### 5.2.8 Sampling of enclosure concentration

The aerosol enclosure concentration is monitored during the tests using a separate sampling system to avoid contamination of the filtering half mask sampling lines. It is preferable to use a separate flame photometer for this purpose.

If a second photometer is not available, sampling of the enclosure concentration using a separate sampling system and the same photometer may be made. However, time will then be required to allow the photometer to return to a clean background.

### 5.2.9 Pressure detection probe

A second probe is fitted near to the sample probe and is connected to the pressure sensor.

## 6. Expression of Results

The leakage  $P$  shall be calculated from the measurements made over the last 100s of each of the exercise periods to avoid carry over of results from one exercise to another.

$$P = \frac{C_2}{C_1} \times \frac{t_{IN} + t_{EX}}{t_{IN}} \times 100$$

where

$C_1$  = Enclosure concentration,

$C_2$  = Measured mean concentration inside the half mask,

$t_{IN}$  = Total duration of inhalation,

$t_{EX}$  = Total duration of exhalation, and

$P$  = Leakage in percent.

Measurement of  $C_2$  is preferably made using an integrating recorder.

## **b) Particle Filter Penetration Test**

### List of Equipment

Set up 1:

- Holder for sealing the mask in leaktight manner
- Aerosol generator and charge neutralizer
- NaCl solution and paraffin oil
- Instrument/device to heat paraffin oil
- Particle size distribution analyzer – (preferably condensation particle counter)
  - number median particle size 0.06 – 0.1  $\mu\text{m}$  for NaCl
  - number median particle size 0.16 – 0.21  $\mu\text{m}$  for paraffin
- Flow meter
- Facility to purge excess aerosol or provide additional air to maintain required flow and aerosol concentration
- Hygrometers or humidity sensors
- Filter test chamber
- Sampling probe
- Flame photometer for detection of NaCl aerosol ( capable of measuring mass concentration in the expected ranges)
- Forward light scattering photometer for paraffin oil aerosol
- Weighing balance for weighing the mask

**OR**

Automated instrument to determine filter penetration, validated against the test method given below:

### Test Details

A schematic drawing of an example for a test apparatus is shown in Figure 1.

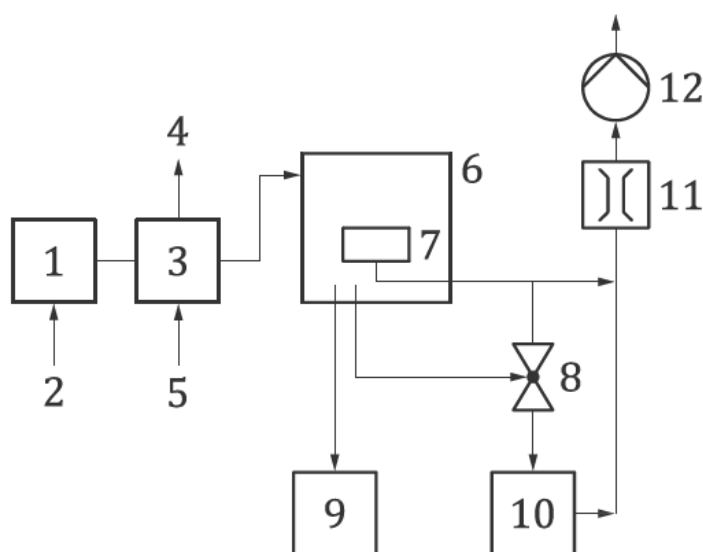


Figure 1 Schematic of test apparatus

### **Key**

- 1 aerosol generator
- 2 compressed air supply
- 3 flow control module
- 4 air bleed (test flows less than the output of the generator)



## **1. Aerosol generator**

### **General**

Sodium chloride (NaCl) aerosol shall be neutralized by the injection of both positive and negative ions into the drying or dilution air flow so that the charge distribution is brought to the state of equilibrium, commonly known as the Boltzmann distribution. Paraffin aerosol shall not be neutralized since this increases variability in the test results.

NOTE The ions should be generated by electrical means and adjusted so that there is no overall charge bias on the aerosol.

## **2. Sodium chloride test method**

2.1 The test aerosol is generated by atomising by compressed air a solution of sodium chloride in demineralized water. The atomized solution is mixed with dry air to cause the water to evaporate. The resultant aerosol shall have the following properties:

- a) the number median of particle size distribution is between 0.06  $\mu\text{m}$  and 0.10  $\mu\text{m}$  electromobility diameter, with a geometric standard deviation between 1.4 and 1.8;
- b) the aerosol concentration is within the range 8  $\text{mg}/\text{m}^3$  to 35  $\text{mg}/\text{m}^3$ ;
- c) the variation of the concentration is not greater than  $\pm 10\%$  during the test;
- d) the relative humidity is 40 % or less at  $(22 \pm 3)^\circ\text{C}$ .

The aerosol mass concentration, particle size distribution and humidity shall be measured within the filter test chamber.

NOTE It is recommended that an electrical mobility method be used to determine the particle size distribution.

2.2 The NaCl solution shall be completely replaced and not replenished in order to maintain the correct solution concentration.

## **3. Paraffin oil test method**

3.1 The test aerosol is generated by atomising by compressed air the liquid paraffin oil. The paraffin oil characteristics at 20  $^\circ\text{C}$  shall be:

- a) CAS number: 8012-95-1;
- b) density: 0.818  $\text{g}/\text{cm}^3$  to 0.875  $\text{g}/\text{cm}^3$ ;
- c) dynamic viscosity: 0.025  $\text{Pa}\cdot\text{s}$  to 0.080  $\text{Pa}\cdot\text{s}$ ; [kinematic viscosity: < 35  $\text{mm}^2/\text{s}$  (at 40  $^\circ\text{C}$ : 13.5  $\text{mm}^2/\text{s}$  to 16.5  $\text{mm}^2/\text{s}$ )].

3.2 Laboratories shall consider the following:

- a) paraffin oil in the test rig shall be replaced with fresh oil every three months irrespective of use, or more frequently if exposed continuously to heating and compressed air;
- b) where the generator requires the oil to be heated, it is recommended not to heat the oil above 60  $^\circ\text{C}$ .

3.3 The paraffin aerosol shall have the following properties:

- a) the number median of particle size distribution is between 0.16  $\mu\text{m}$  and 0.21  $\mu\text{m}$  electromobility diameter, with a geometric standard deviation between 1.4 and 1.8;
- b) the aerosol concentration is within the range 15  $\text{mg}/\text{m}^3$  to 35  $\text{mg}/\text{m}^3$ ;
- c) the variation of the concentration is not greater than  $\pm 10\%$  during the test.

The aerosol mass concentration and particle size distribution shall be measured within the filter test chamber.

NOTE It is recommended that an electrical mobility method be used to determine the particle size distribution.

#### **4. Flow control module**

The flow control module is used to bleed off excess aerosol where the required test flow is less than the output of the aerosol generator. Where the performance standard calls for a flow in excess of the output of the aerosol generator, extra air shall be mixed with the output to increase the flow to the filter test chamber. Action shall be taken to ensure that the challenge concentration remains within the permissible range. If necessary, two or more aerosol generators may be used in parallel in order to maintain the challenge concentration within the specified range at high flow rates.

Measurement of aerosol concentration and particle size distribution shall not be affected by the flow measuring device. This can be achieved by placing the flow measuring device downstream of the test chamber.

#### **4 Filter test chamber**

The filter test chamber shall be sufficiently large to accommodate the filter system under test and allow exposure of the entire filter working area to the aerosol. Care shall be taken that the influent aerosol is not directed preferentially on to one part of the filter or filter system unless this is caused by the filter design.

The construction of the chamber shall be resistant to the aerosol, shall be leaktight and shall safely withstand any pressures, either positive or negative, that may be generated.

The filter test chamber shall be designed to minimize air velocity variations across the surface of the filter under test. Localized high air velocity ("jets") may result in artificially high filter penetration.

#### **5 Aerosol detector**

##### **5.1 General**

The aerosol detector shall have sufficient sensitivity and resolution to accurately determine penetrations to at least an order of magnitude better than the pass/fail criterion specified in the performance standard for the relevant class.

The sampling flow rate should be minimized to reduce the effects of sampling on the aerosol within the test chamber or downstream of the filter. Where necessary, the sample shall be returned to the system to prevent errors in the determination of the test flow rate.

It is permissible to use two aerosol detectors, one monitoring the upstream concentration and one monitoring the downstream concentration, provided that they are both accurately calibrated for the appropriate aerosol size and concentration range in which they are used.

##### **5.2 Sodium chloride**

The sodium chloride aerosol shall be analysed by flame photometry.

Sodium chloride particles in air passing through the flame tube are vaporized giving the characteristic sodium emission at 589 nm. The intensity of this emission is proportional to the concentration of sodium in the air flow.

The intensity of the light emitted by the flame is measured by using a photomultiplier tube. To separate the sodium emission from background light of other wavelengths, a narrow band interference filter with appropriate sideband filters to remove interference from H<sub>2</sub>O and CO<sub>2</sub> shall be used. As the photomultiplier output is only proportional to the incident light over a relatively small range, high light intensities are attenuated by neutral density filters.

### 5.3 Paraffin oil

The reference detector is a forward light scattering photometer that has an effective scattering angle of up to 45°. Other detectors may be employed provided equivalence to the reference detector can be demonstrated when using the paraffin oil aerosol.

## 6 Methods

### 6.1 General

The filter under test is mounted in the filter test chamber and exposed to the appropriate aerosol challenge. The specified flow is passed through the filter. Where an exhalation valve is incorporated into the filter, it shall be sealed during the test.

Where one filter of a multiple filter device is tested separately, the air flow specified for a test shall be divided by the number of filters through which the air flow is proportioned, provided that the filters resistances satisfy Formula (1):

$$\frac{R_{max} - R_{min}}{\bar{R}} \leq 0.2$$

where

$R_{max}$  is the maximum resistance;

$R_{min}$  is the minimum resistance;

$\bar{R}$  is the mean resistance.

The aerosol concentration is monitored both before and after the filter in order to calculate the filter penetration. It is not necessary to monitor both concentrations simultaneously, provided that the challenge concentration can be shown to be stable over the duration of the measurement cycle.

### 6.2 Short-term particle penetration test

After a stabilization time of 3 min, the recording of the filter penetration shall start. The short-term penetration value is the average value over the following 30 s. The stabilization time shall start when the chamber is sealed.

### 6.3 Full exposure particle penetration test

Where required by the performance standard, the filter shall be exposed to  $m = 150$  mg of the challenge aerosol by extending the duration of the test. The duration shall be calculated using Formula (2):

$$t = \frac{m \cdot 1000}{Q \cdot c}$$

where

$t$  is the time, expressed in minutes (min);

$m$  is the mass of 150 mg of the challenge aerosol;

$Q$  is the challenge flow, expressed in litres per minute (l/min);  
 $c$  is the challenge concentration, expressed in milligram per cubic metres (mg/m<sup>3</sup>).

Where practicable, the exposure should be confirmed gravimetrically by weighing the filter before and after the test. This may not be possible with filters that contain sorbents that take up water vapour, due to the difference in weight caused by a change in humidity.

During the duration:

- a) for filters being tested using paraffin oil, continue the test until the filter has been exposed to 150 mg of test aerosol;
- b) for filters being tested using sodium chloride, continue the test until
  - 1) the filter has been exposed to 150 mg of test aerosol, or
  - 2) the penetration shows continued decline for 5 min or 5 sample intervals, whichever is the greater.

Report the maximum penetration during exposure. During the duration of the exposure the penetration shall be continuously monitored or recorded at intervals not exceeding 5 min.

Where one filter of a multiple filter device is tested separately, the challenge weight shall be divided by the number of filters through which the air flow is proportioned, provided that the filter resistances satisfy Formula (1).

## **7 Test report**

The test report shall include at least the following information:

- a) number of specimens;
- b) sequence of preconditioning;
- c) challenge aerosol flow rate(s) through the filter under test;
- d) filter efficiency.

## **Annexure-3C**

**Bacterial Filtration Efficiency (BFE)** — The effectiveness of a surgical face mask to filter (prevent passage of) aerosol droplets containing bacteria of a specified particle size of 3.0 µm (micron) ± 0.3 µm.

A portable setup which is able to meet the test method requirement of IS 16288:2014 with regards to the Six stage viable particle cascade impactor , Peristaltic Pump, Nebulizer, Glass aerosol chamber, flow Meter, Pressure Gauges and Air regulator and has been validated with IS 16288 or equivalent ASTM/ISO/EN / standards can be quoted.

S No	Name of individual Equipment	Specification
1.	Six stage viable particle cascade impactor	
2.	Vacuum Pump,	Capable of maintaining 57 litre/min
3.	Air Pump/Compressor,	capable of supplying 1.1 kg/cm <sup>2</sup>
4.	Peristaltic Pump	Capable of delivering 0.01 ml/min
5.	Nebulizer	Nebulizer, capable of delivering mean particle size of 3.0 micrometer and a challenge level of 2 200 particles per test
6.	Glass Aerosol Chamber	Glass Aerosol Chamber, 60 cm × 8 cm diameter tube
7.	Flow Meters	Flow Meters, capable of 28.3 litres/min
8.	Pressure Gauges,	Pressure Gauges, capable of 35 + 1 kPa
9.	Air Regulator	Suitable Air Regulator

The Six stage viable particle cascade impactor , Peristaltic Pump, Nebulizer ,Glass aerosol chamber, flow Meter, Pressure Gauges and Air regulator should be suitable for carrying out the procedure as below :

- Deliver the challenge to the nebulizer using a peristaltic pump. Connect tubing to nebulizer and peristaltic pump and into the challenge suspension; purge tubing and nebulizer of air bubbles.
- Perform positive control run without a test specimen clamped into the test system to determine the number of viable aerosol particles being generated. The mean particle size of the aerosol will be calculated from the results of these positive control plates. Initiate the aerosol challenge by turning on the air pressure and pump connected to the nebulizer. Immediately begin sampling the aerosol using the cascade impactor. Adjust the flow rate through cascade impactor to 28.3 litre/min.
- Time the challenge suspension to be delivered to the nebulizer for 1 min. Time the air pressure and cascade impactor to run for 2 min. At the conclusion of the positive control run, remove plates from the cascade impactor. Label each plate with the corresponding stage number.
- Place the new agar plates into the cascade impactor and clamp the test specimen into the top of the cascade impactor with either the inside or outside oriented toward the challenge as intended.
- Initiate the aerosol challenge as outlined above. Repeat the challenge procedure for each test specimen. Repeat a positive control sample after completion of the test sample test. Perform a negative control sample by collecting a two minute samples of air from the aerosol chamber. No bacterial challenge should be pumped into the nebulizer during the collection of the negative control sample.

- Incubate the agar plates at  $37 \pm 2$  °C for 48 h. Count each of the six agar plates for the test specimens and positive controls, as specified by the manufacturer of the cascade impactor.

### **Annexure 3D**

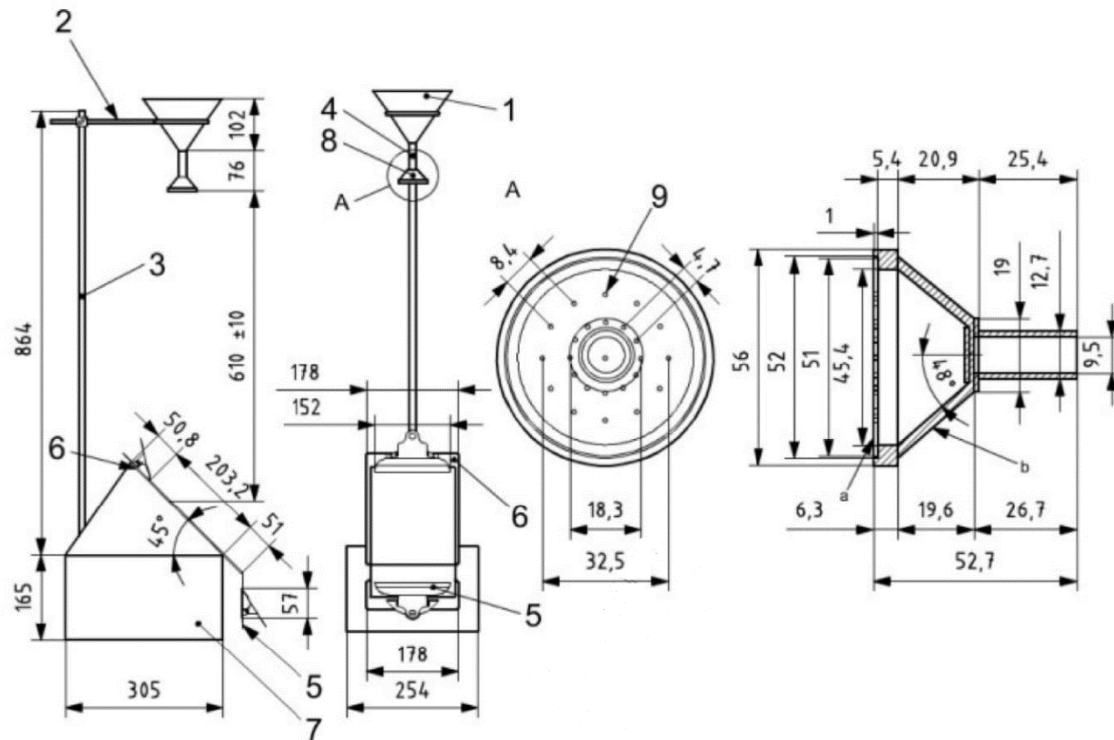
Technical Specification of Impact Penetration tester as per i) of Table 1 & 2 of IS 17334

Sl. No	Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.	Requirement
-----------	---	-------------

(1)	(2)	(3)
1.	Types of tests to be performed	Impact Penetration Test
2.	Materials to be tested	Surgical Drapes and Surgical Gowns
3.	Construction	Construction of the equipment as per ISO 18695 (Relevant portion of the ISO standard is given in Annex-A)

#### Annex-A





**Key**

- 1 laboratory funnel, 152 mm
- 2 laboratory ring support
- 3 metal rod,  $\varnothing$  12,7 mm
- 4 rubber tubing, 9,5 mm
- 5 metal spring clip, 152 mm (494 g)
- 6 steel plate with clip
- 7 inclined stand
- 8 spray head nozzle (see detail A)
- 9 twenty five holes,  $(0,99 \pm 0,005)$  mm

- a Brass.
- b Bronze.

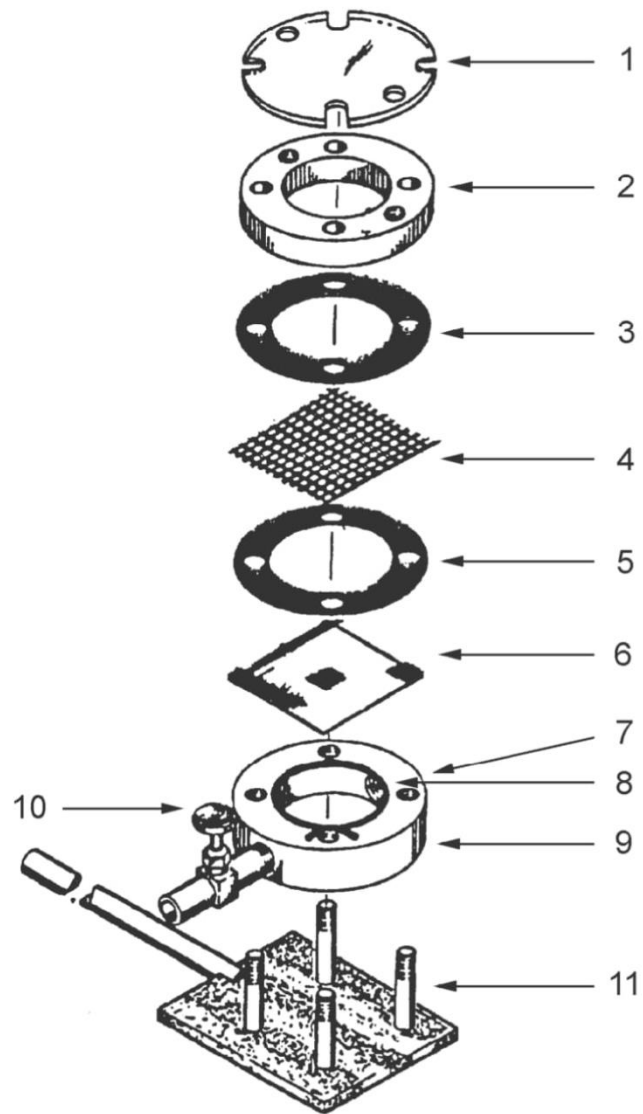
**Figure 3 — Structural details of impact penetration tester**



### Technical Specification of Penetration Cell with air pressure source as per IS 17334: 2019

Sl. No	Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.	Requirement
(1)	(2)	(3)
1.	Types of tests to be performed	Blood Resistance Test and Viral Resistance Test in Medical Textiles - Surgical Gowns and Surgical Drapes
2.	Materials to be tested	Surgical Drapes and Surgical Gowns
3.	Construction	<p>Penetration Test cell, to restrain the specimen during contact with the pressurized challenge fluid.</p> <p>In the test cell, the specimen acts as a partition separating Phi-X174 bacteriophage challenge suspension from the view side of the test cell. It consists of a cell body that is fastened to a cell support. The cell body has a capacity of approximately 60 ml for the Phi-174 bacteriophage challenge suspension. A flange cover, with an open area to allow visual observation, and a transparent cover are included. The cell body has a top port for filling and a drain valve for draining the penetration test cell. Other items such as a fitting to allow attachment of the air line to the top port in the cell body, gasket and the retaining screen are also required. A diagram of the penetration test cell and apparatus are provided in Figure 1 and 2.</p> <p>Figure 1 and 2 are mentioned in Annex A.</p>
4.	Capacity of Cell Body	60 ml (approx.)
5.	Air Pressure Source	Capable of providing air at $(20.0^{+2}_0)$ kPa

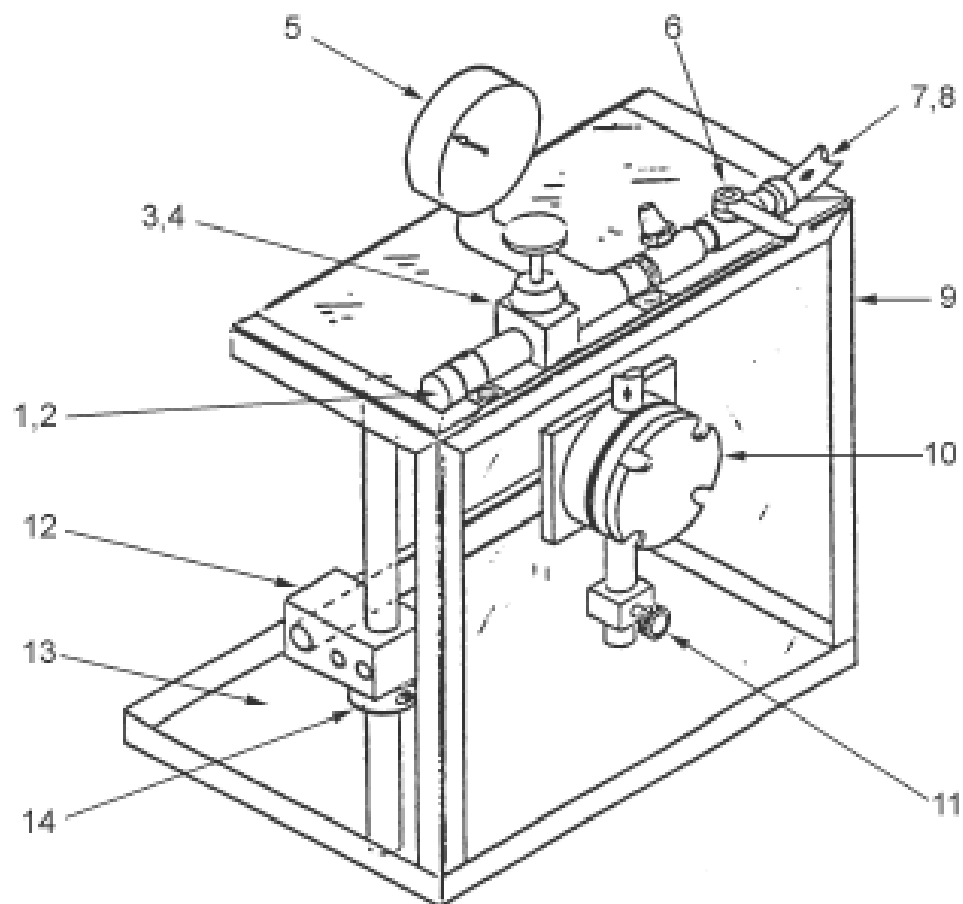
### Annex-A



**Key**

- |   |                                 |
|---|---------------------------------|
| 1 transparent cover                                       | 7 top port                      |
| 2 flange cover  | 8 expanded PTFE gasket material |
| 3 gasket (specimen exposure Procedures B and D)           | 9 cell body                     |
| 4 retaining screen (specimen exposure Procedures B and D) | 10 drain valve                  |
| 5 gasket  | 11 cell support                 |
| 6 test sample   |                                 |

**Figure 1 — Penetration test cell with retaining screen (exploded view)**



**Key**

- |                              |   |
|------------------------------|---|
| 1 compressed air or nitrogen | 8 rubber air hose with male coupling to connect to 7 and a female coupling to connect to 10 |
| 2 air line connector         | 9 safety enclosure  |
| 3 air pressure regulator     | 10 penetration test cell  |
| 4 adjustable relief valve    | 11 drain valve  |
| 5 pressure gauge             | 12 swivel clamp   |
| 6 cell vent valve            | 13 spill pan  |
| 7 female coupling            | 14 two-piece shaft collar   |

Figure 2 — Test apparatus (three-dimensional side view)

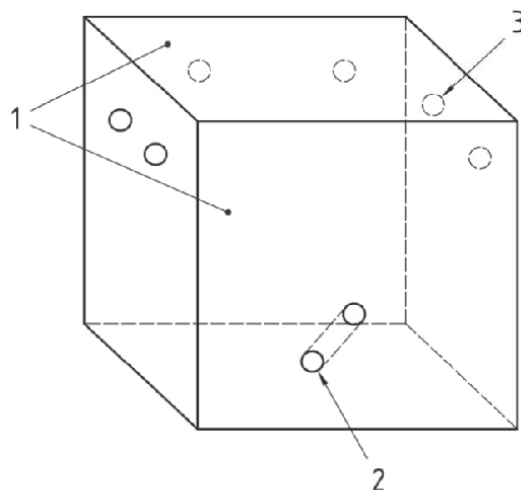
**Annexure-3F**

Technical Specification of Flexing Chamber as per Table 1 of IS 17334 (Test Method IS 15891 (Part-10)/ISO 9073-10)

<b>Sl. No</b>	<b>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</b>	<b>Requirement</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
1.	Types of tests to be performed	Flexing Chamber for Particle Release Test
2.	Materials to be tested	Surgical Drapes and Surgical Gowns
3.	Construction	As per Annex-A
4.	Air collector intake probe	As per Annex-B
5.	Perspex Box	Dimension 300mm x 300mm x 300mm
6.	Side Holes	Diameter 10 mm Located at 25 mm from top Spaced equally across 300 mm of each panel

## Annex-A

**5.3 Flexing chamber and air collector**, in which the flexing unit is enclosed in an antistatic perspex box measuring  $(300 \times 300 \times 300)$  mm (see Figure 2). This chamber has removable front and back panels for cleaning and purging with filtered, clean air. The back and two sides each have two holes (diameter 10 mm) located 25 mm from the top of the chamber and spaced equally across the 300 mm of each panel.



### Key

- 1 removable front and back panels
- 2 air collector
- 3 side holes (10 mm in diameter)

**Figure 2 — Flexing chamber and air collector**

The intake probe of the air collector is fixed to the centre of the base in the chamber, 2 cm above the base plate (see Figure 3).

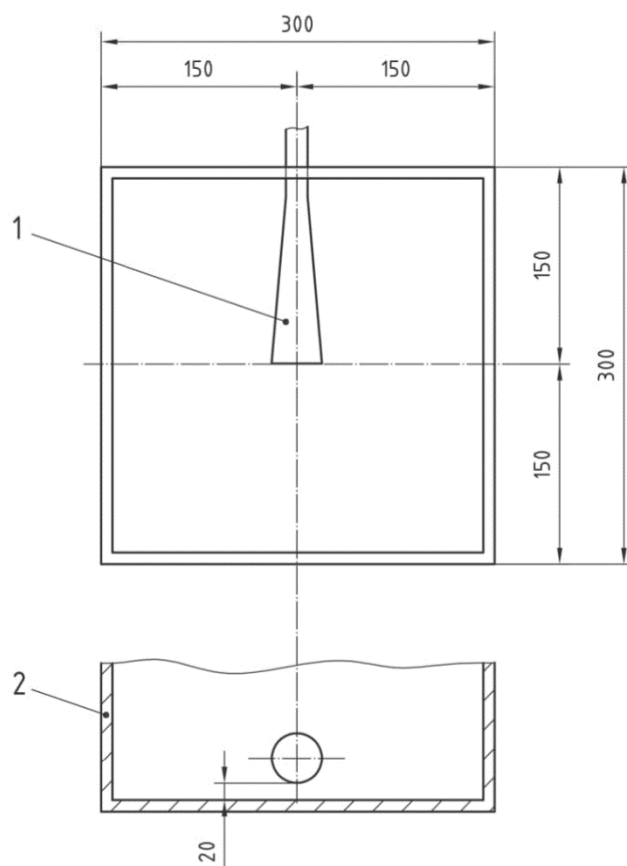
The diameter of the intake probe end is  $(40 \pm 5)$  mm.

The flexible duct connecting the air collector to the particle counter has the following characteristics.

- polyurethane or polyester lined vinyl or similar;
- maximum length 1 500 mm;
- inner diameter  $(8,5 \pm 1,5)$  mm;
- not kinked nor curved with a small curvature radius.

## Annex-B

Dimensions in millimetres



### Key

- 1 air collector intake probe
- 2 flexing chamber

Figure 3 — Position of air collector intake probe

### 5.4 Particle counter, with the following main characteristics:

- 8 measurement channels;
- overall size range: 0,3  $\mu\text{m}$  or 0,5  $\mu\text{m}$  to 25  $\mu\text{m}$ ;
- air flow:  $(28,3 \pm 1,4)$  l/min;
- sampling time selectable between 1 s and 24 h.

### 5.5 Glue, for sealing the cylindrical test piece.

### 5.6 Gloves, for use in ISO class 5 clean room. See ISO 14644-1.

Technical Specification of Flexing Unit as per Table 1 of IS 17334 (Test Method IS 15891 (Part-10)/ISO 9073-10)

Sl. No	Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.	Requirement
(1)	(2)	(3)
1.	Types of tests to be performed	Flexing Unit for Particle Release Test
2.	Materials to be tested	Surgical Drapes and Surgical Gowns
3.	Construction	As per Annex-A
4.	Plates	Diameter 82.8 mm, One fixed One movable
5.	Holes in plates	Diameter 12.5 mm No. of holes = 8 Located at 10 mm from outer edge and equally spaced
6.	Distance between plates at starting position	188±2 mm
7.	Stroke of linear motion	120±2 mm

## Annex-A

**5.2 Flexing unit (modified Gelbo Flex)**, consisting of two circular plates, of diameter 82,8 mm, one fixed and the other moveable, but located on a mechanism that allows it to move towards and away from the fixed plate at a frequency of 60 cycles/min whilst at the same time rotating clockwise and anti-clockwise through an angle of 180°, in synchronization with a to-and-fro movement. See Figure 1.

The plates have 8 holes (diameter 12,5 mm) located 10 mm from the outer edge and equally spaced.

The distance between the plates at the starting position is  $(188 \pm 2)$  mm and the stroke of the linear motion is  $(120 \pm 2)$  mm.

Clamping devices are used to fix the test piece, in a tubular form, to the circular plates.

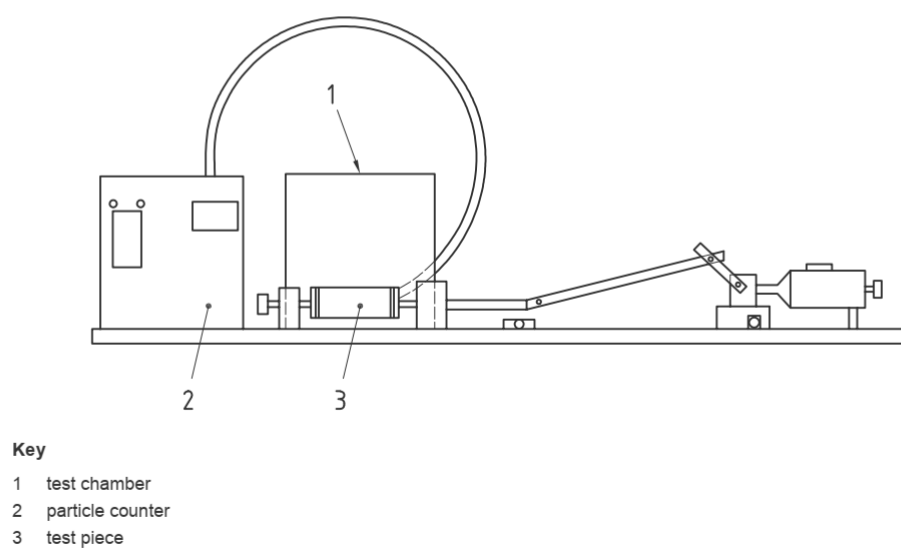


Figure 1 — Gelbo Flex dry particle generator



### **Annexure-3 G**

#### Technical Specification of Extensometer

<b>Sl. No</b>	<b>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</b>	<b>Requirement</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
1.	Types of tests to be performed	Elongation of textile materials during tensile testing
2.	Materials to be tested	Surgical Drapes and Surgical Gowns
3.	Type	Non-contact type (Laser)
4.	Range	Up to 600 mm
5.	Resolution	0.01 mm
6.	Additional requirement	To be mounted on tensile testing machine Data output to computer system

### **Annexure-3H**

Technical Specification of Bursting Tester as per Table 1 of IS 17334 (Test Method IS 1966 (Part-1)/ISO 13938-1)

Sl. No	Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.	Requirement
(1)	(2)	(3)
1.	Types of tests to be performed	Bursting Test
2.	Materials to be tested	Surgical Drapes and Surgical Gowns
3.	Construction	As per Annex-A
4.	Rate of increase in volume per unit time	Adjustable 0 – 600 cm <sup>3</sup> /min Accuracy $\pm 10\%$ or better
5.	Bursting pressure	Accuracy $\pm 2\%$ or better for full range above 20% of range Range 0-50 kPa Resolution 0.01 kPa
6.	Height at burst	Accuracy $\pm 1$ mm or better up to 70 mm
7.	Height measuring gauge	Adjustable zero position Least count 0.01 mm
8.	Volume at burst	Accuracy $\pm 2\%$ or better
9.	Test areas	Adjustable Diameter 30.5 mm (7.3 cm <sup>2</sup> ) Diameter 35.7 mm (10 cm <sup>2</sup> ) Diameter 79.8 mm (50 cm <sup>2</sup> ) Diameter 112.8 mm (100 cm <sup>2</sup> )
10.	Time indicator	Start of testing to bursting time Resolution 1s
11.	Other features	Damping device, safety cover and Diaphragm as per Annex-A

#### Annex-A

## 6.1 Bursting tester

Metrological confirmation of the bursting tester shall be carried out in accordance with EN 30012-1:1993.

The bursting tester shall comply with the following requirements:

**6.1.1** The apparatus shall be capable of producing various constant rates of increase in volume per unit time between 100 cm<sup>3</sup>/min and 500 cm<sup>3</sup>/min to within  $\pm 10$  % of the indicated value. If the apparatus is not equipped to adjust fluid volume, a testing time to burst of (20  $\pm$  5) s may be applied. This shall be indicated in the test report.

**6.1.2** Bursting pressure shall be indicated with an accuracy of  $\pm 2$  % of full scale range above the first 20 % of range.

**6.1.3** Height at burst up to 70 mm shall be indicated with an accuracy of  $\pm 1$  mm. Zero position of the measuring gauge shall be adjustable to accommodate the thickness of the test specimen.

**6.1.4** Means for indicating the volume at burst (if available) to within  $\pm 2$  % of the indicated value.

**6.1.5** A test area of 50 cm<sup>1</sup> (79.8 mm diameter) shall be used.

Other test areas of 100 cm<sup>2</sup> (112,8 mm diameter) or 10 cm<sup>2</sup> (35,7 mm diameter) or 7,3 cm<sup>2</sup> (30,5 mm diameter) may be used, if the preferred test area is not applicable in the existing testing equipment, or due to high or low expansion of the fabric or other fabric requirements, or by mutual agreement

**6.1.6** The damping device shall provide for clamping of the test specimen securely without distortion or damage and prevent slippage during the test. The clamping ring shall allow undisturbed vaulting of highly expansive fabrics (e.g. fabric test specimens whose height at burst is greater than half of the test specimen diameter). All test specimen clamping ring inner diameters shall be accurate to  $\pm 0,2$  mm. To avoid test specimen damage a small curvature at the inner edge of the clamping ring facing the test specimen is recommended.

**6.1.7** A safety cover shall enclose the clamping device during the test when the expansion of the test specimen takes place. It shall allow clear observation of the expansion of the test specimen during the test.

**6.1.8** The diaphragm shall meet the following requirements:

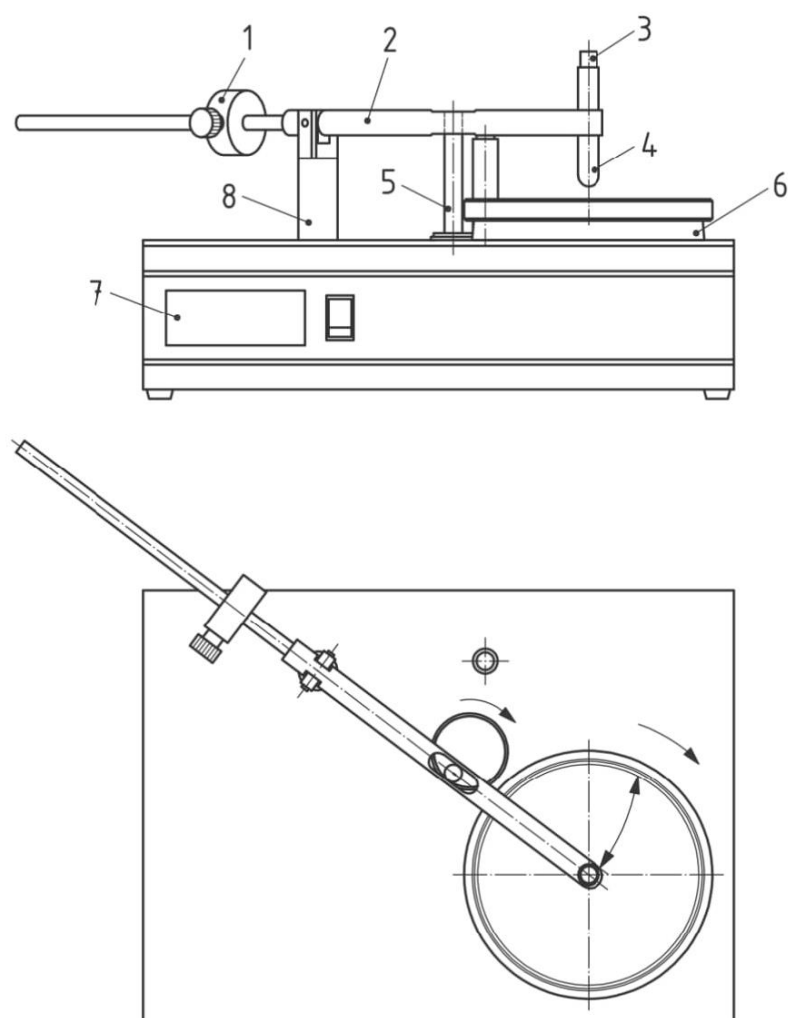
- thickness up to 2 mm;
- highly expansive;
- if the diaphragm is to be used several times, it shall be elastic within the range of height at burst observed during the test;
- resistant against pressurizing fluids used.

**Annexure-3I**

**Technical Specification of Apparatus for Resistance to Microbial Penetration (Wet) as per IS 17334: 2019**

<b>Sl. No</b>	<b>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</b>	<b>Requirement</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
1.	Types of tests to be performed	Resistance to Microbial Penetration (Wet) for Surgical Gowns and Surgical Drapes
2.	Materials to be tested	Surgical Drapes and Surgical Gowns
3.	Construction	<p>The apparatus has an electrically – driven, timer – controlled turntable which holds a 14 cm diameter agar plate. A horizontal lever with a vertical finger at its end is fitted to a pivot, allowing sideways movements of the finger from the centre to the periphery and back of the rotatable (60 r/min) agar plate.</p> <p>Figures of apparatus, inner ring and outer ring are mentioned in Annex-A.</p>
4.	Cylindrical Body	Diameter 9 cm Height 4 cm
5.	Turntable	Electrically driven Timer-controlled
6.	Agar Plate	Diameter 14 cm Rate of rotation: 60 RPM
7.	Eccentric Cam	Rate of rotation: 5.60 RPM
8.	Finger	Semi-spherical Polished end of radius: 11 mm Removable
9.	Force	Measured by Dynamometer (Range 0-5 N, L.C. 0.01 N) Applied force $3 \pm 0.02$ N Adjustable by slidable weight

## Apparatus for testing resistance to wet bacterial penetration



### Key

- 1 counterweight
- 2 balancing arm with finger
- 3 loop for spring balance
- 4 stainless steel finger
- 5 eccentric
- 6 turntable
- 7 electronic timer
- 8 ball bearing

Figure A.1 — Apparatus

Dimensions in millimetres

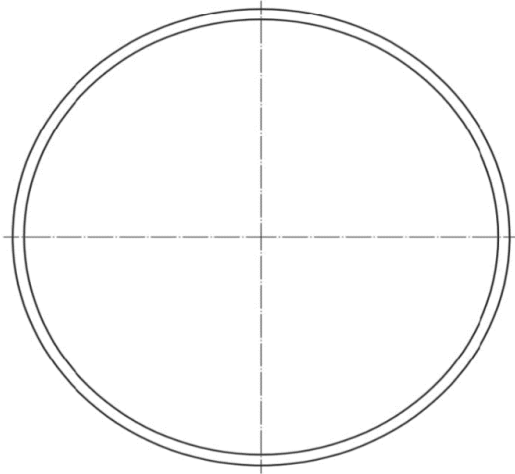
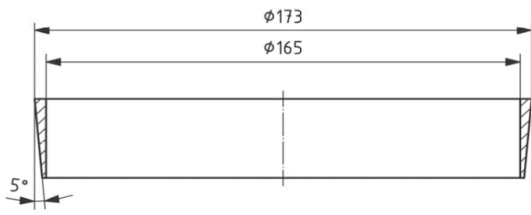


Figure A.2 — Inner ring

Dimensions in millimetres

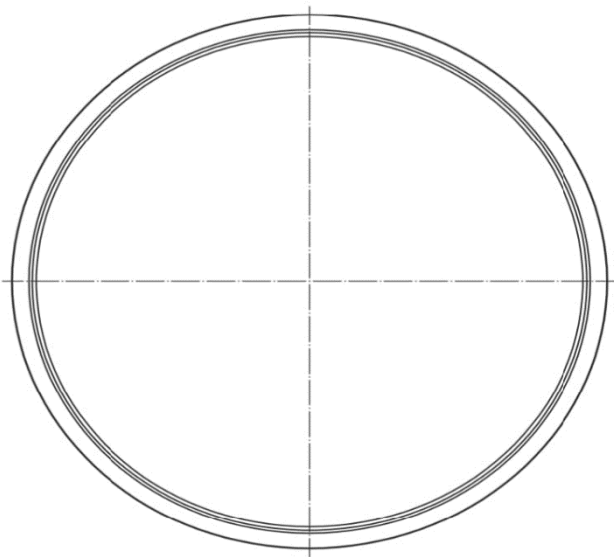
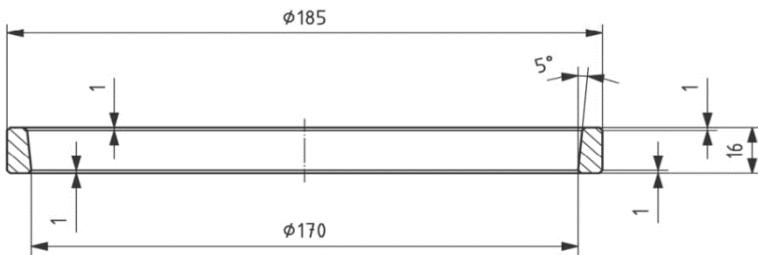


Figure A.3 — Outer ring

### **Annexure-3J**

Technical Specification of Apparatus for Moisture Vapour Transmission Rate as per Table 1 of IS 17334  
(Test Method ISO 11092)

<b>Sl. No</b>	<b>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</b>	<b>Requirement</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
1.	Types of tests to be performed	Moisture Vapour Transmission Rate
2.	Materials to be tested	Surgical Drapes and Surgical Gowns
3.	Construction	Moisture Vapour Transmission Rate apparatus as per Annex-A
4.	Measuring Unit	Temperature Control, Resolution 0.01 Kelvin Water Supply Control Metal Plate Thickness: 3mm Metal Plate Area: 0.04 m <sup>2</sup> or more  Annex-A, Fig 1
5.	Thermal Guard	Temperature control Resolution 0.01-degree C  Annex-A, Fig 2
6.	Testing enclosure	Encasing measuring unit, thermal guard Humidity control Temperature control  Annex-A
7.	Reference Material	Pre-calibrated RM for Thermal Conductivity

## Annex-A

**5.1 Measuring unit, with temperature and water supply control**, consisting of a metal plate approximately 3 mm thick with a minimum area of 0,04 m<sup>2</sup> (e.g. a square with each side 200 mm in length, *l*) fixed to a conductive metal block containing an electrical heating element [see [Figure 1](#), items (1) and (6)]. For the measurement of water-vapour resistance, the metal plate (1) must be porous. It is surrounded by a thermal guard [item (8) of [Figure 2](#)] which is in turn located within an opening in a measuring table (11).

The coefficient of radiant emissivity of the plate surface (1) shall be greater than 0,35, measured at 20 °C between the wavelengths 8 µm to 14 µm, with the primary beam perpendicular to the plate surface and the reflection hemispherical.

Channels are machined into the face of the heating element block (6) where it contacts the porous plate to enable water to be fed from a dosing device (5).

The position of the measuring unit with respect to the measuring table shall be adjustable, so that the upper surface of test specimens placed on it can be made coplanar with the measuring table.

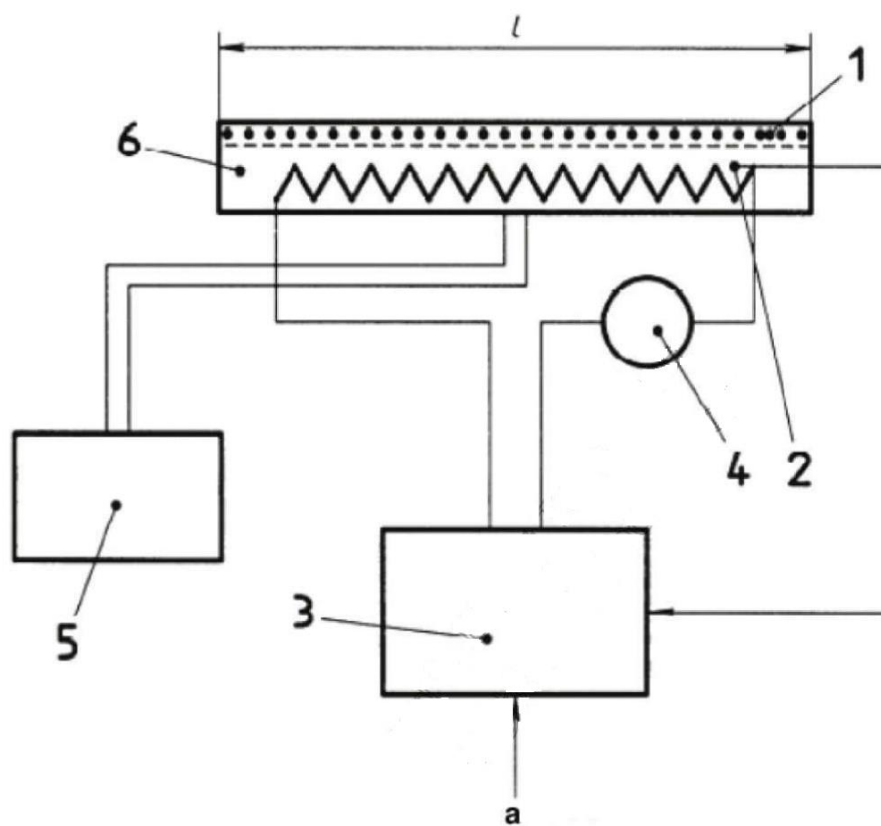
Heat losses from the wiring to the measuring unit or to its temperature measuring device should be minimized, e.g. by leading as much wiring as possible along the inner face of the thermal guard (8).

The temperature controller (3), including the temperature sensor of the measuring unit (2), shall maintain the temperature  $T_m$  of the measuring unit (7) constant to within  $\pm 0,1$  K. The heating power  $H$  shall be measurable by means of a suitable device (4) to within  $\pm 2$  % over the whole of its usable range.

Water is supplied to the surface of the porous metal plate (1) by a dosing device (5) such as a motor-driven burette. The dosing device is activated by a switch which senses when the level of water in the plate falls more than approximately 1,0 mm below the plate surface, in order to maintain a constant rate of evaporation. The level switch is mechanically connected to the measuring unit.

Before entering the measuring unit, the water shall be preheated to the temperature of the measuring unit. This can be achieved by passing it through tubes in the thermal guard before it enters the measuring unit.

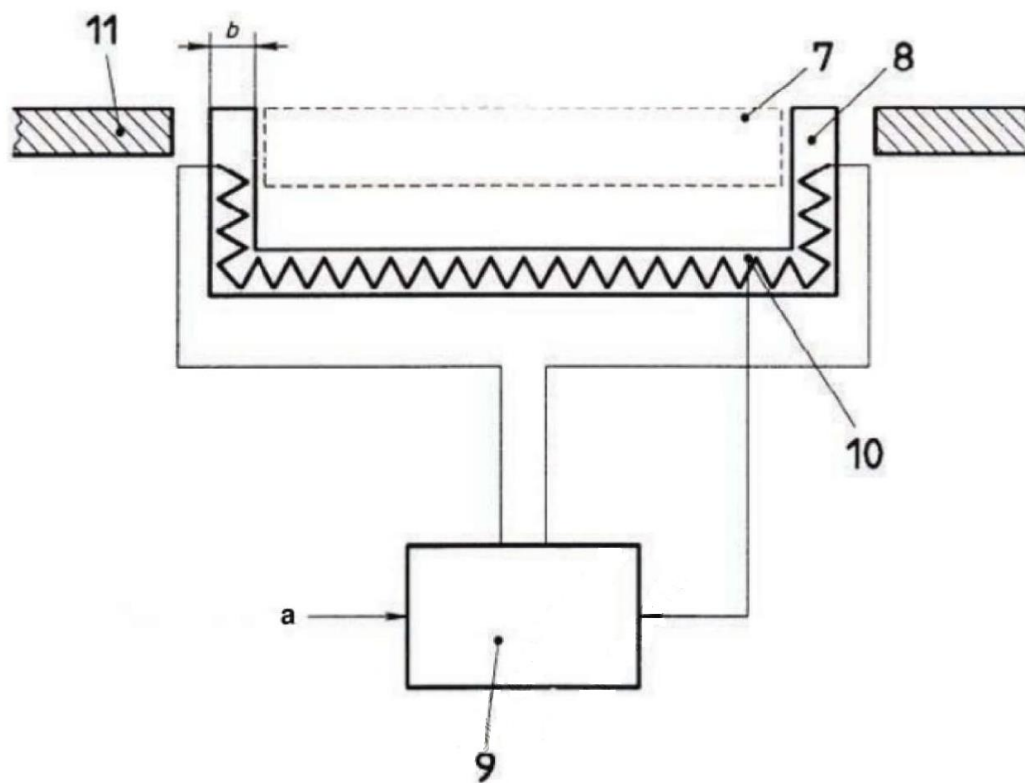




**Key**

- 1 metal plate
- 2 temperature sensor
- 3 temperature controller
- 4 heating-power measuring device
- 5 water-dosing device
- 6 metal block with heating element
- a Set value of  $T_m$ .

**Figure 1 — Measuring unit with temperature and water supply control**



**Key**

- 7 measuring unit according to 5.1
- 8 thermal guard
- 9 temperature controller
- 10 temperature sensor
- 11 measuring table
- a Set value of  $T_s$ .

**Figure 2 — Thermal guard with temperature control**

**5.2 Thermal guard with temperature control** [item (8) of Figure 2], consisting of a material with high thermal conductivity, typically metal, and containing electrical heating elements.

Its purpose is to prevent heat leakage from the sides and bottom of the measuring unit (7).

The width  $b$  of the thermal guard (see Figure 2) should be a minimum of 15 mm. The gap between the upper surface of the thermal guard and the metal plate of the measuring unit shall not exceed 1,5 mm.

The thermal guard may be fitted with a porous plate and water-dosing system similar to that of the measuring unit to form a moisture guard.

The thermal guard temperature  $T_s$  measured by the temperature sensor (10) shall by means of the controller (9), be maintained at the same temperature as the measuring unit  $T_m$  to within  $\pm 0,1$  K.

**5.3 Test enclosure**, into which is built the measuring unit and thermal guard, and in which the ambient air temperature and humidity are controlled.

The conditioned air shall be ducted so that it flows across and parallel to the upper surface of the measuring unit and thermal guard. The height of the duct above the measuring table shall not be less than 50 mm.

The drift of the temperature  $T_a$  of this air flow shall not exceed  $\pm 0,1$  K for the duration of a test. For the measurement of thermal resistance and water vapour resistance values below  $100 \text{ m}^2\cdot\text{Pa}/\text{W}$ , an accuracy of  $\pm 0,5$  K is sufficient.

The drift of the relative humidity R.H. of this air flow shall not exceed  $\pm 3$  % R.H. for the duration of a test.

This air flow is measured at a point 15 mm above the measuring table over the centre of the uncovered measuring unit and at an air temperature  $T_a$  of  $20^\circ\text{C}$ . The air speed  $v_a$  measured at this point shall have a mean value of 1 m/s, with the drift not exceeding  $\pm 0,05$  m/s for the duration of a test.

It is important that at this point the air flow shall have a certain degree of turbulence, expressed by the related variation in air speed  $s_v/v_a$  of between 0,03 and 0,07, measured at approximately 6 s intervals over a time period of at least 10 min with an instrument which has a time constant of less than 1 s.

### **Annexure-3K**

## **TECHNICAL SPECIFICATION OF BLENDER (PERISTALTIC BLENDER WITH STERILE BAGS)**

<b>Sl. No.</b>	<b>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</b>	<b>Requirement</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
<b>1.</b>	<b>Equipment Name</b>	BLENDER (PERISTALTIC BLENDER WITH STERILE BAGS)
<b>2.</b>	<b>Types of tests to be performed</b>	Cleanliness – Microbial test for Surgical Gowns and Surgical Drapes as per IS 17334: 2019 and Shoe Covers as per IS 17349: 2020
<b>3.</b>	<b>SIZE</b>	Dimensions (Approx.): 27 cm X 41cm X 27cm (Width X Depth X Height)
<b>4.</b>	<b>BODY</b>	Stainless Steel
<b>5.</b>	<b>CAPACITY</b>	Upto 400 ml
<b>6.</b>	<b>DOOR</b>	Window door with 270° opening
<b>7.</b>	<b>BLENDING SPEED</b>	Variable speed: 4,6,8,10 strokes / second
<b>8.</b>	<b>BLENDING TIME</b>	From 1 second to 59 min,∞
<b>9.</b>	<b>DIGITAL SCREEN</b>	Digital screen shall be provided to operate and monitor operations
<b>10.</b>	<b>OTHER FEATURES</b>	Silent brushless motor Removable and autoclavable paddles Adjustable blending power (up to 25 kg of pressure) Blending power indicator Side by side paddle stop System shall be leak free Security drip tray shall be provided
<b>11.</b>	<b>ACCESSORIES</b>	Necessary accessories shall be provided for successful installation i. e. sterile bags with and without filter (Minimum 100 each), bag clips (Minimum 25 Pieces) , bag rack(Minimum 1 Piece) etc.
<b>12.</b>	<b>INSTALLATION AND DEMOSTRATION</b>	All functions shall be demonstrated at the time of installation.

### **Annexure-3L**

#### **TECHNICAL SPECIFICATION OF CENTRIFUGE**

<b>Sl. No.</b>	<b>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</b>	<b>Requirement</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
<b>1.</b>	<b>Equipment Name</b>	CENTRIFUGE
<b>2.</b>	<b>Types of tests to be performed</b>	Viral resistance test for Surgical Gowns and Surgical Drapes as per IS 17334: 2019
<b>3.</b>	<b>SIZE</b>	Dimensions (Approx.): 30 cm X 50 cm X 30 cm (Width X Depth X Height)
<b>4.</b>	<b>SPEED</b>	500 to 1500 rpm, with 1 rpm increment
<b>5.</b>	<b>CAPACITY</b>	Upto 1 Lt.
<b>6.</b>	<b>RUN TIME</b>	30 Seconds to 9999 Minutes or Continuous Operation
<b>7.</b>	<b>MOTOR</b>	Brushless motor drive, maintenance free
<b>8.</b>	<b>NOICE LEVEL</b>	Below 60 db
<b>9.</b>	<b>SAFETY FEATURES</b>	Door interlock Over speed detector Automatic rotor selection for safety Automatic imbalance detection Automatic over speed detection Sound alert function
<b>10.</b>	<b>ACCESSORIES</b>	Bio-containment, safe and autoclavable rotors:  a) Fixed angle rotor for 100 ml b) Fixed angle rotor for 50 ml c) Fixed angle rotor for 2 ml
<b>11.</b>	<b>INSTALLATION AND DEMOSTRATION</b>	All functions shall be demonstrated at the time of installation.

### **Annexure-3M**

Test Equipment for Differential Pressure Test

### **Differential pressure test**

The portable equipment/setup which is able to meet the test method requirement and has been validated with requirement of IS 16289: 2014 or equivalent ASTM/ISO/EN / standards can be quoted.

Applicable for class 1, class 2 and class 3 surgical face mask

The quoted setup / device shall be able to meet the principal as detailed below:

Principle:

A device which measures the pressure differential required to draw air through a measured surface area at a constant air flow rate is used to measure the air

exchange pressure of the surgical mask material, as shown in Fig.1. Water-filled manometers (M1 and M2) are used to measure the pressure differential. A flow meter is used for measurement of the air flow. An electric vacuum pump draws air through the apparatus and a needle valve is used to adjust the air flow rate.

### **Specifications**

- Air source: Air compressor
- Test airflow:  $(8 \pm 0.2)$  L / min
- Sealing type: O-shaped ring seal
- Manometer range: 0 ~ 500 Pa
- The internal diameter of the top holder and the bottom holder in the contact area with specimen:  $\Phi 25$  mm, area  $4.9 \text{ cm}^2$
- Test time: Adjustable
- Power: AC 220 V 50 Hz 1 Kw

### C-1 PRINCIPLE

A device which measures the pressure differential required to draw air through a measured surface area at a constant air flow rate is used to measure the air

exchange pressure of the surgical mask material, as shown in Fig.1. Water-filled manometers (M1 and M2) are used to measure the pressure differential. A flow meter is used for measurement of the air flow.

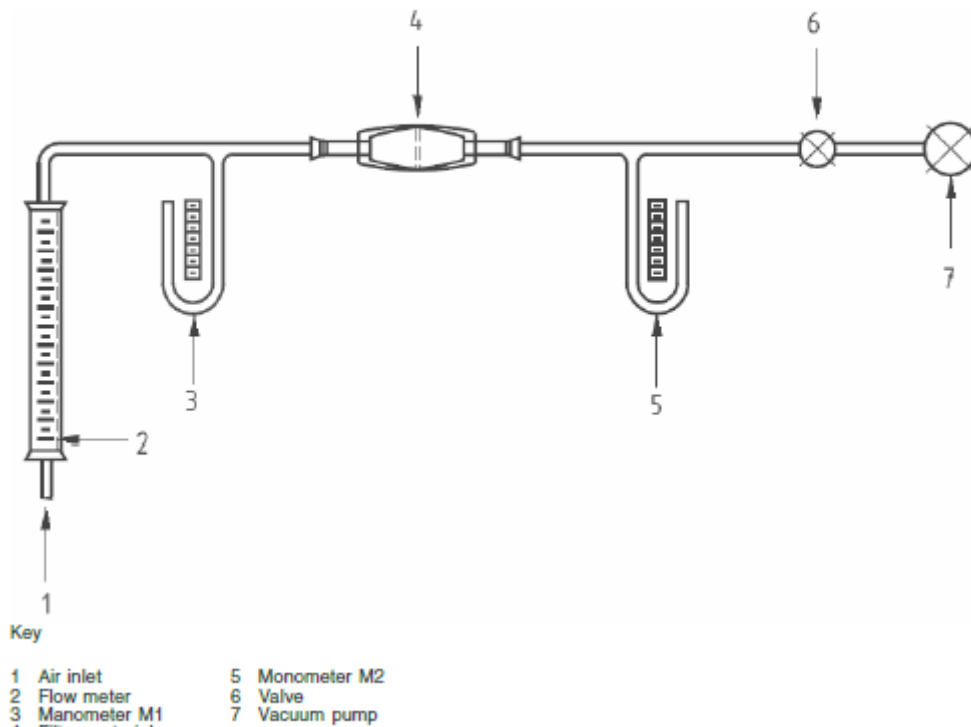


FIG. 1 APPARATUS FOR MEASURING AIR RESISTANCE

## **Annexure-3N**

### **Splash Resistance Test**

Applicable for class 3 surgical face mask

The portable equipment/setup which is able to meet the test method requirement and has been validated with requirement of IS 16289 : 2014 or equivalent ASTM/ISO/EN / standards can be quoted.

The quoted setup/ device shall be able to meet the principal as detailed below:

#### **Principle**

A volume of synthetic blood is disbursed at a specimen mask by a pneumatically controlled valve from a set distance at specified pressure to simulate the impact

of blood or other body fluid onto the specimen. The velocity and volume of fluid are set to simulate a given health care scenario.

#### **Apparatus**

A suitable test apparatus to dispense a specified volume of synthetic blood through a small diameter canula (1.27 cm long with an internal diameter of 0.084 cm) over a controlled amount of time at a specimen mask a set distance away. The test apparatus consists of a specimen holding fixture, a targeting plate, a pressurized fluid reservoir, a pneumatically actuated valve with interchangeable canula and a valve controller. The test apparatus includes a base for more convenient mounting of the components and a hood or other components to contain or control the splash.

Synthetic blood penetration tester, is used for measuring the resistance of surgical face masks to penetration by a splash of synthetic blood.

A sample surgical face mask is supported on this synthetic penetration tester's sample clamping device, a fixed volume(~2ml) synthetic blood is splashed by this tester horizontally to hit the mask, this tester can provide different blood pressures with the control of precise valve to generate a 2ml volume of synthetic blood with the surface tension of  $0.042 \pm 0.002$  N/m

#### **Specifications**

- Blood spraying distance: 300 mm ~ 310 mm adjustable
- Needle/ canula inner Diameter: 0.084 cm
- Canula length: 1.27cm
- Spraying speed: 450cm / s, 550cm / s, 635cm / s
- Stimulated synthetic Blood pressure: 10.6kPa, 16.0 kPa, 21.3 kPa (ie 80mmHg, 120mmHg, 160mmHg)



### Annexure-3 O

#### CO<sub>2</sub> content of Inhalation Air

##### List of Equipment

###### Setup 1:

- Sheffield dummy head
- Blower, duct and sensor for air flow
- Breathing machine (adjusted to 25 cycles/min and 2 l/stroke) with solenoid valves controlled by the breathing machine
- Flowmeter
- Humidifier
- CO<sub>2</sub> analyzer
- CO<sub>2</sub> absorber
- Control valve and non-return valve
- Auxiliary lung
- Compensator
- Sampling line for inhalation air

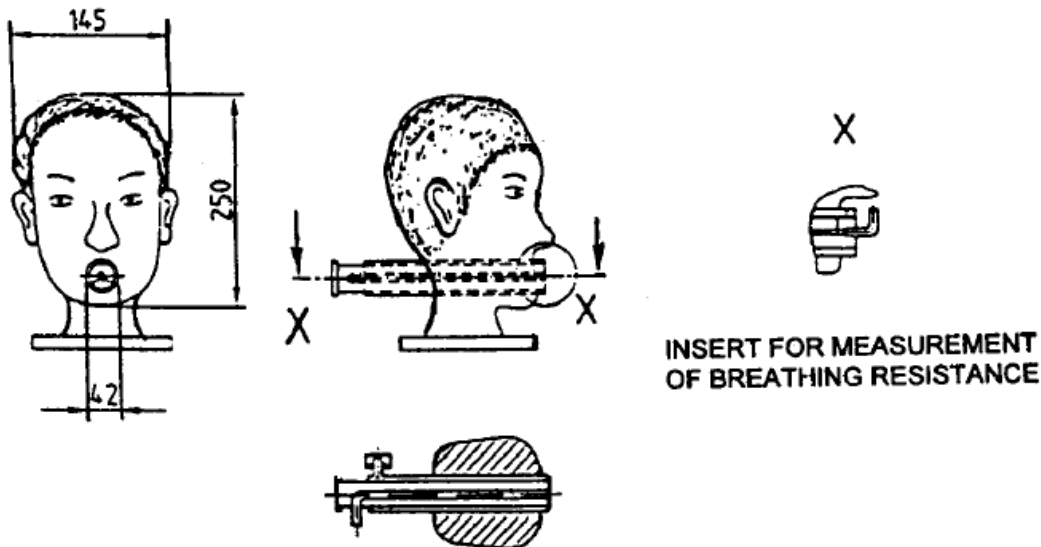
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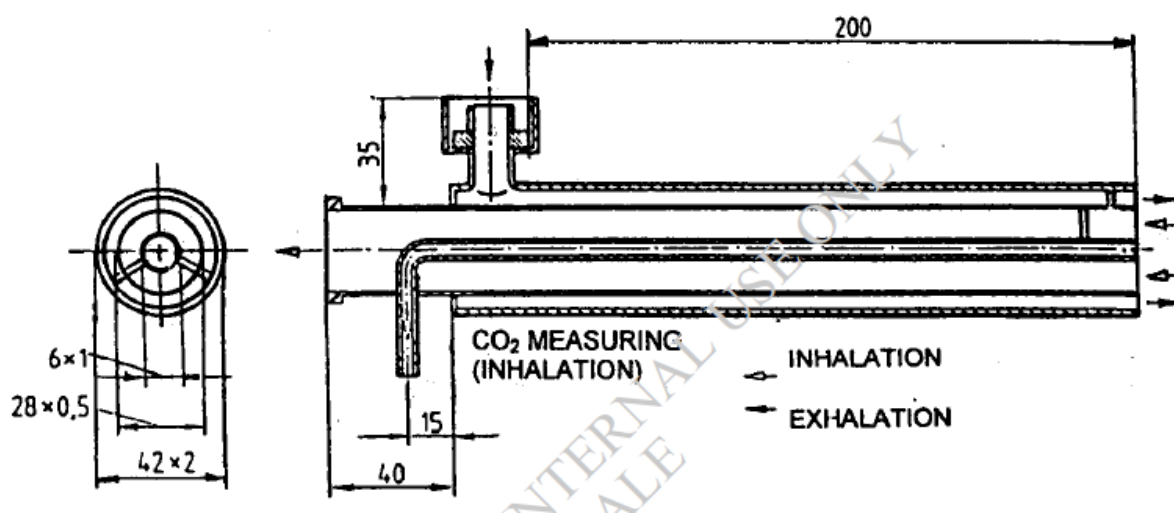
Automated instrument for determination of carbon dioxide content of inhalation air, validated against the test method given below:

##### Test Details

1. The apparatus consists essentially of a breathing machine with solenoid valves controlled by the breathing machine, a connector, a CO<sub>2</sub> flow meter, a CO<sub>2</sub> analyzer and a humidifier.

The apparatus subjects the filtering half mask to a respiration cycle by the breathing machine. For this test, the filtering half mask shall be fitted securely in a leak-tight manner but without deformation to the dummy head (type Sheffield) (see Fig. 1). Air shall be supplied to it from a breathing machine adjusted to 25 cycles/min and 2.0 l/stroke and the exhaled air shall have a carbon dioxide content of 5 percent by volume. A typical test arrangement is shown in Fig 2.





All dimensions are in millimeters

**Figure 1 Dummy Head (Sheffield Head) for Carbon Dioxide Content Test of the Inhalation Air (Dead Space) for a Filtering Half Mask**

If the design of the test equipment causes a CO<sub>2</sub> buildup, a CO<sub>2</sub> absorber shall be used in the inhalation branch between solenoid valve and breathing machine.

The CO<sub>2</sub> is fed into the breathing machine via a control valve, a flow meter, a compensating bag and two non-return valves.

Immediately before the solenoid valve a small quantity of exhaled air is preferably continuously withdrawn through a sampling line and then fed into the exhaled air via a CO<sub>2</sub> analyzer.

To measure the CO<sub>2</sub> content of the inhaled air, 5 percent of the stroke volume of the inhalation phase of the breathing machine is drawn off at the marked place by an auxiliary lung and fed to a CO<sub>2</sub> analyzer. The total dead space of the gas path (excluding the breathing machine) of the test installation should not exceed 2000 ml.

The CO<sub>2</sub> content of the inhaled air shall be measured and recorded continuously.

## 2. Test conditions

Ambient atmosphere: Laboratory ambient

Exhalation air:  $37 \pm 2$  °C,  $\geq 95$  percent relative humidity

Air flow from the front: 0.5 m/s

For test arrangement: see Fig 3

This test shall be performed until a constant carbon dioxide content in inhalation air is achieved.

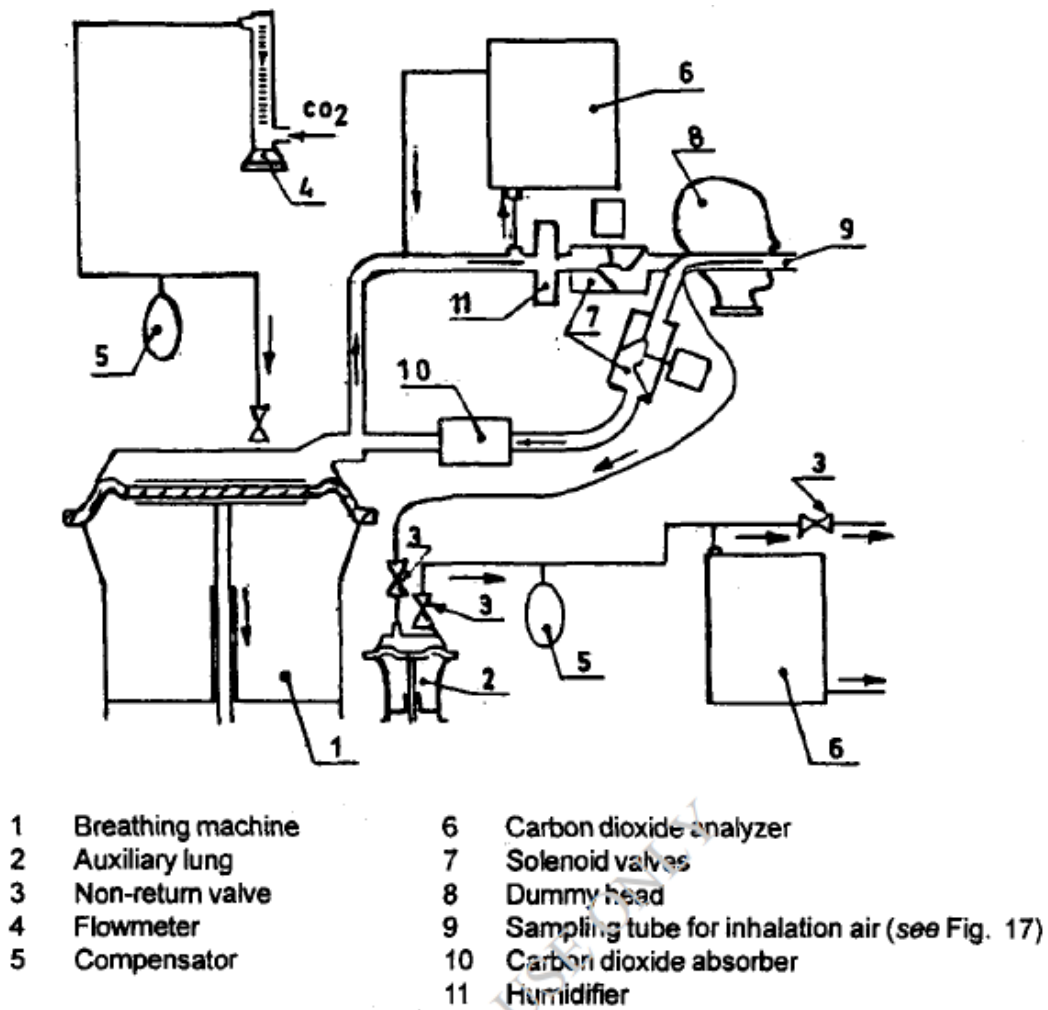


Figure 2 Scheme of Typical Test Rig for Carbon Dioxide Content of the Inhalation Air

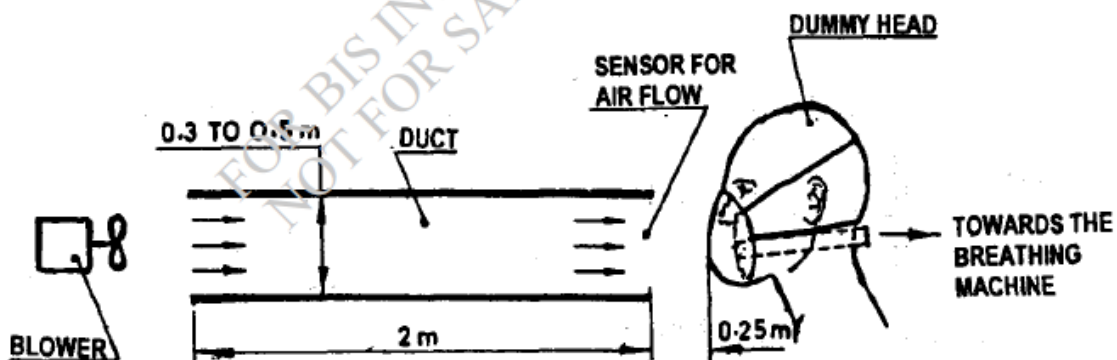


Fig 3 Scheme of Test Arrangement and Air Flow for Carbon Dioxide Test

### Annexure- 3 P

#### Technical Specification of Optical requirements of eye-protectors as per Cl 5.1.1.2 of IS 5983:1980

<b>Sr. No.</b>	<b>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</b>	<b>Requirement</b>
<b>1.</b>	<b>Test to be Carried out</b>	Optical requirements of eye-protectors for Un mounted Oculars and Mounted Oculars
<b>Unmounted Oculars</b>		
<b>2.</b>	<b>Telescope</b>	a) Magnification: between 7.5 and 20 (recommended magnification 15) b) Aperture: 15 to 20 mm c) adjustable eye-piece fitted with a graticule
<b>3.</b>	<b>Target</b>	a) black plate with the cut-out pattern shall be as shown in <b>Annex-1</b> b) The bars are 2.0 mm wide c) The bigger annulus depicted inside the bars shall have diameter of 23 mm with an annular aperture of 0.6 mm and the smaller annular has a diameter of 11 mm. d) The diameter of the central aperture shall be 0.6 mm. e) This target shall be mounted on a glass plate. f) The target shall be trans-illuminated by means of a parallel beam of monochromatic light of adjustable intensity, using interference filter to reduce chromatic aberrations.
<b>4.</b>	<b>Interference filter</b>	for wavelength $5.55 \pm 10$ nm and a half for wavelength $5.55 \pm 10$ nm and a half band width of approximately 50 nm band width of approximately 50 nm.
<b>5.</b>	<b>Standard lenses</b>	Refractive Powers: $\pm 0.6 \text{ m}^{-1}$ , $\pm 0.12 \text{ m}^{-1}$ and $\pm 0.25 \text{ m}^{-1}$ (tolerance $\pm 0.01 \text{ m}^{-1}$ )
<b>6.</b>	<b>Test setup</b>	Shall have the mechanism/frame/test setup to Adjust the distance between the telescope and the target at $4.6 \pm 0.1$ m.
<b>Mounted oculars</b>		
<b>7.</b>	<b>Standard Support</b>	Standard support shall be made of metal or any other rigid material, so that it reproduces the actual position of spectacles in front of the eyes, when worn (Refer Fig.2)
<b>8.</b>	<b>Telescopes</b>	1. Two telescopes (as under) fitted with diaphragms 6 mm in diameter: a) Magnification: between 7.5 and 20 (recommended magnification 15) b) Aperture: 15 to 20 mm c) adjustable eye-piece fitted with a graticule 2. The telescopes shall be fixed on the standard support in alignment with two parallel axes 66 mm apart, this parallelism being nearest to one minute of an arc.
<b>9.</b>	<b>Double target</b>	a) Shall be as per Fig 3. b) Shall be Illuminated by the double target by a strong light.

10.	<b>Standard lenses</b>	Quantity: Two sets (as under) Refractive Powers: $\pm 0.6 \text{ m}^{-1}$ , $\pm 0.12 \text{ m}^{-1}$ and $\pm 0.25 \text{ m}^{-1}$ (tolerance $\pm 0.01 \text{ m}^{-1}$ )
11.	<b>Test setup</b>	Shall have the mechanism/frame/test setup to Adjust the distance between the telescope and the target at $4.6 \pm 0.1 \text{ m}$ .
12.	<b>Software</b>	Shall display/give the direct test result using system software Computers can be connected via Ethernet interface
13.	<b>Any other information</b>	a) Equipment shall conform to the requirements of Cl 5.1.1.2 of IS 5983:1980, Cl 3.1 of IS 7524 Pt 2:1980 and Cl 3.2 of IS 7524 Pt 2:1980 (relevant portion of the standard is given in Annex-A & B). b) Calibration by NABL accredited agency shall be part of commissioning by supplier for applicable parameters. c) <b>Power supply:</b> 220/230 V AC, single phase, 50 Hz.

## Annex-A

**5.1.1.2 Optical requirements** — In order to affect vision as little as possible, the prismatic and spherical effects and astigmatism shall be as small as possible.

a) *Unmounted oculars* — Optical requirements of unmounted oculars shall be measured by the method given in 3.1 of IS : 7524 (Part II)-1980\*. The permissible tolerances shall be as given in Table 2. All measurements shall be taken for:

i) *Spherical effect and astigmatism* — at a minimum of four points in an area of 40 mm diameter around the geometrical centre of the ocular. One of the four points shall be the geometrical centre of the ocular and other points may be chosen by agreement between the manufacturer of the oculars and the manufacturer of the eye-protectors using these oculars; and

ii) *Prismatic effect* — at the geometrical centre of the ocular.

**TABLE 2 PERMISSIBLE TOLERANCES FOR SPHERICAL EFFECT, ASTIGMATISM AND PRISMATIC EFFECT FOR UNMOUNTED OCULARS**

[Clause 5.1.1.2(a)]

TYPE OF OCULARS	SPHERICAL EFFECT, $m^{-1}$	ASTIGMATISM, $m^{-1}$	PRISMATIC EFFECT, cm/m
(1)	(2)	(3)	(4)
a)	$\pm 0.06$	0.06	0.12
b)	$\pm 0.12$	0.12	0.25

b) *Mounted oculars* — Optical requirements of mounted oculars and spectacles shall be measured in accordance with one of the methods given in 3.2 of IS : 7524 (Part II)-1980\*; eye-protectors being positioned on the standard support after being subjected to the test for stability at elevated temperature (see 5.1.2.1). Either of the two methods A or B, by measurement or tolerance, may be used. The permissible tolerances shall be as given in Table 3. All measurements shall be taken as given in (a) and (b) in 5.1.1.2.

b) *Mounted oculars* — Optical requirements of mounted oculars and spectacles shall be measured in accordance with one of the methods given in 3.2 of IS : 7524 (Part II)-1980\*; eye-protectors being positioned on the standard support after being subjected to the test for stability at elevated temperature (see 5.1.2.1). Either of the two methods A or B, by measurement or tolerance, may be used. The permissible tolerances shall be as given in Table 3. All measurements shall be taken as given in (a) and (b) in 5.1.1.2.

## Annex-B

### 3.1 Testing Unmounted Oculars

#### 3.1.1 Apparatus

**3.1.1.1 Telescope** — having a magnification between 7.5 and 20 (recommended magnification 15) with an aperture of 15 to 20 mm and an adjustable eye-piece fitted with a graticule, for example, a thiodolite which is adjustable both vertically and laterally.

NOTE — In the event when the telescope shows a doubling of the image or other aberration the ocular to be tested shall be examined with a 5-mm aperture in instrument to locate and qualify the area or areas of observation in the total area of 20-mm diameter. A focometer may be used for this purpose.

#### 3.1.1.2 Adjustable light source with condenser

**3.1.1.3 Target** — consisting of a black plate with the cut-out pattern shown in Fig. 1. The bars are 2.0 mm wide. The bigger annulus depicted inside the bars has a diameter of 23 mm with an annular aperture of 0.6 mm and the smaller annular has a diameter of 11 mm. The diameter of the central aperture is 0.6 mm. This target is mounted on a glass plate.

**3.1.1.4 Interference filter** — for wavelength  $555 \pm 10$  nm and a half-band width of approximately 50 nm.



Fig. 1

**3.1.1.5 Standard lenses** — with refractive powers of  $\pm 0.6 \text{ m}^{-1}$   $\pm 0.12 \text{ m}^{-1}$  and  $\pm 0.25 \text{ m}^{-1}$  (tolerance  $\pm 0.01 \text{ m}^{-1}$ ).

### 3.1.2 Procedure

**3.1.2.1 Calibration and test** — Place the telescope and the optical system of the target so that they are on the same axis. Trans-illuminate the target (Fig. 1) by means of a parallel beam of monochromatic light of adjustable intensity, using interference filter to reduce chromatic aberrations. Adjust the distance between the telescope and the target at  $4.6 \pm 0.1 \text{ m}$ . Focus the reticule and the target aligning the telescope so that a clear image of the pattern is obtained. Regard this setting as the zero point of the diopetre scale of the telescope.

NOTE — The focusing adjustment of the telescope shall be calibrated so that a power of  $0.01 \text{ m}^{-1}$  can be measured.

**3.1.2.2** Insert the standard lenses (3.1.1.5), one at a time, in the order of ascending refractive powers, normal to the axis of the telescope, in the path of the rays and adjust the telescope to get a clear image of the target each time. Mark these positions on the diopetre scale of the telescope for the respective refractive powers.

**3.1.2.3** Next insert the test lenses in place of the standard lenses as in 3.1.2.2. Adjust the telescope to get a clear image and note their refractive powers from the diopetre scale of the telescope.

**3.1.2.4** Record astigmatism of the lens as the maximum difference between the values of refractive powers obtained in resolving the horizontal and vertical bars (see Fig. 1) of the target during rotation of the test lens around its axis.

**3.1.2.5** For determining the prismatic power, place the test lens normal to the axis of the telescope, in the path of the rays and adjust the telescope to get a clear image. If on doing so, the point of intersection of the lines of the reticule falls outside the image of the bigger annulus the prismatic power of the test lens shall be taken as having exceeded  $0.25 \text{ cm/m}$ . If the permitted limit is  $0.12 \text{ cm/m}$ , the point of intersection of the lines of the reticule shall fall inside the image of the smaller annulus of the target.

## 3.2 Testing Mounted Oculars

### 3.2.1 Method A

**3.2.1.1 Apparatus** — Apparatus required for testing mounted oculars is as follows:

a) **Standard support** — made of metal or any other rigid material, so that it reproduces the actual position of spectacles in front of the eyes, when worn (see Fig. 2).

NOTE — Face shields, not having sides shall be positioned on the support as they are normally placed in front of the eyes when worn.

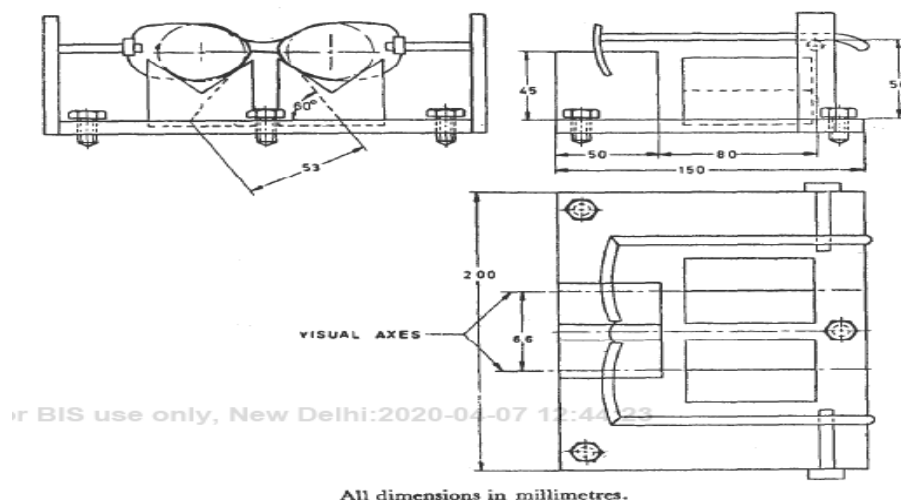
b) **Telescopes** — Two in number, similar to that presented in 3.1.1.1 and fitted with diaphragms 6 mm in diameter. The telescopes shall be fixed on the standard support in alignment with two parallel axes 66 mm apart, this parallelism being nearest to one minute of an arc.

c) **Double target** — as shown in Fig. 3.

d) **Standard lenses** — same as in 3.1.1.5, preferably two sets.



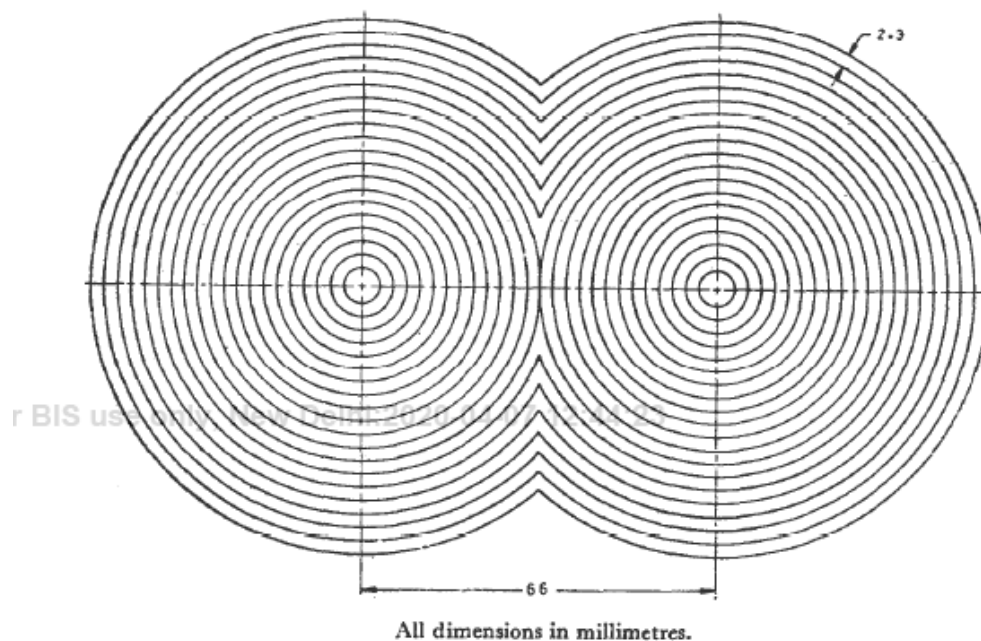
**3.2.1.2 Procedure** — Place the eye protector to be tested on the standard support with both telescopes, that is, one for each ocular in the case of spectacles and two-piece goggles, or one for each visual centre in the case of face-shields and one-piece goggles, in front of the double target so that they are both on the same axis. Illuminate the double target by a strong light and adjust the distance between the telescopes and the double target to  $4.6 \pm 0.1$  m. Measure the horizontal and vertical prismatic powers by counting (and, if necessary by interpolating between two circles), the number of circles from which the vertical line and the horizontal line of the reticule have moved. Since each circle represents  $0.05$  cm/m, the reading may be taken to the nearest  $\pm 0.025$  cm/m. Measure the



All dimensions in millimetres.

**FIG. 2 STANDARD SUPPORT FOR TESTING MOUNTED LENSES**

refractive power for each ocular or each visual centre according to the procedure given in 3.1.2. Determine the astigmatism by the difference of powers measured in resolving two areas of circles on the target.



All dimensions in millimetres.

**Fig. 3**

### Annexure 3 Q

#### Technical Specification of Stability (Ultraviolet Chamber) as per Cl 5.1.1.7 of IS 5983:1980

<b>Sr. No.</b>	<b><u>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</u></b>	<b>Requirement</b>
1.	<b>Test to be Carried out</b>	Stability in presence of ultra-violet radiation
2.	<b>Source of Exposure to Oculars</b>	Oculars shall be exposed to Ultraviolet Irradiation from a Quartz Envelope High Pressure Xenon Lamp of 450 W. (Annex-A)
3.	<b>Exposure mechanism and duration</b>	<p>a) shall be exposed from a distance of 300 mm, incident radiation being substantially normal to the surface of the ocular for a duration of 100 h.</p> <p>b) Shall have the mechanism/provision to reduce/adjust the distance from 300 mm to 200 mm to reduce the exposure time 50 h.</p> <p>c) The equipment shall conform to the requirements given for test in Annex-A.</p>
4.	<b>Testing Capacity</b>	At least Four samples at a time.
5.	<b>Internal chamber Size:</b>	<p>Shall have capacity to simultaneously accommodate four or more samples of various sizes of Oculars as per requirements laid down in IS 5983:1980 (Annex-A)</p> <p>Preferable Size: (Depth X Width X Height): 750mmx750mmx750mm</p>
6.	<b>Material used in construction:</b>	<p><b>Internal Chamber:</b> Internal Chamber including all holders and shelves are of Stainless Steel (Grade 304) of 16 SWG (Corrosion resistant) or better.</p> <p><b>Outer Chamber:</b> Mild Steel duly Powder coated 16 SWG or better.</p> <p><b>Door:</b> Door shall have provision to observe the ongoing conditioning activity with UV Protection (such as UV protection glass, sliding cover on glass window etc.).</p>
7.	<b>Display &amp; Controls</b>	<p>Chamber shall have provision for display of test duration and setting arrangement for customized time duration with automatic cutoff after completion of preset test duration.</p> <p>Display shall have provision for:</p> <p>a) Lamp on and off.</p> <p>Shall have emergency control mechanism.</p> <p>Shall have auto start mechanism in case of power failure.</p>
8.	<b>Additional Requirements/features</b>	<p>a) Equipment shall conform to the requirements of Cl 5.1.1.7 of IS 5983:1980 (relevant portion of the standard is given in Annex-A).</p> <p>b) <b>Working Capacity:</b> Capable to run continuously for minimum period 100 hours. Timer shall be capable of retaining the completed test duration in case of power failure and shall resume from the same point.</p> <p>c) <b>Power supply:</b> 220/230 V AC, single phase, 50 Hz.</p> <p>d) <b>Voltage Stabilizer:</b> Shall be part of supply.</p> <p>e) <b>Calibration:</b></p>

		-Calibration by NABL accredited agency shall be part of commissioning by supplier for applicable parameters. -Certificate regarding Ultraviolet Irradiation by a 450 W Quartz Envelope High pressure Xenon Lamp
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## Annex-A

### (Cl 5.1.1.7 of IS 5983:1980)

**5.1.1.7 Stability in presence of ultra-violet radiation** — The oculars shall be subjected to the test by exposing them for 100 h to radiation from a quartz-envelop high pressure xenon lamp of 450 W at a distance of 300 mm, incident radiation being substantially normal to the surface of the ocular.

**NOTE** — It is permissible, for routine testing, to reduce the time of exposure and the distance to the ocular, for example, to 50 h at 200 mm.

### Annexure 3 R

#### Technical Specification of Equipment for determining transmittances as per cl 5.2.1.1 of IS 5983:1980 and Cl. 6.2 of IS7524(Pt-2):1979

<b>Sr. No.</b>	<b>Components/ Fixtures/ Accessories/ Spare parts/ CRMs etc.</b>	<b>Requirement</b>
<b>1.</b>	<b>Test to be Carried out (Method B)</b>	Determination of transmittances
<b>2.</b>	<b>Source of Light to measure transmittance by Method B</b>	Tungsten filament lamp of 100 W rating.
<b>3.</b>	<b>Apparatus</b>	<ul style="list-style-type: none"> <li>• <b>Detectors</b> - Photo-voltaic cells and thermopiles for visible and infrared regions, respectively.</li> <li>• <b>Light source</b> - Tungsten filament lamp of 100 W rating, provision shall be made to scan a light beam of 5 mm diameter over the entire area of test piece (ocular).</li> <li>• <b>Micro-ammeter</b> -having a range of 0-250 <math>\mu</math>A with a least count of 1 micro-ampere, preferably Digital.</li> <li>• <b>Optical bench</b> - capable of holding the detectors in position in front of the light source.</li> <li>• Arrangement shall be made to hold the test piece perpendicular to the flux.</li> <li>• The apparatus shall conform to the requirements of test prescribed in Annex-A &amp; Annex-B.</li> </ul>
<b>4.</b>	<b>Testing Capacity</b>	1 sample at once
<b>5.</b>	<b>Additional Requirements/features</b>	<p><b>Apparatus:</b></p> <ul style="list-style-type: none"> <li>• The apparatus shall be constructed in such a manner that it may be easily cleaned for dust or greasy material etc before the test.</li> <li>• The relative uncertainty of the test setup/Apparatus shall remain within limits specified in <b>Table 2 of IS 7524(Pt-2):1979 (Refer Annex-B)</b>.</li> <li>• an outer cover shall be provided with the setup to protect the setup against dust other contaminant while not in use.</li> </ul> <p><b>Power supply:</b> 220/230 V AC, Single phase, 50 Hz.</p> <p><b>Voltage Stabilizer:</b> Voltage Stabilizer compatible with the equipment shall be part of supply.</p> <p><b>Calibration:</b></p> <ul style="list-style-type: none"> <li>-Calibration by NABL accredited agency shall be part of commissioning by supplier for applicable parameters.</li> <li>-Certificate regarding Rating of the 100 W tungsten filament lamp.</li> </ul>

## Annex-A

### (Cl 5.2.1.1 of IS 5983:1980)

**5.2.1.1 Transmittance** — Transmittance variations measured by scanning with a light beam of 5 mm diameter over the entire area of an ocular, except in the marginal area 5 mm wide, shall remain within the limits defined as 'relative uncertainty' in Table 2 of IS : 7524 (Part II)-1980†.

NOTE — In the case of curved oculars, the limits shall apply only to the optical viewing area.

a) *Oculars without filtering action* — If oculars are used solely to protect the eyes against mechanical and chemical hazards, their luminous transmittance shall be within the limits of shade number 1.2 (see Table 1).

b) *Oculars with filtering action* — If oculars are used to protect the eyes against harmful radiations, that is, as welding filters, ultra-violet filters, infra-red filters or daylight filters, they shall comply with transmittance requirements and appropriate chromaticity limits as prescribed in Appendix B.

## Annex-B

### (Table-2 of IS 7524(Pt.2):1979)

**TABLE 2 LIMITS OF INHERENT MEASURING ERRORS**  
( Clause 6.1.3 )

TRANSMITTANCE VALUE	RELATIVE UNCERTAINTY
(1) PERCENT	(2) PERCENT
100 to 17.9	5
Above 17.9 to 8.5	10
Above 8.5 to 0.45	10
Above 0.45 to 0.023	15
Above 0.023 to 0.001 2	20
Above 0.001 2 to 0.000 023	30
Reduced luminance factor	25

## 6.2 Method B

### 6.2.1 Apparatus

**6.2.1.1 Detectors** — Photo-voltaic cells and thermopiles for visible and infrared regions, respectively.

**6.2.1.2 Light source** — Tungsten filament lamp of 100 W rating.

**6.2.1.3 Microammeter** — having a range of 0-250  $\mu\text{A}$  with a least count of 1 micro-ampere.

**6.2.1.4 Optical bench** — capable of holding the detectors in position in front of the light source.

**6.2.3 Procedure** — Ensure that the oculars as such or mounted in frame are properly cleaned and are free from dust, greasy material, etc. Mount the photo-voltaic cell and the light source on the optical bench. Connect the photo-voltaic cell to the microammeter. Connect the light source to a constant voltage power supply.

**6.2.3.1** Switch on the light source and adjust the detector so that the microammeter shows the reading as 100  $\mu\text{A}$ . Next insert the cleaned ocular in the path of the rays so that its surface is perpendicular to the flux, care being taken that no stray light falls on the detector. Record the reading of the microammeter ( $V_1$ ) as the transmittance in the visible region.

NOTE — On removal of the ocular from the path of the rays, the microammeter needle should return to 100 on the scale.

**6.2.3.2** Repeat the measurement, next with thermopile as the detector and record the reading of the microammeter ( $V_2$ ). Obtain transmittance in the infrared region by subtracting the value  $V_1$  from  $V_2$ .