TENDER DOCUMENT

e-TENDER No.: ERO/MMD/731/1154

Tender for the “Supply, Storage, Installation, Testing, Commission and Handing Over of Medical Equipment for Medical College and Hospital at Sundergarh Odisha” (Package- B)

VOLUME – II

Additional Purchase Condition (APC), Approved Make and Technical Specification.

ENGINEERING PROJECTS (INDIA) LIMITED
(A GOVT. OF INDIA ENTERPRISE)
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Kolkata – 700071
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1.0 General

The Additional Conditions shall be read in conjunction with General Purchase Conditions where the provisions of these Additional Conditions are at variance with the provisions of the General Purchase Conditions of Contract. The provisions of these Additional Conditions shall take precedence.

2.0 Commencement and Completion of Project

The Contractual Completion Period shall be Two (2) months from the Seventh (7th) day of issue of Letter of Intent of Acceptance of Tender.

3.0 Suppliers Confirmation

The Supplier(s) / tenderer(s) whose tender(s)/bid(s) are accepted hereinafter are called the supplier(s).

4.0 Language

All correspondence, drawings and notations relating to this Contract must be in English.

5.0 References

In case of any conflict, the decision of EPI / NTPC shall be final & binding on the bidder.

6.0 Order of Precedence

In case of ambiguity in Bill of Quantities, Additional Conditions of Contract, Specifications, General Purchase Conditions, the following order of precedence will prevail.

1) Bill of Quantities
2) Additional Purchase Conditions / Corrigendum
3) Specifications
4) General Purchase Conditions

7.0 Conflict in Documents

If there are varying or conflicting provisions made in anyone document forming part of the contract, the Engineer-in-Charge of EPI shall be the deciding authority with regard to the intention of the document and his decision shall be final and binding on the Supplier.

8.0 Price: The following shall be also read with clause no 03 of GPC:

The rates / amount quoted in the Schedule/Bill of Quantities shall be inclusive of all freight charges, taxes, duties, cess, levies, fees, royalty, etc, except Goods and Service Tax (GST).
9.0 Security Deposit cum Performance Guarantee

Clause 9.0 & 18 of GPC stands deleted and shall be read as below.

“Within 10 (ten) days from the date of issue of letter of Intent or within such extended time as may be granted by EPI in writing, the supplier shall submit to EPI a Security Deposit cum Performance Bank Guarantee in the form appended, from any Nationalized bank / Scheduled Bank equivalent to five percent only (5%) of the Contract Value for the due and proper execution of the contract. This bank guarantee shall remain valid up to ninety (90) days after the end of defects liability period.

In case the supplier fails to submit the Security Deposit cum Performance Guarantee of the requisite amount within the stipulated period or extended period, letter of intent shall stand withdrawn and EMD of Supplier shall be forfeited.

10.0 Registration

The SUPPLIER confirms that it holds EPF Code number, GSTN registration at the state of Odisha, PAN (Permanent Account Number of Income Tax) etc. and shall be responsible for depositing EPF subscription and contribution for labour and staff employed by it on the works and GST, other taxes, duties and dues etc. as per statutory requirements and documentary evidence of same shall be provided to EPI. The SUPPLIER shall also be responsible for labour welfare and for arranging labour and other licenses/permits/clearance etc. for the project at their own. The SUPPLIER shall comply with all the requirements as per labour laws/acts. All the records in this regard shall be maintained by the SUPPLIER as per statutory requirements and rules and shall be produced by the SUPPLIER on demand if required. In case, the suppliers do not have PF Registration No. &GSTN (in the state of Odisha) registration, the same shall be obtained by successful suppliers within one month from the date of LOI or before release of First RA Bill.

11.0 Taxes and Duties

The award of the Contract shall be on ‘Work Contract’ as defined in section 2 (119) of the CGST Act, 2017. The rates/amount quoted in the Bill of Quantities shall be inclusive of all taxes, duties, cess, levies, fees, royalty, etc, except Goods and Service Tax (GST). The freight charges shall be quoted separately. The Goods and Services Tax (GST) applicable on all items of Works described in the Bill of Quantities, shall be quoted separately in attachment entitled “Annexure- I - Taxes & Duties” in Vol. III.

The GST quoted by the bidder shall be as applicable in India as on seven (7) days prior to the deadline for submission of Techno-Commercial Bids. Due Input Tax credits under GST as per the relevant Govt. Policy, wherever applicable, shall be taken into account by the Bidder while quoting his price. Income Tax and other Deductions of Taxes as applicable shall be deducted from Bills / due payment of the Supplier.

EPI shall bear and pay/reimburse to the bidder Goods and Services Tax (GST) applicable on the value of Works Contract described in the Bill of Quantities. However, the taxes, duties & levies as may be applicable on the materials used for Works Contract shall be to the bidder’s account and no separate claim in this regard will be entertained by EPI. Further, in case of any variation in the rates of the GST after the date seven (7) days prior to deadline set for submission of the Techno-
Commercial bids, the same shall be paid/ reimbursed to/ recovered from the bidder subject to submission of documentary evidence.

If a new tax, duty or levy is imposed under statute or law in India after the date seven (7) days prior to date of Techno-Commercial bid opening and the successful bidder becomes liable there under to pay and actually pays the said new tax, duty or levy for bonafide use on the Works contracted, the same shall be reimbursed to the successful bidder against documentary evidence of proof of payment.

The Supplier shall, within a period of 30 days of the imposition of any such new tax, duty or levy give a written notice thereof to the Engineer-in-Charge of EPI that the same is given pursuant to this condition, together with all necessary information relating thereto.

The payment/reimbursement of statutory variations in the rates of tax and/or of new tax, duty or levy imposed under statute or law in India as per above, would be restricted only to direct transactions between the EPI and the successful bidder.

a. It shall be incumbent upon the successful bidder to obtain a registration certificate under the GST Law, and other law(s) relating to levy of tax, duty, cess etc. and necessary evidence & GSTIN number to this effect shall be furnished by the successful bidder to the EPI.

b. The successful bidder must submit as a compliance of GST Act, the invoices in GST compliant format failing which the GST amount shall be recovered / adjusted by EPI without any prior notice from the next invoices or available dues with EPI.

c. The successful bidder should update /upload the GST/Taxes data periodically so as to avail ITC credit by EPI failing which it shall be recovered / adjusted by EPI without any prior notice from the next invoices or available dues with EPI.

d. The rates/amount quoted in the Schedule of Quantities shall be inclusive of all taxes, duties, cess, levies, fees, royalty, etc, except Goods and Service Tax (GST). The freight charges shall be quoted separately.

e. Bidder while quoting the rates in the tender must also consider the ITC Credit applicable for the works, if any.

12.0 Insurance

Clause 5 of GPC stands deleted and shall be read as below.

Supplier is required to take Contractor’s All Risk Policy or Erection All Risk Policy (as the case may be) including Marine Insurance from an Approved Insurance Company in the joint name with EPI and NTPC and bear all costs towards the same for the full period of execution of works including the defect liability period for the full amount of contract against all loss or damage from whatever cause arising for which he is responsible under the terms of the contract and in such manner that EPI and the Supplier are covered during the period of execution of works and/or also covered during the period of defect liability for the loss or damage as under:-

a) The work and the temporary works to the full value of such works.
b) The materials and other things brought to the Site for their full value.

Supplier shall submit to EPI, copies of all such insurance policies and receipts for payment of current premium and also whenever required by EPI the Supplier shall produce the original policy or the policies of insurance and the receipts for payment of the current premiums.

INSURANCE UNDER WORKMEN’S COMPENSATION ACT

Supplier is required to take insurance cover as per requirement of the Workmen’s Compensation Act, 1923 amended from time to time from an Approved Insurance Company and pay premium charges thereof. Supplier shall submit to EPI copies of all such insurance policies and receipts for payment of current premium and also whenever required by EPI the Supplier shall produce the original policy or the policies of insurance and the receipt of payment of the current premiums.

THIRD PARTY CONTRACTOR INSURANCE

Supplier is required to take third party CONTRACTOR insurance cover for an amount of five percent (5%) of Contract Value from an Approved Insurance Company for insurance against any damage, injury or loss which may occur to any person or property including that of EPI, and NTPC arising out of the execution of the works or temporary works. Supplier shall submit to EPI copies of all such insurance policies and receipts for payment of current premium and also whenever required by EPI the Supplier shall produce the original policy or the policies of insurance and the receipt of payment of the current premiums.

In case of failure of the Supplier to obtain insurance for works, insurance under Workman Compensation Act and Third Party CONTRACTOR insurance as described above within one month from the date of commencement of work, running account payments of the Supplier shall be withheld till such time the aforesaid insurance covers are obtained by the Supplier.

13.0 Compliance to statutory Rules

The SUPPLIER shall ensure compliance with all Central, State and Local Laws, Rules, Regulations etc. as applicable or may be applicable during the course of execution, maintenance etc. of the works and shall indemnify against any claim or damages whatsoever on such accounts. The SUPPLIER shall also keep EPI/NTPC indemnified at all times against infringement of any Patent or Intellectual Property rights.

14.0 Measurement of Work Done

Engineer-in-charge shall, except as otherwise provided, ascertain and determine measurement and the value in accordance with the contract work done.

All measurement of all items having financial value shall be entered in Measurement Book so that a complete record is obtained of all works performed under the contract.

All measurements shall be taken jointly by EPI and by the Supplier or his authorized representative and such measurements shall be signed and dated by EPI and the Supplier in token of their acceptance. If the Supplier objects to any of the measurements recorded, a note shall be made to that effect with reason and signed by both the parties.
If the Supplier or his authorized representative does not remain present at the time of measurements after the Supplier has been given a notice three (3) days in advance or fails to countersign or to record objection within a week from the date of the measurement then such measurements recorded in his absence by EPI/NTPC shall be deemed be accepted by the Supplier.

The Supplier shall, without extra charge, provide all assistance with every appliance labour and other things necessary for measurements and recording.

EPI/NTPC may cause to check the measurement recorded jointly or otherwise as aforesaid and all provisions stipulated herein above shall be applicable to such checking of measurement.

It is also a term of this contract that recording of measurements of any item of work in the measurement book and/or its payment in the interim, on account or final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the Supplier from liabilities from any over measurement or defects noticed till completion of the defects liability period.

15.0 Documents to be submitted along Bill/Invoice

Following documents shall be enclosed along with each bill for submission otherwise the same shall not be accepted by EPI for checking and certification of payment.

a) Monthly progress reports in the format as issued by EPI/NTPC– the Sample report is available with EPI/NTPC for Supplier’s reference.

b) Safety measurement certificate.

c) Manufacturer’s Test Certificates.

d) All the information/documents contained in relevant checklists.

Formats shall be provided to the Supplier by EPI.

16.0 Payment Terms

Clause 4.0 of GPC stands deleted and shall be read as below.

Unless otherwise agreed upon between the parties payment on receipt of materials at site / store and on submission of separate bills/invoice for each stage/part payment as below by a cheque or demand draft or RTGS in accordance with the following procedure.

16.1 Seventy-five percent (75%) of the BOQ rate of the item/equipment/material shall be paid on receipt of the same at site, and on production of Inspection Report issued by the Inspector (incase inspection is done at manufacturing unit), Manufacture’s Test Certificate, consignment note, and Interim Joint Inspection report after proper Storage at site and submission of Indemnity Bond in the prescribed pro-forma.

16.2 Twenty percent (20%) of the BOQ rate of the item/equipment/material shall be released after assembling, installation, testing & commissioning and final inspection.
16.3 Balance five percent (5%) of the BOQ rate of the item/ equipment/ material shall be released within 30 days after expiry of the defects liability period as per Clause No. 39 of APC.

17.0 Price Escalation

No Price Escalation is admissible.

18.0 Additional / Extra Items

The following procedures shall be meticulously adopted in case of any additional / extra items.

a) EPI shall issue a Contemplated Change Notice (CCN) in the format enclosed as Annexure-VII.

b) Based upon the requirement stipulated in CCN Supplier shall submit analysis to reflect financial implications if any, within seven (7) days from issue of CCN. The price analysis shall be based upon rates given in bill of items for the similar works or can be derived on the basis of basic rate of material and labour appended with annexure.

c) After review and approval of analysis by Engineer In-charge of EPI / NTPC, Change Order shall be issued by EPI in the Change Order format enclosed as per the Annexure-VIII to enable Supplier to execute item.

d) For substitute items Supplier shall produce price analysis for the approval of EPI / NTPC and adjustment in the contract amount accordingly. No overheads and profits shall be applicable against substituted items.

19.0 Variation

The variation limit shall be ± 10% of the value of Contract for works and of similar nature and specification at the same accepted rate. The limit of variation for individual BOQ item is ± 25%.

20.0 Alterations, Additions and Omissions

EPI / NTPC can make any variation of the form, quality or quantity of the works or any part thereof that may, in their opinion be necessary and for that purpose, or if for any other reason it shall in his opinion be desirable, they shall have power to order in writing to the Supplier to do and the Supplier shall do any of the following:

a) Increase or decrease in the quantity of any work included in the contract in which case the value of contract may be increased or decreased.

b) Omit any such work.

c) Change the dimension of any part of the works and

d) Execute additional work of any kind necessary for the completion of the works and no such variation shall in any way vitiate or invalidate the contract, but the value, if any of all such variations shall be taken into account to ascertain the amount of the Contract Price.

e) The Supplier shall not affect any of the aforementioned changes without the written order of EPI / NTPC.
21.0 Deviation, Extra items pricing

In the case of extra items, the rate analysis submitted by the Supplier as per above Clause 18.0 of APC, the Engineer-In-Charge of EPI shall within one (1) month of the receipt of the claims supported by analysis, shall determine the rates on the basis of the market rates/other prevailing codes as approved NTPC in consideration to the analysis of the rates submitted by the Supplier, and the Supplier shall be paid in accordance with the rates so determined and approved.

22.0 Deviation, Substituted items, Pricing

In the case of substituted items, the rate for the agreement item (to be substituted) and substituted item shall also be determined in the manner as mentioned in the aforesaid para.

a) If the market rate for the substituted item so determined is more than the market rate of the agreement item (to be substituted) the rate payable to the Supplier for the substituted item shall be the rate for the agreement item (to be substituted) so increased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).

b) If the market rate for the substituted item so determined is less than the market rate of the agreement item (to be substituted) the rate payable to the Supplier for the substituted item shall be the rate for the agreement item (to be substituted) so decreased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).

23.0 Deviation, Deviated Quantities Pricing

a) In the case of contract items, substituted items, contract cum substituted items, which exceed the limits laid down in Clause -19.0, the Supplier may within fifteen days of receipt of order or occurrence of the excess, claim revision of the rates, supported by proper analysis. for the work in excess of the above mentioned limits; provided that if the rates so claimed are in excess of the rates specified in the schedule of quantities the Engineer-In-Charge of EPI shall within one month of receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the Supplier, determine the rates on the basis of the market rates/other prevailing codes as approved by NTPC and the Supplier shall be paid in accordance with the rates so determined.

b) The provisions of the preceding paragraph shall also apply to the decrease in the rates of items for the work in excess of the limits laid down in Clause-19.0 and the Engineer-in-Charge of EPI shall after giving notice to the Supplier within one month of occurrence of the excess and after taking into consideration any reply received from him within fifteen days of receipt of the notice, revise the rates for the work in question within one month of expiry of the said period of fifteen days having regard to the market rates or current schedule of rate or other prevailing codes as approved by NTPC.

c) The Supplier shall send to the Engineer-In-Charge once every three months an up to date account giving complete details of all claims for additional payments to which the Supplier may consider himself entitled and of all additional work ordered by the Engineer-in-Charge of EPI which he has executed during the
preceding quarter failing which the Supplier shall be deemed to have waived his right.

24.0 Compensation for delay

Clause 13.0 of GPC stands deleted and shall be read as below.

If the Supplier fails to maintain the required progress as committed/ or to complete the work and clear the site on or before the date of completion or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to EPI on account of such breach, pay compensation as agreed the amount calculated at the rates stipulated below as EPI may decide (whose decision in writing shall be final and binding) on the amount of tendered value of the work for every completed day/month (as applicable) for which progress remains below that specified in schedule or that the work remains incomplete.

Compensation for delay of work is at the rate of One percent (1%) per week of delay to be computed on per day basis.

Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed ten percent (10%) of the contract amount.

25.0 Work subjected to audit

The work executed by the SUPPLIER shall be subject to audit and quality control checks from Quality Control Division & Technical audit of EPI/NTPC, inspecting Agency of the Client and Chief Technical Examiner of Central Vigilance Commission, Govt. of India. In the eventuality of any defect/sub standard works as brought out in the report or noticed otherwise at any time during execution, maintenance period etc., the same shall be made good by the SUPPLIER without any extra cost. In case the SUPPLIER fails to rectify the defect/sub- standard work within the time period stipulated by EPI/NTPC, necessary action as deemed fit shall be taken by EPI/NTPC and decision of EPI/NTPC shall be final and binding on the Supplier.

26.0 Action in case work not done as per Specifications

All works under or in course of execution or executed in pursuance of the contract shall at all times be open and accessible to the inspection and supervision of the Engineer-in-Charge, his authorized representative in charge of the work and all the superior officers, officer of the Quality Control Department of EPI / NTPC and of the Cabinet (Technical) Vigilance, the Supplier shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to the Supplier either himself be present to receive orders and instructions or have a responsible agent duly authorized in writing, present for that purpose. Orders given to the Supplier's agent shall be considered to have the same force as they had been given to the Supplier himself.

If it shall appear to the Engineer-In-charge of EPI or his higher authority or his authorized subordinates in charge of the work or to the Cabinet (Technical) Vigilance or his subordinate officers, that any work has been executed with unsound, imperfect or unskilful workmanship, or with materials or article provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract the Supplier shall, on demand in writing which shall be made within the period specified by the Engineer-in-charge of EPI/NTPC all such materials or articles under complained of notwithstanding whether
or not the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost.

In the event of the Supplier, failing do so within a period specified by the Engineer-in-Charge of EPI in his demand aforesaid, then the Supplier shall be liable to pay compensation at the same rate as under Clause -24.0 of APC of the contract (for non-completion of the work in time) for this default. In such case the Engineer-in-charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the competent authority may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure and incidental items rectified, or removed and re-executed at the risk and cost or Supplier. Decision of the Engineer-in-Charge to be conveyed in writing in respect of the same will be final and binding on the Supplier.

27.0 Supplier Liable for Damages, defects during maintenance period

If the Supplier or his working people or servants shall break, deface, injure or destroy any part of building in which they may be working, or any building, road, road curb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wired, trees, grass or grassland, or cultivated ground contiguous to the premises on which the work or any part is being executed, or if any damage shall happen to the work while in progress, from any cause whatever or if any defect, shrinkage or other faults appear in the work within defect liability period after a certificate final or otherwise of its completion shall have been given by the Engineer-in-charge of EPI as aforesaid arising out of defect or improper materials or workmanship the Supplier shall upon receipt of a notice in writing on that behalf make the same good at his own expense or in default the Engineer-in-charge of EPI cause the same to be made good by other workmen and deduct the expense from any sums that may be due or at any time thereafter may become due to the Supplier, or from his security deposit or the proceeds of sale thereof or of a sufficient option thereof.

28.0 Safety Measures and Public Convenience

The Supplier shall in the course of execution of the work take all necessary precautions for the protection of all persons and property at his cost.

29.0 Schedule of Completion

Successful suppliers shall submit supply, assembly and placement schedule for all BOQ items within fifteen (15) days. It shall indicate the forecast (mile-stones) of the dates of commencement and completion of supply of items, trades, sections of the work and may be amended as necessary by agreement between the Engineer-In-Charge and the Supplier within the scheduled completion period (i.e. 2 Months).

30.0 Time Essence of Contract & Extension for Delay

30.1 The time allowed for execution of the Works as specified in “Memorandum” to the “Form of Tender” or the extended time in accordance with these conditions shall be the essence of the contract. If the Supplier commits default in commencing the execution of the work as aforesaid, EPI/NTPC shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the security deposit money
30.2 If the work(s) be delayed by:

a) force-majeure or 
b) serious loss or damage by fire, or 
c) Civil commotion of workmen, strike or lockout, affecting any or the trades 
employed on the work, or 
d) delay on the part of other Suppliers or tradesmen engaged by Engineer-In-
Charge in executing work not forming part of the Contract, or 
e) any other cause which, in the absolute discretion of EPI, is beyond the 
Supplier's control, then, upon the happening of any such event causing delay, 
the Supplier shall immediately give notice thereof in writing to the Engineer-In-
Charge but shall nevertheless use constantly his best endeavours to prevent or 
make good the delay and shall do all that may be reasonably required to the 
satisfaction of the Engineer-In-Charge to proceed with the works.

Request for extension of time, to be eligible for consideration, shall be made by the 
Supplier in writing within fourteen (14) days of the happening of the event causing 
delay on the prescribed form and at least fifteen (15) days before the completion 
date. The Supplier may also, if practicable, indicate in such a request the period for 
which extension is desired. In any such case EPI may give a fair and reasonable 
extension of time for completion of work. Such extension shall be communicated to 
the Supplier by the Engineer- In-Charge in writing, within three (3) months of the date 
of receipt of such request. Non application by the Supplier for extension of time shall 
not be a bar for giving a fair and reasonable extension by the Engineer-In-Charge 
and the extension of time so given by the Engineer-In-Charge shall be binding on the 
Supplier.

31.0 Codes

In the absence of definite provision on particular issue in the specification / codes, 
reference may be made to relevant latest Codes recommended to be used and good 
engineering practices and / or as per instruction / suggestion of EPI / NTPC.

32.0 Supplier's Responsibilities during inspections

a) Furnish labour and facilities to:
   i)    Provide access to work to be inspected and tested. 
   ii)   Facilitate inspections and tests. 
   iii)  Make good work disturbed by inspection and test. 
   iv)   Provide all test equipment required for carry out field tests.

33.0 Inspection and Testing

Clause 6.0 of GPC stands deleted and shall be read as below.

The stores/material covered as per this Work Order / Agreement shall be subject to 
preliminary inspection and testing at any time prior to shipment and /or dispatch and 
final inspection within a reasonable time after arrival at the place of delivery. The 
Inspector shall have the right to carry out the inspection and testing which include 
raw materials at manufacturing unit and the material at the time of actual dispatch 
before and after completion of packing.
The supplier shall inform the EPI at least twenty one (21) days in advance, place, date and time of offering the stores/material for required inspection, provide free access to Inspectors during normal working hours at manufacturing unit and places at their disposal, internal test reports, material/component test certificates, approved drawings and all useful means of performing, checking, marking, testing, inspection and final stamping to be made available at his own expenses. Stores/material offered without internal testing and quality documents shall be treated as not ready for inspection.

If, after receiving inspection call from the Supplier, the inspector on reaching the works finds that the equipment/materials offered for inspection is not ready or fails to meet quality parameters, the inspection call will be considered to be a cancelled and material offered under the inspection call are treated rejected / disqualified.

The material shall be offered in lots and the inspector has liberty to choose randomly Inspection Samples from each lot for inspection. In the event of rejection of Inspection Samples due to defective workmanship/material/design, the entire lot is treated as rejected and should be offered for re-inspection at the earliest. EPI shall have the right to deduct the cost of re-inspection from the supplier's invoices/bills.

Final inspection shall be carried out after unpacking, assembly (if any) and placing of the items/material.

Even if inspections and tests are fully carried out, supplier shall not be absolved to any degree from their responsibilities to ensure that stores/material supplied, comply strictly with requirements, of the purchase order at the time of delivery, inspection on arrival at site, after its erection or start-up and guarantee period.

In any case, the stores/material must be strictly in accordance with the Work Order / Agreement failing which EPI shall have the right to reject goods/material and hold the supplier liable for non-performance of contract.

EPI reserves the right to test any item or number of items to any government testing laboratory in India and the total cost for forwarding and testing of these materials will be borne by the bidder.

34.0 Testing Laboratory Services

All the inspection & testing charges to be carried at testing laboratory designated EPI/ NTPC shall be borne by the supplier.

35.0 Manufacturer’s Test Certificate

Clause 7.0 of GPC stands deleted and shall be read as below.

Manufacturer’s test certificate shall be submitted by the Supplier along with invoice / challan. Failure to comply may cause delay in release of payment.

36.0 Sub-standard Material

Any material/item/fitting/fixtures rejected by EPI / NTPC shall be removed from the site within forty eight (48) hours of issue of instructions to this effect by EPI. Failing this, the
EPI shall have the rights to get these removed and the Supplier shall have no claim whatsoever in this regard.

37.0 Defects Liability Period

The Supplier shall be responsible for the rectification of defects in the works for a period of **12 (Twelve) months** from the date of taking over of the works in totality by the Owner/Client. Any defects discovered and brought to the notice of the Supplier forthwith shall be attended to and rectified by him at his own cost and expense. In case the Supplier fails to carry out these rectifications, the same may without prejudice to any other right or remedy available, be got rectified by EPI at the cost and expense of the Supplier.

38.0 Dispatch Instructions

Clause 10.0 of GPC stands deleted.

39.0 After sales service and training

Clause 11. of GPC stands deleted and shall be read as below.

The supplier shall provide necessary "After Sales Service" (for items supplied) free of cost to the satisfaction of the end user.

40.0 Approval of Engineer-in-charge

All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects by the Engineer-In-Charge who shall be entitled to specify time and the manner they are to be commenced, and from time to time carried on.

41.0 Approval from Client

The Supplier shall be responsible for obtaining all approvals from EPI/Client with regard to quality of materials & workmanship and measurements etc.

42.0 Suppliers Use of Sites

The Supplier is restricted to use the site without permission and shall obtain prior permission for entering the work premises or for use as per contractual works.

43.0 Storage of Material

The bidder shall make his own arrangement for storage of all materials at site including its safe custody, watch and ward, & damages etc. at his own cost till completion of the work and handing over of the same to EPI/NTPC.

44.0 Association with EPI

If desired by EPI, the Supplier shall be available / associate with EPI in meetings with Client for its portion of work at their own cost. The Supplier shall furnish all information and clarifications as and when required by EPI/NTPC.

45.0 Co-ordination with other agencies
This is a Percentage Rate base contract. Therefore, it shall be the Suppliers responsibility to ensure complete co-ordination between works of various agencies such as Civil, Electrical, Utilities, etc. It is deemed that the Supplier have considered this aspect carefully while quoting tender.

46.0 Site Meetings

Site meetings shall be held at regular intervals and in addition to other meeting required by EPI/NTPC. There shall be at least one site meeting per fortnight in the presence of EPI/NTPC to discuss and co-ordinate the work. The Supplier shall provide responsible member of his organization who is authorized to commit and bind the Supplier to any agreement reached during said meeting.

47.0 Non-interference with other works

The Supplier shall plan and execute the works in his scope of work in such a manner that the other works, connected with the works of the Supplier, but not included in the Supplier’s scope of work, do not get affected/delayed.

48.0 Local Manpower

Successful suppliers shall ensure maximum utilization of local manpower as far as possible.

49.0 Preservation of tree/vegetation

Existing trees and other forms of vegetation to be preserved by avoiding disturbance / damage due to activities.

50.0 Supplier to indemnify Govt. against Patent Rights

The Supplier shall fully indemnify and deem indemnified EPI/NTPC against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract. In the event of any claims made under the action brought against EPI/NTPC in respect of any such matter as aforesaid the Supplier shall be immediately notified thereof and the Supplier shall be at liberty, at his own expenses, to settle any dispute or to conduct any litigation that may arise there from, provided that the Supplier shall not be liable to indemnify EPI/NTPC if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge of EPI/NTPC in this behalf.

51.0 Recovery

Any amount found recoverable from the Supplier shall be recovered without prejudice to any other mode of recovery.

52.0 Release of Security Deposit

The entire Security Deposit (SD) amount shall be released to the Supplier after Ninety (90) days of expiry of defect liability period if all the defects are rectified by Supplier, raised during defect liability period.

53.0 Water Supply
The Supplier shall make their own arrangements for water required for construction as well as for drinking and other purposes for their staffs and labour and the personnel of EPI / NTPC.

54.0 Electricity

a) Supplier shall obtain temporary power connection from Local Authorities at his cost.

b) Supplier shall make his own arrangements for further distribution as per their requirement and cost of cables switches, fuses, meters etc. shall be borne by Supplier. It is to be noted that power from local authority may not be continuous and there may be possibilities of disruption of power. Hence Supplier shall install sufficient number of generators of adequate capacity duly approved by EPI/NTPC bearing all operating and installation.

c) EPI/NTPC reserves the right to supply power at mutually agreed rates as and when sufficient availability of same is attained.

55.0 Gate keeper & Watchman

The Supplier shall provide, maintain at his own expense gate keepers and watchmen to ensure at all times effective protection of the works, materials and workmen, until completion of the project, at his own risk and cost

56.0 Safety Measures

It shall be the sole responsibility of the Supplier to ensure all safety measures giving proper, prior notices etc. and obtaining prior permission from concerned local authorities as per bye-laws or directions issued by them at his own cost. No claim of the Supplier in this regard shall be entertained.

57.0 Recovery against Labour Safety

In respect of all labour directly or indirectly employed in the work for the performance of the Supplier’s part of this contract, the Supplier shall at his own expense arrange for the safety provisions as per CPWD Safety Code framed from time to time and shall at his own expense provide for all facilities in connection therewith. Failing which, necessary action as deemed fit shall be taken by EPI/NTPC.

58.0 Sanitation/safety facilities for workers

The Supplier shall adhere to guidelines laid down in the National Building Code of India 2005 for constructional practices and safety of workers Health and Sanitation facilities for workers/working residing on site. This shall include, but not limited to, safety equipment (safety helmets, jackets, boots, gloves etc), safety nets/harnesses, appropriate warning/safety signs, fire extinguishers, adequate light for working during evenings/night's, regular maintenance and repairs of machinery / equipments and adequate sanitation/potable drinking water facilities. The Acts and rules as stipulated by Govt. of India, enforced by the Chief Labour Commissioner (Central) (refer web site clc.gov.in) and revised time to time shall be applicable in case of any violations with respect safety.

59.0 Supplier’s risks
All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the contract other than the excepted risks are the responsibility of the Supplier.

60.0 Warranty

Clause 17. of GPC stands deleted and shall be read as below.

The supplier shall warrant that every material/plant, machinery and equipment to be supplied be new and free from all defects and faults in design, material, workmanship and manufacture and shall be of the highest quality.

The items should be consistent with the established, recognized or stipulated standards for material of the type usually used for the purpose and in full conformity with the specifications and drawings or samples, if any. Equipment offered must be capable, during operation, of withstanding extreme dusty, wet, humid and sultry conditions. The warranty shall continue not withstanding inspection, payment, acceptance of tendered equipment and shall expire except in respect of complaints notified to supplier prior to such date within 12 months from the date of Taking Over.

61.0 House Keeping

General:

a) Conduct cleaning and disposal operations to comply with local authority and antipollution Laws.

b) Store volatile waste in covered metal containers and remove from premises at the end of each working day.

c) Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

Materials:

For surfaces Use only cleaning materials recommended by manufacturer and as recommended by cleaning material manufacturer.

Cleaning:

a) Provide on-site containers for collection of waste materials and debris.

b) Dispose waste materials and debris off site.

c) Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

Final Cleaning:

a) Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials, from finished surfaces including glass and other polished surfaces.

b) Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

62.0 Brand Name
The specific reference in the Specifications and documents to any material by trade name, make or catalogue number shall be construed as establishing standard or quality and performance and not as limited competition.

63.0 Submission of Manuals / Catalogues

Maintenance manuals, product catalogues, all warranties and guarantees against each section of work shall be submitted hardbound in triplicate on completion as per direction of EPI.

64.0 Shop Drawings

Clause 21 of GPC stands deleted and shall be read as below:

The supplier shall submit the required drawings / data sheets alongwith documents for prior approval of EPI / NTPC. Nothing extra shall be payable on this account.

65.0 CONCILIATION AND ARBITRATION

Clause 23. of GPC stands deleted and shall be read as below.

Before resorting to arbitration as per the clause given below, the parties if they so agree may explore the possibility of conciliation as per the provisions of Part III of the Arbitration and Conciliation Act, 1996 as amended by Arbitration and Conciliation (Amendment) Act, 2015. When such conciliation has failed, the parties shall adopt the following procedure for arbitration:

65.1 Except where otherwise provided for in the contract, any disputes and differences relating to the meaning of the Specifications, Design, Drawing and Instructions herein before mentioned and as to the quality of workmanship or materials used in the work or as to any other questions, claim, right, matter or things whatsoever in any way arising out of or relating to the Contract, Designs, Drawings, Specifications, Estimates, Instructions, or these conditions or otherwise concerning the works of the execution or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the Sole Arbitrator appointed by the Chairman & Managing Director (CMD) of Engineering Projects (India) Limited (EPI) or any other person discharging the functions of CMD of EPI. The person approached for appointment as Arbitrator shall disclose in writing circumstances, in terms of Sub-Section (1) of Section (12) of the Arbitration and Conciliation Act, 1996 as amended by Arbitration and Conciliation (Amendment) Act, 2015 as follows:

(i) such as the existence either direct or indirect, of any past or present relationship with or interest in any of the parties or in relation to the subject- DLI/C&E/WI-675/306 ADDITIONAL PURCHASE CONDITIONS (APC) Page 7 of 8 matter in dispute, whether financial, business, professional or other kind. Which is likely to give rise to justifiable doubts as to his independence or impartiality; and

(ii) which are likely to affect his ability to devote sufficient time to the arbitration and in particular his ability to complete the entire arbitration within a period of twelve months. The Arbitrator shall be appointed within 30 days of the receipt of letter of invocation of arbitration duly satisfying the requirements of this clause.
65.2 If the arbitrator so appointed resigns or is unable or unwilling to act due to any reason whatsoever, or dies, the Chairman & Managing Director aforesaid or in his absence the person discharging the duties of the CMD of EPI may appoint a new arbitrator in accordance with these terms and conditions of the contract, to act in his place and the new arbitrator so appointed may proceed from the stage at which it was left by his predecessor.

65.3 It is a term of the contract that the party invoking the arbitration shall specify the dispute/ differences or questions to be referred to the Arbitrator under this clause together with the amounts claimed in respect of each dispute.

65.4 The Arbitrator may proceed with the arbitration ex-parte, if either party, in spite of a notice from the arbitrator, fails to take part in the proceedings.

65.5 The work under the contract shall continue as directed by the Engineer-In-Charge, during the arbitration proceedings.

65.6 Unless otherwise agreed, the venue of arbitration proceedings shall be at the venue given in the ‘Memorandum’ to the ‘Form of Tender’.

65.7 The award of the Arbitrator shall be final, conclusive and binding on both the parties.

65.8 Subject to the aforesaid, the provisions of the Arbitration and Conciliation Act, 1996 as amended by Arbitration and Conciliation (Amendment) Act, 2015 or any statutory modifications or re-enactment thereof and the Rules made there under and for the time being in force shall apply to the arbitration proceedings and Arbitrator shall publish his Award accordingly.

Note: Not withstanding anything contained herein above, this clause shall not be applicable where the dispute is between EPI and another Public Sector Enterprise or Govt. Department for which a separate Arbitration Clause is provided vide Clause No. A given below:-

A. ARBITRATION BETWEEN PUBLIC SECTOR ENTERPRISES INTERSE/ GOVERNMENT DEPARTMENTS.

1. In the event of any dispute of difference relating to the interpretation and application of the provisions of the contracts, such dispute or differences shall be referred by either party for Arbitration to the sole Arbitrator in the Department of DLI/C&E/WI-675/306 ADDITIONAL PURCHASE CONDITIONS (APC) Page 8 of 8 Public Enterprises to be nominated by the Secretary to the Government of India in-charge of the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 and The Arbitration and Conciliation Act, 2015 shall not be applicable to arbitration under this clause. The award of the Arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make a further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law & Justice, Government of India. Upon such reference the dispute shall be decided by the Law-Secretary or the Special Secretary/Additional Secretary, when so authorized by the Law-Secretary, whose decision shall bind the Parties finally and conclusively. The Parties to the dispute will share equally the cost of arbitration as intimated by the Arbitrator“.
2. Subject to any amendment that may be carried out by the Government of India from time to time the procedure to be followed in arbitration shall be as is contained in F. No. 4(1)/2013-DPE(PMA)/FTS-1835 Dated: 11/04/2017 of Department of Public Enterprises, Ministry of Heavy Industries & Public Enterprises or any modification issued in this regard.

66.0 Court Jurisdiction

Clause 24.0 of GPC stands deleted and shall be read as below:

Disputes of any nature that may arise in connection with the execution of the contract shall be subjected to the jurisdiction of courts situated in Kolkata only.
CONTEMPLATED CHANGE NOTICE

To: 
Submit Quotation to: 
Supplier 
Project No.: 
CCN No: 
Date: 

Sub: 

It is proposed to make the following change in the work. You are requested to quote a firm price for any revision to the contract amount arising from the change. No work should be undertaken on this change until a change order / written authorization has been signed and issued.

Quotation to be submitted within seven (7) days of the date of this notice.

The work shall conform to the contract documents where applicable unless otherwise stated.

Initiator ___________________________ Reasons for Change ___________________________
CHANGE ORDER

Project No.: Change Order No.: 

Location: 

Description: Construction of Medical College & Hospital at Sundergarh, Odisha 

Project Management & Execution Consultant: -

Architect: -

Suppliers Name and Address:

<table>
<thead>
<tr>
<th>Original Amount of Contract</th>
<th>Approved Amount to Date</th>
<th>C.O.</th>
<th>Present Amount</th>
<th>C.O.</th>
<th>Revised Contract Amount</th>
</tr>
</thead>
</table>

Description of Change – Refer CNN No.

Recommended by: M/s EPIL

Approved By:
## Annexure-IX

### LIST OF APPROVED MAKES

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Description of Items</th>
<th>List of Approved Makes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>ECG Machine</td>
<td>Nihon Kohden/ Philips/Wipro GE/Schiller/ BPL Medical/ Mindray/Edan</td>
</tr>
<tr>
<td>2.0</td>
<td>Central Cardiac monitor Console</td>
<td>Wipro GE/ Draeger/ Philips/ Nihon Kohden Medical/ Schiller Healthcare/BPL Medical/ Mindray</td>
</tr>
<tr>
<td>3.0</td>
<td>Monitors for pulse rate, Heart Rate,E.C.G., Invasive and non-invasive pressure (2 in each ward)</td>
<td>Wipro GE/ Draeger/ Philips/ Nihon Kohden Medical/ Schiller Healthcare/BPL Medical/</td>
</tr>
<tr>
<td>4.0</td>
<td>Multimodel ventilator</td>
<td>Draeger/Wipro GE/ Philips/ BPL Medical/ Maquet, Mindray</td>
</tr>
<tr>
<td>5.0</td>
<td>EEG machine</td>
<td>Nihon kohoden /Interkardio(Astromed,EMS)/ Cadwell/ Geratherm/ Biodex/ RMS India/ Alliance(Viasys/Integra)/ ROHANIKA(Allen Medical,Zeihm,sthilier) (579)</td>
</tr>
<tr>
<td>6.0</td>
<td>Electro Convulsive Therapy (E.C.T.) machine preferably with ECG monitoring</td>
<td>Nihon kohoden/ RMS/ MECTA corporation (750,751)</td>
</tr>
<tr>
<td>7.0</td>
<td>EEG machine &amp; monitor</td>
<td>Nihon kohoden /Interkardio(Astromed,EMS)/ Cadwell/ Geratherm/ Biodex/ RMS India/ Alliance(Viasys/Integra)/ ROHANIKA(Allen Medical,Zeihm,sthilier) (579)</td>
</tr>
<tr>
<td>8.0</td>
<td>Nebulizer</td>
<td>Omron/B Braun/ Philips/ Online Surgicals/ Dr. Morepen/ Dr. Ozone/ Handyneb</td>
</tr>
<tr>
<td>9.0</td>
<td>Ventilator (Transport)</td>
<td>Draeger/Wipro GE/ Philips/Schiller/ BPL Medical/ Maquet/ Minday</td>
</tr>
<tr>
<td>10.0</td>
<td>Stress Test</td>
<td>Nihon Kohden /Wipro GE/Philips/Schiller Healthcare/ BPL/ mindray</td>
</tr>
<tr>
<td>11.0</td>
<td>EMC and nerve conduction velocity machine</td>
<td>RMS/Nihon Kohoden</td>
</tr>
<tr>
<td>12.0</td>
<td>Steam Inhaler</td>
<td>Nidhi Surgical/Surgical Product Of India Pvt Ltd.</td>
</tr>
<tr>
<td>13.0</td>
<td>NST machine</td>
<td>Huntleigh/ Wipro GE/ Philips</td>
</tr>
<tr>
<td>14.0</td>
<td>Fetal Doppler</td>
<td>Hunteligh/Nidek/BPL</td>
</tr>
<tr>
<td>15.0</td>
<td>Cardiotocogram machine</td>
<td>Wipro GE/ Huntleigh/Broze India/BPL</td>
</tr>
<tr>
<td>16.0</td>
<td>Impedance Audiometer</td>
<td>Welch Allyn/Sibel/Horentek Srl</td>
</tr>
<tr>
<td>17.0</td>
<td>Puretone Audiometer</td>
<td>Welch Allyn/Sibel/Horentek Srl</td>
</tr>
<tr>
<td>18.0</td>
<td>Pulmonary function Test machine with facility for spirometry, lung volume and diffusion capacity</td>
<td>Carefusion(Jaeger)/ Schiller/ RMS/ Morgan/ Halios</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Manufacturer</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>19.0</td>
<td>Uroflowmetry</td>
<td>Santron Meditronic/ Advin/ Nidhi Meditech Systems Pvt Ltd/Status Medical Equipments/S. N. Medical Systems/Unique Medical Devices</td>
</tr>
<tr>
<td>20.0</td>
<td>Spirometer</td>
<td>Carefusion(Jaeger)/ Schiller/ Morgan/ RMS</td>
</tr>
<tr>
<td>21.0</td>
<td>Spirometer</td>
<td>Carefusion(Jaeger)/ Schiller/ Morgan/ RMS</td>
</tr>
<tr>
<td>22.0</td>
<td>Spirometer Digital</td>
<td>Carefusion(Jaeger)/Schiller/Mergan/RMS India/NDD Medical Technologies</td>
</tr>
<tr>
<td>23.0</td>
<td>Sphygmanometer</td>
<td>Diamond/Rudulf Riester/Welch Allyn/Hiene</td>
</tr>
<tr>
<td>24.0</td>
<td>Biofeed-back instruments (sets)</td>
<td>Dolphin Pharmacy Instruments/ INCO instruments &amp; Chemicals (583)</td>
</tr>
<tr>
<td>25.0</td>
<td>IABP machine</td>
<td>Arrow/ Translux/MAT Medical System / Maquet</td>
</tr>
<tr>
<td>26.0</td>
<td>Basic-Boyle’s</td>
<td>Wiporo GE/Draeger Medical/BPL Medical Technologies</td>
</tr>
</tbody>
</table>
## TECHNICAL SPECIFICATION

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Technical Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td><strong>ECG Machine</strong>&lt;br&gt;Technical specifications:&lt;br&gt;1. 3 Channel portable electrocardiograph graphical display and interpretation.&lt;br&gt;2. 12 Leads Simultaneous acquisition.&lt;br&gt;3. Auto and Manual mode. 3.5” colour TFT Display.&lt;br&gt;4. 20 patients internal Memory.&lt;br&gt;5. 2 bit A/D conversion.&lt;br&gt;Consist of:&lt;br&gt;6. Full Alphanumeric key pad.&lt;br&gt;7. Thermo sensitive 80 mm. Paper roll.&lt;br&gt;8. LCD Screen for stand alone use with built in Printer &amp; PC Compatible.</td>
</tr>
<tr>
<td>2.0</td>
<td><strong>Central Cardiac monitor Console</strong>&lt;br&gt;2.1&lt;br&gt;1. Voltage (value, AC or DC, monophase or triphase) 220 to 240V, 50Hz.&lt;br&gt;2. battery operated Battery charger to be integral to mains power supply, and to charge battery during mains power operation of unit.&lt;br&gt;3. Tolerance (to variations, shutdowns) Voltage corrector / stabilizer to allow operation at ± 30% of local rated voltage.&lt;br&gt;4. Protection Electrical protection provided by fuses in both live and neutral supply lines.&lt;br&gt;5. Overview of functional requirements Operates from mains voltage or from internal rechargeable battery.&lt;br&gt;6. Operator can set audio visual alarm levels for low or high levels of each parameter independently.&lt;br&gt;7. Allows display of single, 3 lead ECG or simultaneous display of at least 5 waves ECG selected from up to 12 points.&lt;br&gt;8. Display to be digital of all active parameters and trace display for at least three selectable parameters.&lt;br&gt;9. Continuous display on screen of neonatal or infant ECG, respiration and heart rates, invasive / non-invasive blood pressure, body temperature and SpO2.</td>
</tr>
<tr>
<td>3.0</td>
<td><strong>Monitors for pulse rate, Heart Rate,E.C.G., Invasive and non-invasive pressure (2 in each ward)</strong>&lt;br&gt;3.1&lt;br&gt;1. 7” Monitor Display screen Size.&lt;br&gt;2. 5 Waveforms ECG.&lt;br&gt;3. Resp/Temp/SpO2/NIBP/ECG.&lt;br&gt;4. It should have capability to connect with Central Monitor stations.&lt;br&gt;5. Printer().</td>
</tr>
</tbody>
</table>
concentrator

4. Nurse call - Connection for transmitting alarm signals to a central, alarm system
Patient type Adult
5. Pediatric Respiratory rate 2/min to 80/min Inspiration time 0.2 to 10 s Tidal volume 0.05 to 2.0 L, BTPS2) with PediatricPlus 0.02 to 2.0 L Inspiratory pressure 1 to 99 mbar (or hPa or cmH2O) PEEP/interm. PEEP 0 to 50 mbar (or hPa or cmH2O)
6. Pressure support/ΔPsupp 0 to 50 mbar (or hPa or cmH2O) (relative to PEEP) Flow acceleration 5 to 200 mbar/s (or hPa/s or cmH2O/s) O2-concentration 21 to 100 Vol.
7. Trigger sensitivity (Flow trigger) 1 to 15 L/min Inspiratory termination criterion 5 to 75 % PIF (peak inspiratory flow) PC-APRV (Inspirational time Thigh 0.2 to 22.0 s
8. Expiratory time Tlow 0.1 to 22.0 s Inspiratory pressure Phigh 1 to 95 mbar (or hPa or cmH2O) Expiratory pressure Plow 0 to 50 mbar (or hPa or cmH2O) Displayed measured values Airway pressure measurements Max. airway pressure, plateau pressure, mean airway pressure, PEEP 0 to 99 mbar (or hPa or cmH2O) Minute volume (MV) Total MV, spontaneous MV 0 to 99 L/min, BTPS Tidal volume Inspiratory VT, expiratory VTspom 0 to 3999 mL, BTPS Total respiratory rate Total and spontaneous respiratory rate, 0 to 150/min Inspiratory O2-concentration 21 to 100 % Vol. End-tidal CO2 concentration EtCO2 0 to 100 mmHg (or 0 to 13.2 Vol% or 0 to 13.3 kPa) Breathing gas temperature 18 to 48 °C (64.4 to 116.4 °F) Curve displays Paw(t), Flow (t), Tidal volume (t), CO2 (t) Ventilation ratio (I:E) 1:150 to 150:1 Compliance C 0.5 to 200 mL/mbar (or mL/hPa or mL/cmH2O) Resistance R 3 to 300 mbar/L/s (or mL/hPa or mL/cmH2O/L/s) Leakage minute volume MVleak 0 to 100 % Rapid shallow breathing RSB 0 to 9999 (1/min/L) Special Maneuvers () – Intrinsic PEEP EEp 0 to 99 mbar (or hPa or cmH2O) 10. Exp. Gas supply Air Turbine technology O2 supply 3 bar (43.5 psi)

5.0 EEG machine

1. Excellent performance for routine EEG exam rooms as well as epilepsy centers, sleep labs and research facilities.
2. High expandability with a wide variety of hardware and software gives the capability to handle routine EEG recording to high level brain function research.
3. DSA trengdgraph and several types of mapping, frequency spectrum analysis and phase comparison
5. 3-D voltage mapping displays voltage maps in 6 different views or a sequence of voltage maps in one view
6. EEG Scope—Data review during acquisition
7. Including standard

6.0 Electro Convulsive Therapy (E.C.T.) machine preferably with ECG monitoring

6.1 SINE WAVE ECT
1. Lcd /LED Display for stimulus voltage & Time
2. Output voltage 90 to 190 V
3. Manual, timer & Ectonus Modes
4. Fitted in brief case.
5. Timer 0.1 to 5.9 sec. in step of 0.1 sec
6. Cerebral Stimulation 0 to 40 volts
8. Power input to be 220-240VAC, 50Hz fitted with Indian plug
9. UPS of suitable rating with voltage regulation and spike protection for 60 minutes back up

7.0 EEG machine & monitor

7.1 1. Excellent performance for routine EEG exam rooms as well as epilepsy centers, sleep labs and research facilities.
2. High expandability with a wide variety of hardware and software gives the capability to handle routine EEG recording to high level brain function research.
3. DSA trengdgraph and several types of mapping, frequency spectrum analysis and phase comparison
4. Advanced EEG report generation by NeuroReport channel EEG input and SpO2/CO2
5. 3-D voltage mapping displays voltage maps in 6 different views or a sequence of voltage maps in one view.
6. EEG Scope—Data review during acquisition
7. Including standard

<table>
<thead>
<tr>
<th>8.0 Nebulizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ultrasonic energy for uniform and highly dense 1-5 microns.</td>
</tr>
<tr>
<td>2. More than 96% of 0.3 micron or larger airborne dust particles is effectively shut out with the air filter to provide purified air for aerosol nebulization.</td>
</tr>
<tr>
<td>Medication cup with replaceable diaphragm.</td>
</tr>
<tr>
<td>3. Easily detachable fan cover and pneumoclean (Air filter).</td>
</tr>
<tr>
<td>4. Made of highly resistant sterilizable resin.</td>
</tr>
<tr>
<td>5. Stand with solution bottle for safety.</td>
</tr>
<tr>
<td>6. Nebulizing rate: 4 ml/min or greater.</td>
</tr>
<tr>
<td>7. Mist particle size: Approx 1-5 microns.</td>
</tr>
<tr>
<td>8. Nebulizing time setting: 1-30 min &amp; continuous</td>
</tr>
<tr>
<td>10. Accessories: Tray set for nebulizer with tray track and pole mount fitting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.0 Ventilator (Transport)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Purpose and Definition</td>
</tr>
<tr>
<td>a. For the safe transport of ventilator dependent patient into and out of ICU, OT and accident &amp; Emergency unit.</td>
</tr>
<tr>
<td>b. Should be capable of supporting Pediatrics and Adult patients with wide variety of clinical conditions with dual limb patient circuit facility.</td>
</tr>
<tr>
<td>2. Technical Specification:</td>
</tr>
<tr>
<td>a. Should be microprocessor controlled, portable, light weight.</td>
</tr>
<tr>
<td>b. Should operate with main electric supply as well as with battery.</td>
</tr>
<tr>
<td>c. Should be able to work both with cylinders and pipeline, connectors and high pressure tubing of appropriate length to be supplied.</td>
</tr>
<tr>
<td>d. Should have turbine/piston-technology for supplying air-oxygen mixture.</td>
</tr>
<tr>
<td>e. Should have built-in air source through Internal compressor / micro piston gas/ Turbine delivery system. With battery back up to 3 hours.</td>
</tr>
<tr>
<td>f. Should have facility to work on both low flow oxygen supply and high flow oxygen supply source.</td>
</tr>
<tr>
<td>g. Should have following modes of ventilation CMV, Assist –control, SIMV, PS-PEEP, CPAP, NIV</td>
</tr>
<tr>
<td>h. Should have tidal volume setting from 35 to 2000 ml in VCV modes &amp; flow from 3 to 100L/min.</td>
</tr>
<tr>
<td>i. Should have the pressure support ranges from 0 to 50cm H2O.</td>
</tr>
<tr>
<td>j. Should have built in Oxygen Monitoring with alarms.</td>
</tr>
<tr>
<td>k. Should be US FDA or CE Approved.</td>
</tr>
<tr>
<td>l. Audio –visual alarms for</td>
</tr>
<tr>
<td>(i) Low supply pressure</td>
</tr>
<tr>
<td>(ii) High/Low airway pressure</td>
</tr>
<tr>
<td>(iii) Leakage/disconnection</td>
</tr>
<tr>
<td>(iv) Power failure</td>
</tr>
<tr>
<td>(v) Apnea</td>
</tr>
<tr>
<td>(vi) Low battery</td>
</tr>
<tr>
<td>(vii) High Pressure 4 to 99cm H2O</td>
</tr>
<tr>
<td>(viii) High Pressure 4 to 99cm H2O</td>
</tr>
<tr>
<td>m. Should have following settings</td>
</tr>
<tr>
<td>(i) TV 50-1500ml</td>
</tr>
<tr>
<td>(ii) PEEP/CPAP &amp; Pressure Support</td>
</tr>
<tr>
<td>(iii) RR up to 40bpm</td>
</tr>
<tr>
<td>(iv) I:E ratio 1:3 to 2:1</td>
</tr>
<tr>
<td>(v) FiO2 40-100%</td>
</tr>
</tbody>
</table>
n. Rechargeable batteries
o. Should fix, on rails of transport trolley and on stand with wheels.
p. Two sets of reusable silicon ventilator circuits.
q. Should have menu for easy operation as well as setting up the patients
3. Accessories:
a. Adult circuits – 2Nos
b. Pediatric Circuits – 2Nos
1. Purpose and Definition
a. For the safe transport of ventilator dependent patient into and out of ICU’s and dialysis unit.
b. Should be capable of supporting Pediatrics and Adult patients with wide variety of clinical conditions with dual limb patient circuit facility.

10.0 Stress Test
1. State of the art, latest model, high end equipment must be quoted.
2. System should simultaneously acquire and analyze at least 15 ECG leads.
3. System should have digital acquisition preferably in the form of acquisition module.
4. Facility for CRT display processed, signal averaged distortion free ECG signals updated every 5 beats with at least 15 channels and at least 3 rhythm channels.
5. Medial display of 1 or 2 leads updated every 5 beats with maximum ST deviation with pretest and updated ECG.
6. Facility to display all the 15 channels simultaneously with pretest and updated ECG with ECG analysis.
7. System should have facility for storage of all ECG data in hard disk for retrieval, replay and transmission.
8. Should have facility for recording 15 lead resting ECG , selectable minute by minute ECG’s, pre-programmed distortion free exercise ECG’s and ECG during recovery and test end with ST segment analysis report.
9. Should have provision of software, driven user programmable exercise protocols and/or standard protocols.
10. System should print comprehensive minute by minute record of ST segment changes, ST segment trend plot and acceleration of the ST segment.
11. Should have facility for editing of final report.
12. Should have facility for display of 6 channels of rhythm user defined levels.
13. Should have capability for adjusting the isoelectric point, J-point and ST level during any phase of stress test.
14. Should have hard disk memory for storing current patient data including wave forms.
15. In addition the equipment should have floppy disk memory for storing final report including wave forms and for incorporating any future upgrades introduced by the manufacturer.
16. Should have trend facility for HR, ST slope, blood pressure, PVC/min, R wave amplitude, J point changes, work load, rate pressure product, ST/HR slope.
17. Should have ability to reanalyze of St segment of ST measurement points i.e., to set new points and move the median complexes through a new measurement points generating a new final report even after the test is over and stored.
18. System should have dynamic scan facility to display automatically the worse ECG lead.
19. System should have automatic noise free programmable treadmill, which should be manufactured by the same manufacturer run by the system. It should also have manual controls.
20. Automatic arrhythmia detection and documentation.
21. System should be defibrillation protected.
22. Should have facility to store current patient data on floppy disk and facility to retrieve data back and print out.
23. Should have bicycle ergometry compatible.
24. Should not be assembled unit.

### 11.0 EMC and nerve conduction velocity machine

1) Minimum 4 channel system with optical isolation with Ethernet connection for connecting to either to desktop system or laptop system for portable use.
2) Motor NCV with automatic marking
3) Sensory NCV with automatic marking
4) F wave with split screen display with automatic marking of F responses showing the Max F, Min F and % F values.
5) H reflex & Blink reflex
6) Repetitive nerve stimulation
7) Insertional/Spontaneous EMG recording for minimum 600 secs on hard disk or unlimited buffer storage
8) EMG replay of minimum 600 sec of stored data from hard disk with audio and store in AVI format for review on any Windows Media Player PC.
9) Single Motor unit Analysis.
10) Sympathetic skin response
11) Somato sensory evoked potentials (Upper, lower, Dermatomes)
12) RR Interval program with programs for stand/sit/supine position & Heart rate variability calculations
13) Auditory evoked potentials: BAER, AEP programs
14) The software should have facility to measure the Patient Hearing Threshold before running the BERA test.
15) The software should be capable of Grand averaging of the responses for better signal quality for BERA recordings.
16) Auditory headphones with clicks, bips and tones
17) Visual evoked potentials: Pattern reversal VEP
18) 16” VEP monitor for visual evoked potential
19) Common mode input impedance > 1000Mohm
20) Low filter to be varied from 0.05 Hz - 500Hz or Higher
21) High filter to be varied from 30Hz - 5KHz or Higher
22) Gain to be varied from 0.5 ms/div to 1000 ms/div
23) Constant current stimulator with current variable from 0 to 100mA with increments of 0.5mA and pulse duration to be varied from 50µs - 1000µs with 50µs increments.
24) Software adjustable notch filter
25) The electrical stimulator should have controls for stimulus delivery, intensity, store, reverse polarity button and two programmable buttons preferred by user
26) The base unit of the system should provide all the controls for performing the test, switching to other test protocols and review of the test with control knobs for sensitivity, gain, marking cursors, pulse width etc.In-built comprehensive nerve/muscle directory
27) Automatic report generation and grammatically frame the sentences and print in the report.
28) The software should be supplied with Normative data for computation and online comparison with test values
29) The software to have facility to quickly review the complete summary of the all the acquired traces and tabulate the results without need to go in each and every test protocol.
30) The software should have also facility for Left vs Right comparison in NCV, F, H and Evoked potential tests.
31) The software should have Live monitor window to view the raw signal of the data before acquiring or storing on the system.
32) The system should be supplied with branded Pentium Core 2 Duo Processor 2.7 GHz, 512 MB RAM, 120 GB Hard Disk, 15” flat panel TFT /LCD monitor, DVD Writer, Laser Printer, UPS and CVT, Trolley & Electrode starter kit.
32) The system should have Quantitative EMG with Multi MUP, Interference pattern with online cloud plot, Single fiber EMG with Histograms, Motor unit number estimation, P300, Reflex hammer, Skin temperature probe.

### 12.0 Steam Inhaler

1. Input Supply 5Amp.
2. Heat Protecting Body of Steam Inhaler

13.0 NST machine

1. The system should be Microprocessor based Foetal Monitor providing continuous monitoring of foetal heart rate (FHR) alongwith maternally sensed foetal activity during antepartum testing for NST (Non-StressTest) and for intensive monitoring of active labor, with twin foetal monitoring facility at the same time.

2. Transducer
   Type: Multicrystal wide beam transducer
   Technique: Autocorrelation
   Quantity: 2 nos (FHR 1, FHR 2)
   Frequency: 1MHz to 2 MHz.
   Intensity: Less than 10mW/Sq cm.
   Resolution: 1BPM
   Heart Rate counting Range: 30 to 250BPM

3. Features:
   1. Twin fetal monitoring with TOCO transducers – 01 No
   2. It should have clinical event marker
   3. It should have monitoring of Bradycardia & Tachycardia alarm events.
   4. It should have facility to control the volume of FHR sound.
   5. It should have battery back up of 4-6 hours
   6. Power Supply: 230Vac, 50/60Hz

4. Fetal Doppler
   1. Should provide rechargeable battery along with recharging unit (Charger/Adaptor).
   2. Should provide a pre-cut non-fray elasticized belt with buckle shall enable easy transducer positioning for more accurate traces.- 03Nos
   3. Vibroacoustic stimulator – 01 No
   5. Display:
      1. Display Minimum 5”.
      2. Actual FHR1 & FHR2 in BPM
      3. Uterine Contraction/Activity in %.
      4. High / Low FHR limits.
      5. Alarm Message Display
      6. Battery charging and Low indication.

7. Blinking corresponding to each beat

14.0 Cardiotocogram machine

a) Foetal Heart Rate range 50 to 240 bpm
b) External Toco range 0 to 127 relatives units
c) NST timer for antepartum applications
Color TFT display
Pacemaker detection
Electro surgical interference proof
Defibrillation protection and defibrillation synchronization
Pitch tone
Unique iSEAP algorithm which is specially optimized for arrhythmia and high blood pressure 6.patients
Advanced SpO2 module with equivalent performance as the industry leaders’
NIBP passed clinical validation process
Large storage capacity
Nurse call function
LAN/Wi-Fi(*) connections
Bi-directional communication with the MFM-CMS central station
Data management via PatientCare Viewer software

16.0 Impedance Audiometer

1. Probe tone: 220 or 226 Hz/678Hz/1000Hz (For Pediatric testing also)
2. Probe assembly with contralateral test facility (with supra aural earphones: TDH 39/TDH39A/TDH49/TDH49A/TDH 50 with MX 41 AR ear cushions or insert earphones (ER Tone 3A)
3. Test cavities (0.5, 2, 5 cc)
4. Probe tips - assorted
5. Shall have Printer
6. Tests required
   a. Compensated tympanometry (ear canal volume and tympanometric peak pressure)
   b. Ipsilateral and contralateral acoustic reflexes
   c. Eustachian tube function tests - intact and perforated
7. Air pressure range: + 200da Pa to – 400 da Pa
8. Stimuli for acoustic reflexes:
   a. Type: Pure tones
   b. Frequencies: 500Hz, 1000Hz, 2000Hz and 4000Hz
   c. Intensity : up to 120 dB HL
9. Power supply: Battery operated & main
10. Should operate in 200-240 V AC 50 Hz
11. Shall have Self-calibration

17.0 Puretone Audiometer

1. Probe tone: 220 or 226 Hz/678Hz/1000Hz (For Pediatric testing also)
2. Probe assembly with contralateral test facility (with supra aural earphones: TDH 39/TDH39A/TDH49/TDH49A/TDH 50 with MX 41 AR ear cushions or insert earphones (ER Tone 3A)
3. Test cavities (0.5, 2, 5 cc)
4. Probe tips - assorted
5. Shall have Printer
6. Tests required
   a. Compensated tympanometry (ear canal volume and tympanometric peak pressure)
   b. Ipsilateral and contralateral acoustic reflexes
   c. Eustachian tube function tests - intact and perforated
7. Air pressure range: + 200da Pa to – 400 da Pa
8. Stimuli for acoustic reflexes:
   a. Type: Pure tones
   b. Frequencies: 500Hz, 1000Hz, 2000Hz and 4000Hz
   c. Intensity : up to 120 dB HL
9. Power supply: Battery operated & main
10. Should operate in 200-240 V AC 50 Hz
11. Shall have Self-calibration

18.0 Pulmonary function Test machine with facility for spirometry, lung volume and diffusion capacity

1. Suitable for measuring pulmonary volumes and capacities.
2. Software to analyze blood pressure, ECG, heart rate
3. The system should come with all the necessary including power cords and cables and should be installed by the deliverer to ensure it subserves all the above functions.
4. It should come with owner’s manual guide.
5. The following is a summary of
### Uroflowmetry
1. LINE VOLTAGE 230 V/110V AC Stabilized
2. LINE FREQUENCY 50 / 60 Hz
3. LEAKAGE VOLTAGE < 1 V (Between Neutral (N) and Earth (E)).
4. DIMENSIONS (only uroflow module) 208 mm x 102 mm x 165 mm (w x h x d)
   REPEAT COPY Selectable in two modes - 5ml / 10ml per sec.
5. ACCURACY ± 5 % of voided volume in reading.
6. ± 2 % of voided volume at full range
7. Maximum Capacity for a single micturation 1000 ml.
8. Maximum peak flow rate detectable < > 65 ml / Second.
9. Maximum micturation times Normal : 50 seconds
10. Extended : 3 minutes.
12. STANDARD Advance Microprocessor based Ad-On module, Transducer, Micturation chair with back rest and arms, Urine collection beaker and EPSON Compatible Dot matrix Printer
   PRINTER Supports to EPSON Compatible Printer.

### Spirometer
1. Suitable for measuring pulmonary volumes and capacities.
2. Software to analyze blood pressure, ECG, heart rate
3. The system should come with all the necessary including power cords and cables and should be installed by the deliverer to ensure it subserves all the above functions.
4. It should come with owner’s manual guide.
5. The following is a summary of specifications:
   1. Measurement Device: Fleisch Pneumotachometer (unheated)
   2. Flow Range: -12 L/Sec. To +18 L/Sec.
   3. Volume Range: -12 L to +14 L
   4. Flow & Volume Accuracy: +/-2% Resolution to 0.008L/Sec.
   5. Sampling Rate: 100 samples per second (4096 byte resolution)
   6. Test Storage: Unlimited (average usage approximately 6Kbytes per patient per session); 30 sec per test.
7. Calibration: 3.00L Creative Biomedics Calibration Syringe.
8. BTPS Temperature Correction:
9. Automatic, accurate to 1 degree C.
10. Sensor Dimensions: 6.5in x 5in x 3in (16.5cm x 12.7cm x 7.6cm)
11. Sensor Weight: 1.25 lbs. (0.57 kg)
13. Computer Requirements: processor (486 or higher recommended), 1 GB RAM, 60 GB Hard Disk, VGA Graphics, RS 232 Serial Port, Parallel Printer Port.
15. Tests performed:
   Pre/ post FVC, SVC, MVV
   and challenge with bronchial
   provocation software
16. Patient database
17. Pulmonary consult interpretation software
18. Trend reports

### Medical Equipments

#### 21.0 Spirometer

<table>
<thead>
<tr>
<th>General specifications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 litre capacity ordinary. s.s chamber 304 with chain compensated counter balance to float, Pulley calibrated to denote volume, Inlet &amp; outlet tubes. Complete with corrugated rubber tube, mouth piece &amp; recording lever.</td>
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</tbody>
</table>

#### Benedict Roth Recording Spirometer.

1. The 6 litre capacity spirometer has a four speed electrical recording unit with gravity writing ink pen.
2. Soda lime container with screw connection in the centre chamber.
3. Drain cocks to all the tubes & container.
4. Sampling cock for connecting the patient to spirometer or atmosphere.
5. The unit is fitted with portable frame.
6. Complete with valves, tubes, mouth piece, nose clip, ink writing pen & 50 charts.

#### 22.0 Spirometer

<table>
<thead>
<tr>
<th>General specifications:</th>
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<tbody>
<tr>
<td>1. Electronic with computer attachment and print out with software for complete analysis</td>
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<tr>
<td>2. The System should be an economically oriented lung function measuring system by using the single Breath technique.</td>
</tr>
<tr>
<td>3. Suitable for measuring Diffusion Capacity (DLCO) by the Rebreathing technique for patients with distribution impairments of the lungs, to minimise patient co-operation</td>
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<tr>
<td>4. Indian predictive values should be available</td>
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</table>

**Technical Specifications:**

- a) Slow and forced Spirometry, VT, BF, MV, ERV, FVC, FEV1, VCin, VCex, MEF 50, MEF 75, PEF, MVV etc.
- b) Lung Subvolumes : FRC, RV, TLC, RV% TLC etc. c) Diffusion capacity of the Lungs : DLCO-SB, DLCO – RB.
- 8. The system should have an easy to exchange, bidirectional heated pneumotach with the following specifications. Range - Should be 0 to 20 lit/sec. Accuracy - Should be +/-2% Resistance - Should be less than 0.05 KPa/ lit/sec.
- 9. The system should have carbon monoxide analyser, He analyser and O2 Analyser with the following specifications:
  - a) Carbon monoxide analyser : Range - Should be from 0 to 0.4% Resolution/Accuracy should be 0.0002%/0.0003% Reproducibility should be 0.0006%
  - b) He Analyser : Range - Should be 0 to 9.5% Resolution/Accuracy should be 0.005% /0.05 % Reproducibility should be 0.02%
  - c) O2 analyser Range - Should be 0 to 100%. Resolution / Accuracy should be 0.05% / 1.0% Reproducibility should be 0.1%...
10. The system should have a demand valve unit for direct breathing (no inspiratory bag) from pre-mix gas container, to minimize wastage of gas.

11. The computer system should have the following specification: Branded - P4 3 GHz PC/advanced/equivalent System with 500 GB HDD, 4 GB RAM, CD/DVD W/R 21” TFT Monitor. Keyboard, Mouse. HP colour laserjet printer ORIGNAL WINDOWS XP PROFESSIONAL LATEST OEM O.S.WITH LATEST SERVICE PACKS

12. information in a data base system.

13. It should be possible to upgrade the system to the following:
   a) Airway resistance by shutter method.
   b) Respiratory impedance by Impulse Oscillometry system.
   c) Respiratory muscle strength, Respiratory drive.
   d) Compliance - Static / Dynamic system
   e) Body Plethysmography.
   f) Aerosol Provocation system.
   g) Ergospirometry & Stress test ECG.
   h) Breathing Analysis for children.

23.0 Sphygmomanometer

<table>
<thead>
<tr>
<th>Sphygmomanometer (digital)</th>
<th>battery-6.0V(AA*4), LCD Display, Dimension145x103x56 mm</th>
</tr>
</thead>
</table>

Mercury type Sphygmomanometer
1 Should be Portable mercurial type.
2 Should have ISI mark.
3 Should have ON and OFF provision for mercury reservoir.
4 Should have a measuring range from 0 to 300 mmHg.
5 Should be provided with adult arm cuffs of size medium & large and paediatric cuff.
6 The control valve should have a knurled thumb control device. The leak rate should not exceed 10 mm of mercury per minute.
7 The manometer scale markings and graduations should be permanent and clearly visible and filled with pigments.
8 The internal diameter of the manometer glass tube should be 4.1 ± 0.1 mm and the thickness not less than 2 mm.
9 All plastic parts, if any used should not crack, flake, peel or disintegrate in normal use.
10 The inflating rubber bag should be capable of withstanding an internal pressure of 450 mmHg without leaking.
11 The inflating bulb should be soft and should not have any joints or ridges.
12 The mercury used should be clean, double distilled and of 99.9% purity.
13 The fastening arrangements of the cuff should be of hook and loop type (Velcro).
14 The threading and fastening arrangement of the cuff should show no sign of slip or failure when subjected to the maximum test conditions.
15 The rubber tubes used should have an internal diameter of 3 ± 0.5 mm and the external diameter should not be less than 8mm.

II Sphygmomanometer - Aneroid Type
1 Should be aneroid type, 2 Should have ISI mark.
3 Should have a measuring range from 0 to 300 mmHg,
4 Should be provided with adult arm cuffs of size medium & large and paediatric cuff.
5 The dial manometer markings and graduations should be permanent and clearly visible and filled with pigments, with diameter of minimum diameter of 160 mm.
6 Body & Bazel – Aluminium die casted (Powder coated), screw type bazel
7 Sensing-corrogated phosphorous bronze twin capsule bellows.
8 Movement mechanism – Brass
9 Connection : brass, nickel plated for 3-4 mm rubber hose.
10 Dial – Aluminium
11 Pointer – White coated, thin & sharp made of phosphorous Bronze
12 Window lenses – Clear plastic.
13 All plastic parts, if any used should not crack, flake, peel or disintegrate in normal use.
14 The inflating rubber bag should be capable of withstanding an internal pressure of 450 mmHg without leaking.
15 The inflating bulb should be soft and should not have any joints or ridges.
16 The fastening arrangements of the cuff should be of hook and loop type (Velcro).
17 The threading and fastening arrangement of the cuff should show no sign of slip or failure when subjected to the maximum test conditions.
18 The rubber tubes used should have an internal diameter of 3 ± 0.5mm and the external diameter should not be less than 8mm.
19 The tubes should be fitted with male and female leur connectors.

24.0 Biofeed-back instruments (sets)

EEG (Alpha), EMG, Pulse, Temperature, Respiration, GSR, ECG & HRV. Continuous graphical display of all parameters simultaneous and singular. Visual feedback through digital display and colour bargraph. Audio feedback through headphones and speakers. Facility to play audio of your choice for relaxation. Storage of patient data for review. Plotting of graph depicting patient progress for every parameter. User definable event marker. Facility for video and audio recording.

25.0 IABP machine

Color Display: 8.3”(21cm)W x 6.2”(15.8cm)H; up 45°, down 55°, right 70°, left 70° viewing angle; Rotates 330°; Tilts 180°; Detachable; Laptop-like closure for storage and protection.
Preferences Menu: User may select display sweep speed (25 or 50mm/sec), brightness (low, med., high); balloon wave form (on/off); ECG inflation markers (on/off); flashing alarms (on/off).
ECG Trigger: Threshold dynamically adjusted by system for high sensitivity and selectivity of the R-wave detection; Minimum= 120µV ± 20µV at normal gain; 40µV at max. gain.
Pressure Trigger: Default trigger threshold is automatically adjusted to 38% of the difference between peak systolic and end diastolic (avg. over multiple cycles); In variable mode: User adjustable between 7 and 30 mmHg ± 3 mmHg.
Pacer A Trigger: R-wave detections (as above) except pacer blanking is extended to 100 ms.
Pacer V/A-V Trigger: V Pacer: fixed at rate up to 185 bpm (no demand pacing) A-V Pacer: fixed at rate up to 125 bpm (no demand pacing) with A-V intervals between 80-224 ms.
Internal Trigger: Variable mode: 40-120 bpm; Normal mode: 80 ± 1 bpm.
Tall T-Wave Rejection (ECG and Pacer A Mode): Rejects all T-Waves where Q-T interval is <300 ms and the amplitude is <70% of QRS input amplitude.
Pacer Rejection (ECG and Pacer A mode): Rejects all pulses of amplitude ± 2.0 mV to ± 700 mV (ECG and Defibrillator Protection: Discharge levels 360 J (trace returns to screen in 5 sec. max)

26.0 Basic-Boyle’s

1. Should be portable stainless steel, with large antistatic sturdy castor wheels fitted with brakes.
2. Gas cylinder (pin indexed) yokes with sliding stainless steel/sturdy clamping bars for easy handling.
3. Two Pin index yokes for connecting cylinders each for O2, N2O.
4. Regulator two each for O2 and N2O with output pressure 4.22kg/cm2. N2O regulator is activated only when minimum oxygen on flow.
5. Should have pressure gauge for all gas inlets including central lines mounted on the front panel for easy visibility.
6. Should have audible alarm for O2 failure.
7. N2O supply should shut off if O2 supply fails (Anti-hypoxic guard).
8. Oxygen and Nitrous oxide should be linked either mechanically or pneumatically to ensure a minimum of 25% oxygen delivery at all times to avoid delivery of hypoxic mixture.
9. Should have dual cascade type flow meter for O2 and N2O calibrated in multiple scale.
10. Provision to mount any two selectable vaporizer with interlocking facility to allow use of only one vaporizer at a time.
11. Iso-flurane vaporizer of newer generation having specifications equivalent to tech 7 type to be provided.
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<tr>
<td>12.</td>
<td>Non-return cum pressure relief valve when pressure exceeds 120cm of H2O.</td>
</tr>
<tr>
<td>13.</td>
<td>Should have change over from open circuit to closed circuit and vice versa.</td>
</tr>
<tr>
<td>14.</td>
<td>Should provide with oxygen flush switch.</td>
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<tr>
<td>15.</td>
<td>Circle absorber with corrugated reusable breathing circuit for closed circuit system with each unit.</td>
</tr>
</tbody>
</table>
| 16. | Should have low flow anesthesia technique  
   a. Should have a provision for mount monitors on top of the machine.  
   b. The table top made up of stainless steel/ chemical resistant fiber.  
   c. Standard bains circuit : 2 nos. with each unit  
   d. Reservoir bag (2 liters): 3 nos. with each machine  
   e. Connectors for bains circuit: 5 nos with each machine.  
   f. AMBU bag: 1 no. with each machine.  
   g. Pressure regulated valve with 5 meter hose and connector (conversion kit) for oxygen should be provided with each machine.  
   h. Should be supplied with driver gas hoses with necessary attachments (colour coded). |