

TENDER FOR

Supply, Installation, Testing and Commissioning of Medical Gases Pipeline System

AT

NATIONAL INSTITUTE OF AYURVEDA, JAIPUR

NIT ISSUE DATE	:	29-10-2020
NIT NO.	:	NIA/CS/GPS/(1)28/2020
PRE-BID MEETING	:	05-11-2020 (3.00 pm)
LAST DATE OF SUBMISSION	:	17-11-2020 (2.00 pm)
BID OPENING DATE	:	18-11-2020 (2.00 PM)
TENDER COST	:	1500/-



NATIONAL INSTITUTE OF AYURVEDA

**MINISTRY OF AYUSH GOVT. OF INDIA
JORAWAR SINGH GATE AMER ROAD, JAIPUR**

Supply, Installation, Testing and Commissioning of Medical Gases Pipeline System
NIA/CS/MGPS/(1)28/2020/

National Institute of Ayurveda, Jaipur is an autonomous body under the Ministry of AYUSH, Government of India, invites Online bids in two bid system for tender **Supply, Installation, Testing and Commissioning of Medical Gases Pipeline System**. Best offers are invited along with the complete details of specifications, terms & conditions.

S.N.	ITEM DESCRIPTION	QUANTITY	EMD (Rs.)
1.	Supply, Installation, Testing, and Commissioning of Medical Gases Pipeline System	01	40,440/-

INSTRUCTIONS:

1. Bids shall be submitted online at CPPP website: <https://eprocure.gov.in/eprocure/app>
2. The complete bidding process is online. Bidders should be in possession of valid digital Signature Certificate (DSC) of class II or III for online submission of Bids, Prior to bidding DSC need to be registered on the website mentioned above.
3. Tenderer/Contractor/Bidders are advised to follow the instructions provided in the instructions to the contractors/Tenderer/Bidders for the e-submission of the bids online through the Central Public Procurement Portal for e-Procurement at <https://eprocure.gov.in/eprocure/app>
4. Bid documents may be scanned with 100 dpi in black and white option which helps in reducing size of the scanned document.

5. Tender Fee: Tender fee will be Non-refundable amount of one thousand Five hundred only (Rs. 1500/-).

6. Pre Bid Meeting:

Pre Bid meeting with the intending bidders shall be held on 05 November 2020 at 3.00 PM onwards in NIA, Jaipur. All the prospective bidders are requested to send comments/representations on or before pre-bid meeting. Intending bidder will be allowed to seek clarification of specifications, conditions of contract etc. in writing to NIA, Jaipur (e-mail: store-nia-rj@gov.in or nia-rj@nic.in) within 24 hours after the pre bid meeting.

7. EMD Payment:

The Bidder shall be required to submit the Earnest Money Deposit (EMD) for an amount of **Rs.40,440/-(Rupees forty thousand four hundred fortyOnly)** by way of demand drafts or Bank Guarantee only. The demand drafts or Bank Guarantee shall be drawn in favour of **“Director, NIA, Jaipur”** Payable at Jaipur. The EMD of the Successful Bidder shall be returned after the successful submission of Bank Guarantee/Security Deposit and for unsuccessful Bidder(s) it would be returned after award of the Contract. **The demand Drafts or Bank Guarantee for EMD must deliver to Director, NIA, Jaipur on or before last date /time of Bid Submission.**

- a) Tenderer shall not be permitted to withdraw his offer or modify the terms and conditions thereof. In case the tenderer fails to observe and comply with stipulation made herein or back out after quoting the rates, the aforesaid amount of earnest money will be forfeited.
- b) The firms who are registered with National Small industries corporation (NSIC) or Small Scale Industries (SSI) are exempted to submit the EMD(Copy of registration must be provided along with Technical Bid) Registration proof and UdyogAadhar Certificate should be enclosed with Technical Bid.
- c) Bidders are not allowed to submit more than one bid anytime during the tendering process for the same/similar tendered item else all his bids shall be cancelled thereby making him disqualified in addition to the forfeiture of the EMD.

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The EMD, in case of unsuccessful Bidders shall be retained by NIA, Jaipur till the finalization of the Tender. No Interest will be payable by NIA, Jaipur on EMD.

- d) EMD is required to protect the purchaser against the risk of Bidders conduct. The EMD will be forfeited if the bidder withdraws or amends its tender or impairs or derogates from the tender in any respect within the period of validity of its tender or if it comes to the notice that the information/ documents furnished in its tender is incorrect or false.
- e) The EMD/PBG shall be forfeited if successful bidder fails to supply the goods/equipment in stipulated time or fails to comply with any of the terms & conditions of the contract or fail to sign the contract.

8. Submission of Tender:

The tender shall be submitted online in two part, viz., Technical Bid and Financial Bid (BOQ). All the pages of bid being submitted must be signed and sequentially numbered by the bidder irrespective of nature of content of the documents before uploading.

The Bidder shall quote the Technical and Financial Bids as per the format enclosed with tender document. **The Bidders should submit their all relevant documents (Technical bid document and EMD proof etc) before last date and time of bid submission.**

The offers submitted by Telegram/Fax/email shall not be considered. No correspondence will be entertained in this matter.

9. Technical Bid:

All pages of the Tender should be numbered and indexed.

The bidder shall provide in its tender the required as well as the relevant documents like technical data, literature, drawings etc. to establish that the goods and services offered in the tender fully confirm to the goods and services specified by the purchaser in the tender documents. For this purpose, the bidder shall also provide a clause-by-clause commentary on the technical specifications and other technical details incorporated by the purchaser in the tender documents to establish technical responsiveness of the goods and services offered in its tender duly indicating relevant page numbers in the product literature.

The following documents are to be furnished by the contractor/Bidder along with Technical Bid as per the Tender Document:

- a) Signed and scanned copy of appropriate value of valid registration certificate (if any), experience certificate as per the tender notice, PAN, GST registration certificate and Tender Acceptance Letter.
- b) Signed and Scanned Copy of make and model of all systems, sub systems and additional items should be mentioned in the technical bid and complete technical details should be provided in the form of Brochures and write-ups.
- c) The bidders are required to submit user certificate for the relevant equipment on the letter head of the institution (Government/ Private)
- d) Signed & stamped compliance sheet of the technical specification of the goods with technical printed literature must be enclosed with the bid.
- e) **Manufacturer Authorization:** The bidder (if not original equipment manufacturer) must submit Original Equipment Manufacturer authorization certificate that the tenderer is authorized for selling and maintain the equipment quoted for.

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10. Financial Bid:

Price Schedule(s) as per BoQ format filled up with all the details including Make, Model etc. of the goods offered to be uploaded.

While filling up the columns of the Financial Bid, the following aspects should be noted for compliance:

Price should include:

- a) Duties and fees, if any.
- b) Charges towards Packing & Forwarding, Inland Transportation, Insurance, Loading/Unloading and other local costs incidental to delivery of the goods to their final destination as specified in the List of Requirements and Financial Bid.
- c) The price of annual CMC, as mentioned in List of Requirements, Technical Specification and Financial Bid.
- d) GST will be payable separately as per applicable rate.

Schedule of price bid in the form of BOQ_XXXX .xls

The below mentioned price bid format is provided as BoQ_XXXX.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. 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 NIA, Jaipur.

- 11.** The authorized signatory of the bidder must digitally sign the bid. Individuals digitally signing the bid or other documents connected with a contract must specify whether he signs as:
- a) A 'Sole Proprietor' of the firm or constituted attorney of such Sole Proprietor.
 - b) In case of partnership firm he must have authority to quote & to refer to arbitration dispute concerning the business of the partnership either by virtue of the partnership agreement or a power of attorney.
 - c) Constituted attorney of the firm if it is a company.

12. Turnover:

The Firm/Agency should have an annual total minimum turnover of Rs. 50 lac. during the Last 3 Years (2016-17, 2017- 18, 2018-19) to be eligible for consideration.

13. Validity:

The quoted rates must be valid for a period for 180 days from the date of closing of the tender. The overall offer for the assignment and bidder(s) quoted price shall remain unchanged during the period of validity. If the bidder quoted the validity shorter than the required period, the same will be treated as unresponsive and it may be rejected.

- 14.** The Bidding firm should be continuously engaged (with valid license/ Registration) in the same business at least for last 3 Years the bidding firm should have at least 1 similar contracts with Central Government / State Government / PSU's / Universities/Deemed to be Universities/autonomous bodies **Reputed Medical Institute of Organisation** in last 3 Years.
- 15. The bidder firm should not have been blacklisted by any Ministry/Department of Govt. of India/State Government/any PSU's etc. The Performance Security Deposit will be forfeited after awarding the Bid, in case the bidding firms found blacklisted by Central Government/State Government/PSU's/Universities/Deemed to be Universities/Autonomous Bodies at any point of time.**

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16. The Director, National Institute of Ayurveda reserve the right to accept or reject any/all tenders without assigning any reason thereof.

17. Availability of Funds:

Expenditure to be incurred for the proposed purchase will be met from the funds available with the purchaser/consignee.

18. Scope of Work:

The scope of work shall include Supply, Installation, Commissioning and Satisfactory Demonstration. This will also include testing, packing, transportation, scheduling of transportation, transit insurance, delivery at sites, unloading, storage, job site storage, insurance, installation any other services associated with the delivery of the equipment and materials providing warranty of services and operation and maintenance of other related equipment/items required for complete installation. The successful bidder will assume full responsibility of the complete system until final acceptance.

19. Delivery and Installation:

For goods supplied from India.

- a) All the goods ordered shall be delivered and Installed at NIA, JAIPUR within 30 days from the date of issue of supply order. All the aspects of safe delivery, installation and commissioning shall be the exclusive responsibility of the supplier. If the supplier fails to deliver, install and commission the goods on or before the stipulated date, then a penalty at the rate of 0.5% per week or a part thereof of the total order value shall be levied subject to maximum of 10% of the total order value. The successful tenderer will also provide required training for supplied items at NIA, JAIPUR. The goods should be manufactured after adoption of latest technology y. If at any time during the currency of the contract, the supplier encounters conditions hindering timely supply of the goods and performance of services, the supplier shall promptly inform the NIA, JAIPUR for extension of the delivery schedule accordingly.
- b) On receiving the supplier's communication, NIA, JAIPUR shall examine the situation as soon as possible and, at its discretion, may agree to extend the delivery schedule, with or without liquidated damages for completion of supplier's contractual obligations by issuing an amendment to the contract. In the case of package supply where the delayed portion of supply materially hampers installation and commissioning of the systems, liquidated damages charges shall be levied as above on the total value of the concerned package of the purchase order. Quantum of liquidated damages assessed and levied by the purchaser shall be final and not challengeable by the supplier.

20. Signing the Contract:

The successful bidder shall be required to execute the Contract Agreement accepting all terms and conditions stipulated herein on a non-judicial stamp paper of Rs. 500/- (Rs. Five Hundred only) along with performance security within fifteen days of the issue of the Letter of notification of a ward. In the event of failure on the part of the successful bidder to sign the Contract within the period stipulated above, the EMD shall be forfeited and the acceptance of BID shall be considered as cancelled.

21. Performance Security :

As a guarantee towards due performance and compliance of the contract work, the successful bidder (contractor) will deposit an amount equal to 5% of order value and should be kept valid for a period of 60 days beyond completion of all the contractual obligation, including

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CMC period towards security deposit by way of demand draft in favour of “**DIRECTOR, NIA JAIPUR**” payable at JAIPUR drawn on any Nationalized Bank/Scheduled Bank and payable at JAIPUR within fifteen days of the issue of the Letter of notification of award along with non-judicial stamp paper of Rs. 500/- (Contract agreement).

22. Incidental Services:

The supplier shall be required to perform the following services: -

- a) Installation & Commissioning, Supervision and Demonstration of the goods.
- b) Providing required jigs and tools for assembly, minor civil works required for the completion of the installation.
- c) On Site Training to Doctors/ Technicians/ Staff is to be provided by Supplier for operation and maintenance of the equipment for a period of 30 working days after successful installation of the machine, as per direction of user department.
- d) Supplying required number of operation & maintenance manual for the goods.
- e) To provide non-locked open software and standard interface inter-operability conditions for networked equipment's in hospital management information system, wherever applicable.

23. After Sales Service:

After sales service centre should be available on 24 (hrs.) X 7 (days) X 365 (days) basis.

Complaints should be attended properly, maximum within 24 hrs to ensure an uptime of minimum 95%, wherever applicable, failing which the necessary penalty measures shall be enforced.

24. Inspections:

- a) NIA, Jaipur shall have the right to inspect and/or to test the goods to confirm their conformity to the NIT Specifications at no extra cost to the Purchaser.
- b) NIA, Jaipur right to inspect, test and, where necessary, reject the Goods after the goods arrival at the final destination shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by NIA,JAIPUR prior to the goods shipment.
- c) The Director, NIA, JAIPUR shall be the final authority to reject full or any part of the supply which is not confirming to the specification and other terms and conditions.
- d) No payment shall be made for rejected items and those must be removed by the Bidders within two weeks of the date of rejection at their own cost and replaced immediately. In case these are not removed, these will be auctioned at the risk and responsibility of the suppliers without any further notice.

25. Payment Terms:

Payment of the total order value shall be released after the successful installation/commissioning and tanning of the ordered goods against the submission of the inspection report

26. Guarantee / Warrantee Period:

The Tenderers must quote for 5 year comprehensive warranty (including all Spares, Accessories and Labour) from the date of completion for satisfactory installation. The Warranty Charges shall not be quoted separately otherwise the offer shall be summarily rejected.

27. Site Preparation for installation:

The site for installation of the equipment shall be provided by the purchaser as per the required specification and environmental conditions before the installation of System.

Site plan and System layout plan including civil/electrical work or other related works shall be prepared by the supplier.

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Earthing arrangements for all the equipment shall be completed as per standard practice.

28. The prices quoted by the Bidder and accepted by the committee duly constituted by NIA, Jaipur shall hold good till the completion of the works and no additional claims will be admissible on account of any price variation or fluctuation in market rates.
29. Before the equipment is taken over by the Purchaser/Consignee, the Supplier shall provide manuals of the equipment / systems. This shall include the following:
 - a) System Interface Drawings, Wiring diagrams
 - b) System Interconnection and Block diagrams
 - c) User Operation Manuals
 - d) Equipment Maintenance Manuals
30. The vendor should collect the copy of building layout plan and visit the site, for complete evaluation of the project and feasibility of his material before submitting the bid.
31. Copper pipes to be certified by a recognized certifying agency for its compliance to specific standard.
32. Bidder must submit Printed catalogue and technical data sheet to substantiate offer.
33. Bidder shall submit a copy of the tender document and addenda thereto, if any, with each page of this document should be signed and stamped to confirm the acceptance of the entire terms & conditions as mentioned in the tender enquiry document.
34. Quality assurance certification like ISO 9000 series should be enclosed wherever applicable.
35. The bidder should be capable to inspect the centralised medical gas pipeline system by internationally accredited "Lloyd or equivalent certified Person". Regarding this matter, necessary proof has to be provided alongwith the offer.
36. NIA, Jaipur reserves the right to ask the tenderers for submitting the sample of the item for which rates have been quoted. Technically Qualified Bidders may be asked to submit samples along with their quoted items no. and their firm name without indicating any prices before opening of Financial Bid to NIA, Jaipur for Inspection.
37. The quantity of item given in the tender is tentative, which may be increased or decreased as per the institute's requirement.
38. Conditional bid will be treated as unresponsive and it may be rejected.
39. After due evaluation of the bid(s) Institute will award the contract to the lowest evaluated responsive tenderer.
- 40. Demonstration:**

NIA, Jaipur reserves the right to ask the tenderers for arranging demonstration of their equipment for which rates have been quoted, to the concerned committee, if required.
41. The Institute reserves the right to accept in part or in full or reject any or more tender(s) without assigning any reasons or cancel the tendering process and reject all tender(s) at any time prior to award of contract, without incurring any liability, whatsoever to the affected bidder or bidder(s).
- 42. Breach of Terms and Conditions:**

In case of breach of any terms and conditions as mentioned above, the Competent Authority, will have the right to cancel the work order/job without assigning any reason thereof and nothing will be payable by NIA, Jaipur in that event the security deposit shall also stands forfeited.
- 43. Insolvency etc.:**

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In the event of the firm being adjudged insolvent or having a receiver appointed for it by a court or any other order under the Insolvency Act made against them or in the case of a company the passing any resolution or making of any order for winding up, whether voluntary or otherwise, or in the event of the firm failing to comply with any of the conditions herein specified NIA, Jaipur shall have the power to terminate the contract without any prior notice.

44. Force Majeure:

If, at any time during the subsistence of this contract, the performance in whole or in part by either party of any obligation under this contract is prevented or delayed by reasons of any war or hostility, act of public enemy, civil commotion, sabotage, fire, floods, explosion, epidemics, quarantine restriction, strikers lockout or act of God (hereinafter referred to as events) provided notice of happening of any such eventuality is given by party to other within 21 days from the date of occurrence thereof, neither party shall be entitled to terminate this contract nor shall either party have any claim for damages against other in respect of such nonperformance or delay in performance, and deliveries have been so resumed or not shall be final and conclusive.

Further, that if the performance in whole or in part of any obligation under this contract is prevented or delayed by reason of any such event for a period exceeding 60 days, either party may, at least option to terminate the contract.

45. Applicable Law:

The contract shall be governed by the laws and procedures established by Govt. of India, within the framework of applicable legislation and enactment made from time to time concerning such Commercial dealings/processing.

Any disputes are subject to exclusive jurisdiction of Competent Court and Forum in Jaipur, Rajasthan, India only.

The Arbitration shall be held in accordance with the provisions of the Arbitration and Conciliation Act, 1996 and the venue of arbitration shall be at Jaipur. The decision of the Arbitrator shall be final and binding on both the parties.

Force Majeure: Any delay due to Force Majeure will not be attributable to the supplier.

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Technical Bid

1.	Name of Tendering Company/Firm/Agency	:	
2.	Name of Owner/Partners/Directors	:	
3	Full Particulars of the Head Office	:	
	• Address	:	
	• Telephone No.	:	
	• Fax No.	:	
	• E-mail address	:	
4	Full Particulars of the Bankers of the Company/Firm/Agency, with full Address/Tel. No.	:	
	• Name of the Bank	:	
	• Address of the Bank	:	
	• Telephone No.	:	
	• Fax No.	:	
	• E-mail address	:	
5	Registration Details:	:	
	• Copy of Firm/Agency's Registration No.	:	
	• PAN/GIR NO.	:	
	• GST Registration No	:	
	• Aadhar No. of Owner/Partners/Directors	:	
6	Details of Earnest Money Deposit	:	
	• Amounts (Rs.)	:	
	• DD/PO No. and Date	:	
	• Drawn on Bank	:	
	• Valid upto	:	
7	Details of Tender Fee	:	
	• Amount	:	
	• DD/PO No.	:	
	• Drawn on Bank	:	
	• Valid upto	:	
8	Annual Turnover of the Company/Firm/Agency for the last 3 years (With Proof duly certified by Chartered Accountant/Auditor) Last 03 Years balance sheet and copies of Income tax returns for 3 Years as stated in Terms & Conditions		
	2016-2017	:	
	2017-2018	:	
	2018-2019	:	
9	The Firm who are registered with National small Industries Corporation (NSIC)/ or Small Scale Industry / or MSME are exempted to submit the Tender fee or EMD (copy of Valid MSME registration Certificate must be provide along with Udhyog Addhar)		
10	Similar supplies in last 3 Years (with Proof)		
	Experience in the field for the minimum 2 years		Similar 1 Government Running Contract with central government/State Government/PSU/University/Deemed to be university/Autonomous bodies in last 3 years

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Certificate
(To be submitted with the Technical Bid)

The Annual Turnover of M/s. _____ for the last 3 Years are given below and it is certified that the Statement is true and correct:

S.N.	Year	Turnover Rs. In Lacks
1	2016-2017	
2	2017-2018	
3	2018-2019	
	Total	Rs _____ Lacks

Average Turnover per Annum: Rs. _____ Lakhs.

Signature of Chartered Accountant/Auditor with Seal

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MANUFACTURER'S/PRINCIPAL'S AUTHORIZATION FORM

TO,
Director
National Institute of Ayurveda
Jaipur
Sir,
Tender:.....

We ----- who are established and reputable manufacturer of having factories at.....and....., hereby authorize Messrs. ----- (name and address of agent(s) to bid, negotiate and conclude the contract with you against Tender.

No ----- for the above goods manufactured by us. No company or firm or individual Other than Messrs -----are authorized to bid, negotiate and conclude the contract in regards to this business against this specific tender.

We hereby extend our full guarantee and warranty as per the conditions of tender for the goods offered for supply against this tender by the above firm.

The authorization is valid upto..... -

Yours faithfully,

For and on behalf of messrs.-----
(Name of manufacturers) principal

Specification

OBJECTIVE: INSTALLATION OF MGPS TO SUPPORT:

- **MINIMAL 30 HIGH FLOW OXYGEN OUTLETS INCLUDING 10 VENTILATORS AND 8-10 OUTLETS FOR OT COMPLEX.**
- **8-10 NITROUS OXIDES OUTLETS.**
- **ALONG WITH MEDICAL COMPRESSED AIR & VACUUM PLANT.**

1 Oxygen Manifold:

1.1 Oxygen Manifold: Main with Middle Frames to support minimal **30 High flow oxygen outlets including minimal 10 ventilators and 8-10 outlets for OT Complex**. Oxygen manifold suitable to withstand adequate pressure, along with high-pressure copper annealed tail pipes with end Brass adapter suitable for Oxygen Cylinders and manifold. Top frame comprising of high pressure copper pipes of size 1/2" I.D. x 15swg with high pressure brass fittings made of high tensile brass and connections through non- return valves; high pressure copper tail pipes, made of high pressure copper pipe of size 1/4" I.D. x 15 swg. The design of middle and bottom frames provided to fit both round and flat bottom cylinders safely. The manifold tested (hydraulically) at 3500 psig and necessary test certificates accompany along with the supply. Preferably non Halogenated Polymer materials are to be used in the Non Return Valves supplied along with the manifold.

1.2 Fully-Automatic Control Panel – Oxygen:

- Control panel having two first stage regulators each capable of delivering 100 - 200 psig outlet pressure. It should comply international standards: HTM 02-01/NFPA99/ISO-7396-1
- Both the first stage regulators in the oxygen control panel having non-halogenated polymer in the high pressure side to ensure that there will be no ignition due to adiabatic compression. Furthermore, minimal 40 micron filter should be provided at the inlet of each high pressure regulators of the oxygen control panel.
- The first stage regulators connected to a common second stage regulator which will deliver an outlet pressure of 60 psi g.
- The first two regulators meant for first stage shall be capable of switchover system incorporated from "RUNNING" to "RESERVE" bank due to differential pressure.
- The control panel shall provide for two individual content contact pressure gauges to indicate the cylinder pressure in the two wings of the manifold and common pressure gauge to indicate the delivery / line pressure.
- The control panel shall have built in audio-visual signal lamp indications for bank Changeover.
- The control panel shall be covered with aesthetically suitable cover for safe operation indicating the respective services.
- Control panel shall have built in transformer to ensure safe operation by low voltage.

1.3 Oxygen Manifold: Emergency with Middle Frames Two Cylinder Oxygen Manifold should be suitable to withstand a pressure of minimal 145 Kg/cm², along with high-pressure copper annealed tail pipes with end Brass adapters suitable for Oxygen Cylinders and manifold. Top frame comprising of high pressure copper pipes of size 1/2" I.D. x 15swg with high pressure brass fittings made of high tensile brass and connections through non- return valves; high pressure copper tail pipes, made of high pressure copper pipe of size 1/4" I.D. x 15 swg. The manifold should be tested (hydraulically) at 3500 psig and necessary test certificates should accompany along with the supply. A High Pressure Regulator to be mounted on the Manifold System for reducing the cylinder pressure suitable to the line pressure. Only Non Halogenated Polymer materials are used in the Non Return Valves & Pressure Reducers

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supplied along with the manifold.

2 Nitrous Oxide Manifold:

2.1 Nitrous Oxide Manifold: Main with Middle Frames to support 8-10 Nitrous oxides outlets preferably with 2 x 1 Cylinder Nitrous- Oxide. Manifold should be suitable to withstand a pressure of 145 Kg/cm², along with high-pressure copper annealed tail pipes with end Brass adapter suitable for Nitrous oxide Cylinders and manifold. Top frame comprising of high pressure copper pipe of size 5/8" I.D. x 7/8" OD with high pressure brass fittings made of high tensile brass, NRV and high pressure copper tailpipes made of high pressure copper pipe of size 3/16 inch I.D. x 3/8 inch OD. The manifold shall be hydraulically tested to 3500 psig. The manifold shall be so designed that it shall suit easy cylinder changing and positioning. The system shall have non-return valves for easy changing of cylinders without closing the bank. The cylinder shall be placed with the help of cylinder brackets and fixing chains which shall be zinc plated.

2.2 Fully/Semi-Automatic Control Panel – Nitrous Oxide:

- Control panel shall have two first stage regulators each capable of delivering 100 - 200 psig outlet pressure. It should comply international standards: HTM 02-01/NFPA-99/ISO 7396-1
- Both the first stage regulators in the control panel shall have non-halogenated polymer in the high pressure side to ensure that there will be no ignition due to adiabatic compression. Furthermore, 40 micron filter should be provided at the inlet of each high pressure regulators of the oxygen control panel.
- The first stage regulators shall be connected to a common second stage regulator which will deliver an outlet pressure of 60 psi g.
- The first two regulators meant for first stage shall be capable of switchover system incorporated from "RUNNING" to "RESERVE" bank due to differential pressure.
- The control panel shall provide for two individual content contact pressure gauges to indicate the cylinder pressure in the two wings of the manifold and common pressure gauge to indicate the delivery / line pressure.
- The control panel shall have built in audio-visual signal lamp indications for bank changeover
- The control panel shall be covered with aesthetically suitable cover for safe operation indicating the respective services.
- Control panel shall have built in transformer to ensure safe operation by low voltage.
- N₂O Control Panel shall have in built heating arrangement to ensure that there will be no freezing in the delivery line during high flow requirement.

2.3 Nitrous Oxide Manifold: Emergency Single cylinder with outlet point, regulator and High pressure tube.

3. Medical Compressed Air: Combined Air Plant And Surgical Air Plant (preferably 7BAR) – 1000 LPM – Triplex system Air Plant System The Medical Air system shall conform to NFPA 99/EN ISO 7396-1/HTM02-01. Medical quality air to the European Pharmacopoeia monograph shall be delivered at pressures of around 700kPa (7 bar) gauge for supply of the hospital medical or surgical air systems. The entire system shall be "Triplex" such that any single functional component failure will not affect the integrity of the medical compressed air supply.

3.1 Sources of Supply - HTM02-01/NFPA99/ISO 7396-1 Triplex compressor configurations shall produce the primary supply with two compressors in standby. Each compressor shall be capable of supplying the specified volumetric flow for duplex and triplex plant, and half flow for quadruple.

Control System The central control system shall provide an intelligent human machine interface incorporating on board flash memory and real-time clock for recording operational parameters in the inbuilt event log. The central control system shall operate at low voltage and include BMS connection for plant fault, plant emergency, reserve fault and pressure fault. Visualisation of plant inputs, outputs

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and status through a web browser, using a simple Ethernet connection shall be available. The central control unit shall incorporate a user friendly 5.7” high-definition colour display with clear pictograms and LED indicators, providing easy access to system operational information. A mechanical back-up facility shall ensure continued operation in the event of a control system malfunction. The control system shall normally employ automatic rotation of the lead compressor to maximise life and ensure even wear. Compressors shall be oil injected rotary screw compressors suitable for both continuous and frequent start/stop operation at a nominal outlet pressure of 750 kPa (7.5 bar) gauge. Compressors shall be supplied with a block and fin style after cooler with a dedicated quiet running fan to maximise cooling and efficiency. A multistage oil separator capable of achieving 2ppm oil carry over shall be fitted to minimise contamination and maintenance. EFF1 (CEMEP) rated TEFC, IP55 class F electric motors shall be used and incorporate maintenance-free greased for life bearings. Motors with lower efficiency ratings are not acceptable.

3.2 Dryer/Filter/Regulator System: The duplexed filter and dryer module shall incorporate high efficiency water separators, oil filters, and heatless regenerative desiccant dryer, dust/activated carbon filters, hopcolite filters and anti-bacterial filters with autoclavable element. Electrical contacts shall be installed on the filters to provide warning alarms on the dryer controller in the event of high pressure drop (ie blockage) and shall also include connections for BMS. Contaminants in the delivered air downstream of the bacterial filters shall be maintained at levels below those shown in the following table:

Contaminant Threshold

H2O	67 ppm v/v
Dry particulates	Free from visible particulates in a 75 litre sample
Oil (droplet or mist)	0.1 mg/m ³
CO	5 ppm v/v
CO2	500 ppm v/v
SO2	1 ppm v/v
NO	2 ppm v/v
NO2	2 ppm v/v

Dryer Purge Control

The dryer control system shall incorporate a Purge Saver Energy Management system that freezes the regeneration of the desiccant once adequate dew point is reached in the inactive tower. Only when the dew point level in the active tower deteriorates to an unacceptable level, will the intelligent controller switch towers. This shall be achieved by including an additional dew point sensor and associated software in the dryer controller to effectively manage the system as well as providing on screen measurements of purge savings. Dew Point Monitoring The dryer shall incorporate a ceramic dew point hygrometer with an accuracy of ±10 C in the range - 20 to -800 C atmospheric dew point and 4-20mA analogue output. Aluminium oxide or palladium wire sensors are not acceptable. An alarm condition shall trigger on the dryer control panel if the dew point exceeds a -460 C atmospheric set point. The plant control unit shall incorporate a multifunctional LCD displaying, amongst other things, the dew point of the delivered air to enable monitoring of the air quality by the hospitals estates department. Volt free contacts shall be included to enable the dew point alarm signal to be connected to a central medical gas alarm system and/or building management system (BMS). To enable periodic calibration of the dew point sensor element, the hygrometer shall be remotely connected downstream of the dryer via a micro-bore tube. It is not acceptable to install the sensor directly into the medical air supply pipeline.

Receiver Assembly

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Air receivers shall comply with BS EN 286-1, supplied with relevant test certificates. Each air receiver shall be hot dip galvanised inside and out and fitted with a zero loss electronic drain valve. Float type drain valves are not acceptable. The receiver assembly shall be fitted with a pressure safety valve capable of passing the maximum flow output of the compressor at 10% receiver overpressure. The receiver shall be further protected by a safety pressure relief valve and include a pressure gauge. The system shall consist of 1 receiver vessel each shall be of 1500 litres. There shall be the followings available for enhanced operation of the air plant system:-

- Phase sequence relays that prevent unintentional reverse operation of the compressors.
- Synthetic oil for increased compressor life
- Tropical thermostatic sensors for countries with high humidity CE Marking

The standard range of Medical Air plant systems are 'CE' marked under the Medical Devices Directive 93/42/EEC with approval from notified body no. 0088 (Lloyd's Register Quality Assurance). Under this directive, the specified products are classified as Class IIa Medical Devices.

4.0 Vacuum Plant : Preferably with 500 Liters per minute/ System Capacity 1500 litres per minute at 19 INCH Hg – Triplex system fully compliant to NFPA 99/EN ISO 7396-1/HTM02-01 standards

4.1 Medical Vacuum the Medical Vacuum System shall ensure the minimum pipeline. Vacuum level of 450mmHg is maintained at the plant service connection point at the rated volumetric 'free air' flow rate with two pumps in standby. The bacteria filtration system shall be 'duplexed' such that each filter can be isolated for replacement of the filter cartridge.

4.2 Vacuum pumps: Four Vacuum pumps shall be air-cooled; oil lubricated rotary vane type suitable for both continuous and frequent start/stop operation at nominal inlet vacuum levels of between 578mmHg and 728mmHg. Composite carbon fibre rotor blades shall be fitted to minimise the cost of maintenance. Rotors shall be driven by directly coupled TEFV electric motors. Pump inlets shall include a wire mesh filter and integral non-return valve to prevent oil suck back and pressure increases in the vacuum system. Each vacuum pump shall have an integral separator filter to ensure a virtually oil-free exhaust. Each pump shall be fitted with anti-vibration pads between the pump foot and mounting frame.

4.3 Bacteria Filters The duplex bacteria filter system shall incorporate high efficiency filter elements. A differential vacuum indicator shall be installed across the filter to indicate blockage. Additional pressure sensors shall be installed at the inlet and outlet of the filter to measure the pressure drop across the filters. Each filter shall be designed and sized to carry the full plant design flow capacity with a pressure drop not exceeding 33mbar (25mmHg). Bacteria Filter elements shall have penetration levels not exceeding 0.005% when tested by the sodium flame method in accordance with BS 3928:1969 and utilising particles in the 0.02 to 2 micron size range. Drain flasks shall be connected to each filter. Drain flasks shall be manufactured from transparent Pyrex with a polymer coating on the inner and outer surfaces in order to maintain a seal in the event of inadvertent breakage of the Pyrex flask. All drain flasks shall be suitable for sterilisation and be connected via a manual isolating valve.

4.4 Control System The central control system shall provide an intelligent human machine interface incorporating on board flash memory and real-time clock for recording operational parameters in the in built event log. The central control system shall operate at low voltage and include BMS connection for common fault. Visualisation of plant inputs, outputs and status through a web browser, using a simple Ethernet connection shall be available. The central control unit shall incorporate a user friendly 5.7" high-definition colour display with clear pictograms and LED indicators, providing easy access to system operational information. Cascading of vacuum pumps shall be achieved by measuring the vacuum level at the plant inlet with a pressure transducer. A mechanical back-up facility shall ensure continued operation in the event of a control system malfunction. The control system shall normally employ automatic rotation of the lead pump to maximise pump life and ensure even wear.

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4.5 Vacuum Receiver(s): Vacuum receiver(s) shall be supplied with relevant test certificates and have a total volume of at least 100% of the plant output in 1 minute in terms of free air aspired at normal working pressure. Each vacuum receiver shall be hot dip galvanised inside and out. One receiver tanks of total 500 litres capacity.

4.6 CE Marking: The standard range of Medical Vacuum plant systems are 'CE' marked under the Medical Devices Directive 93/42/EEC with approval from notified body no. 0088 (Lloyd's Register Quality Assurance). Under this directive, the specified products are classified as Class IIa Medical Devices.

5 Distribution piping system:

SCOPE The scope of work shall cover all distribution piping and terminal units for oxygen, nitrous oxide, vacuum and compressed air.

Materials: Solid drawn, seamless, de-oxidized, non-arsenical, half-hard, tempered and de-greased copper pipe conforming to EN 13348: 2008. All copper pipes shall be de-greased & delivered capped at both ends. The pipes shall be accompanied with manufacturers test certificate for the physical properties & chemical composition. Copper pipe shall also have third party inspection certificate from Lloyd's Register Services. The Pipe Sizes to be used are from among as under: Copper fittings shall be made of copper and suitable for a steam working Pressure of 17 bar and especially made for brazed socket type connections. All copper fittings shall be conforming to EN 1254-1, should be factory degreased, certified, and individually packed and identified for medical use. Fittings should be kite marked up to 54 mm size.

6 Isolation valves: The isolation valves shall be Non Lubricated, 900 turn level, Ball type, suitable for oxygen service. All valves shall be pneumatically tested for twice the working pressure and factory degreased for medical gas service before supply.

7 Service valve box 2 /3/4 Gas types.

Installation and Testing: Installation of piping shall be carried out with utmost cleanliness. Only pipes, fittings and valves which have been de-greased and fittings brought in polythene sealed bags shall be used at site. Pipe fixing clamps shall be of nonferrous or non deteriorating plastic suitable for the diameter of the pipe. All joints shall be made of copper to copper and brazed by silver brazing filler material without use of any flux. All brazing shall be done using a brazing rod CP 104 (5% silver copper phosphorous brazing alloy) and copper-to-brass or gunmetal shall only be joints using brazing rod AG 203 (43% Silver-copper-zinc-brazing alloy) manufactured to EN-1044. Inert gas welding technique should be used by oxygen free Nitrogen gas inside copper pipes while brazing to avoid carbon deposition.

SL. NO.	COPPER PIPE'S OUTER DIAMETER	THICKNESS OF COPPER PIPE
5.1	12 mm	1 mm
5.2	15 mm	1 mm
5.3	22 mm	1 mm
5.4	28 mm	1 mm

Adequate supports shall be provided while laying pipelines to ensure that the pipes do not sag. Suitable sleeves shall be provided wherever pipes cross through walls / slabs. All pipe clamps shall be non-reactive to copper. After erection, the pipes shall be flushed and then pressure tested with dry air at a pressure equal to 1.5 times of the working pressure or 150 psig, whichever is higher for a period of not less than 24 hours. All the piping system shall be tested in the presence of the site-engineer or his authorized representative. PAINTING All exposed pipes should be painted with two coats of synthetic enamel paint and colour codification should be as per IS : 2379 of 1963.

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8 Digital Alarm System: Four channel microprocessor controlled alarm for pneumatic & vacuum services should have the following features:

- Digital Display of Line Pressure for all the services with factory calibrated pressure sensors.
- Color coded LED Display of Line pressure status (High – Caution – Normal – Caution–Low)
- Audible Alarm for High & Low pressure condition.
- Test and Alarm Acknowledge (Mute) facility. (Alarm acknowledges (Mute) time span is programmable from 1 to 60 min).
- Programming facility of alarm limits from front panel (Password protected)
- Facility to connect to remote alarm box by potential free contacts provided in the alarm box
- Small and compact design, light Weight (3 kg)
- Imported highly sensitive gas pressure sensors & USA/CE marked power supply.
- Mounted on a powder coated MS box.
- Nut & Nipples are to be provided for connection with Pneumatic supply line.
- Low voltage internal operation with input power supply of 220V AC.
- Battery Backup
- Easy wall mounting facility.

9. Double Lock Outlet Outlets shall be manufactured with a 165 mm length, Copper inlet pipe stub which is silver brazed to the outlet body. Body shall be of one piece brass construction. For positive pressure gas services, the outlet shall be equipped with a primary and secondary check valve and the secondary check valve shall have break safe mechanism and also comply to EN 737 pressure test standards and rated at minimum 200 psi in the event the primary check valve is removed for maintenance. The outlet assembly should have separate colour coding for each service and shall accept only corresponding gas specific adaptors. All outlets shall be cleaned and de-greased for medical gas service, factory assembled and tested. The medical gas outlets should be of quick connecting and wall mounted modular type.

10. BPC Flow meter with Humidifier: Back Pressure Compensated flow meter shall be of accurate gas flow measurement with following features:

- Control within a range of 0 – 15 lpm (calibration within +/- 10%).
- It shall meet strict precision and durability standard.
- The flow meter body shall be made of brass chrome plated materials.
- The flow tube and shroud components shall be made of clear, impact resistant polycarbonate.
- Flow Tube shall have large and expanded 0 – 5 lpm range for improved readability at low flows.
- Inlet filters of stainless steel wire mesh to prevent entry of foreign particles.
- The humidifier bottle shall be made of unbreakable polycarbonate material and autoclavable at 121 degree Centigrade temperature.

11. Ward Vacuum Units:

- Ward Vacuum Unit shall be of light weight and compact. The unit will consist of a regulator, a 600 ml. Reusable collection jar, made of unbreakable poly carbonate material and fully autoclavable at 134 degree centigrade.
- A wall bracket for mounting the jar assembly on the wall.
- The vacuum regulator shall be infinitely adjustable and have vacuum gauge which indicates suction