KERALA MEDICAL SERVICES CORPORATION LTD
(A Government of Kerala Undertaking)
Thycaud P.O, Thiruvananthapuram - 14, Kerala.
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CIN: U24233KL200TSGC021616, PAN : AADCK4029M, GSTIN : 32AADCK4029M1ZK

Running Contract Details	
Equipment Name	Centralized Medical Gas Supply
Running Contract Valid Till	08-08-2021
Tender Ref No	KMSCL/EP/T327/363/2019
Tendered Quantity	100
Supplier Name	M/s United Biomedical Services
GST No	32AABFU7327D1ZI
Installation & Delivery Period	10 Week(s)
Up-time / PM vist	95% & 4 Visits per year
Warranty period	3 Years

Supplier`s Details		
Address	**Contact Details**	
Abiyas Complex - M.M Ali Road Palayam (P.O) Chalappuram Calicut - 673 002	Contact Person	Ahammed Adil/Haris Ali
	Phone	
	Mobile No	9388774401/ 9388774404
	Email	unitedbiomed@hotmail.com

Item-wise Price Details

#	Item Details	Unit Rate (Incl.all taxes & charges)	Service Charges (Through KMSCL)	Grand Total
1	**Semi auto control panel for oxygen**	28000 Incl.GST :12%	2065	30065
2	**3x3 manifold for nitrous oxide**	33600 Incl.GST :12%	2478	36078
3	**Semi auto control panel for nitrous oxide**	44800 Incl.GST :12%	3304	48104
4	**1x1 nitrous oxide emergency reserve manifold**	28000 Incl.GST :12%	2065	30065
5	**Medical air compressor duplex 15 Hp (type I)**	840000 Incl.GST :12%	61950	901950
6	**Filteration and dryer system**	56000 Incl.GST :12%	4130	60130
7	**Pressure control 4 bar**	5600 Incl.GST :12%	413	6013

Item-wise Price Details				
8	**Pressure control 7 bar**	5600 Incl.GST :12%	413	6013
9	**Vacuum pump duplex 10 Hp Type I**	784000 Incl.GST :12%	57820	841820
10	**Reservoir**	50400 Incl.GST :12%	3717	54117
11	**Filter & Vaccum pump exhaust**	8960 Incl.GST :12%	660.8	9620.8
12	**Oxygen flowmeter with humidifier**	784 Incl.GST :12%	57.82	841.82
13	**Vacuum regulator with suction bottle**	3136 Incl.GST :12%	231.28	3367.28
14	**Theater vacuum unit**	5040 Incl.GST :12%	371.7	5411.7
15	**Gas / Vacuum outlet**	1680 Incl.GST :12%	123.9	1803.9
16	**Copper pipe 42mm**	1456 Incl.GST :12%	107.38	1563.38
17	**Copper pipe 35mm**	1344 Incl.GST :12%	99.12	1443.12
18	**Copper pipe 28mm**	868 Incl.GST :12%	64.02	932.02
19	**Copper pipe 22mm**	716.8 Incl.GST :12%	52.86	769.66
20	**Copper pipe 15mm**	560 Incl.GST :12%	41.3	601.3
21	**Copper pipe 12mm**	392 Incl.GST :12%	28.91	420.91
22	**Valve 42mm**	3472 Incl.GST :12%	256.06	3728.06
23	**Valve 35mm**	3360 Incl.GST :12%	247.8	3607.8
24	**Valve 28mm**	2240 Incl.GST :12%	165.2	2405.2
25	**Valve 22mm**	2016 Incl.GST :12%	148.68	2164.68
26	**Valve 15mm**	1120 Incl.GST :12%	82.6	1202.6
27	**Valve 12mm**	336 Incl.GST :12%	24.78	360.78
28	**Area valve service unit 2 gas**	5600 Incl.GST :12%	413	6013

Item-wise Price Details				
29	**Area valve service unit 3 gas**	6720 Incl.GST :12%	495.6	7215.6
30	**Area valve service unit 4 gas**	7840 Incl.GST :12%	578.2	8418.2
31	**Area valve service unit 5 gas**	8960 Incl.GST :12%	660.8	9620.8
32	**Area line pressure medical gas alarm 2 gas**	16800 Incl.GST :12%	1239	18039
33	**Area line pressure medical gas alarm 3 gas**	17920 Incl.GST :12%	1321.6	19241.6
34	**Area line pressure medical gas alarm 4 gas**	19040 Incl.GST :12%	1404.2	20444.2
35	**Area line pressure medical gas alarm 5 gas**	19040 Incl.GST :12%	1404.2	20444.2
36	**Ceiling pendant** single arm	56000 Incl.GST :12%	4130	60130
37	**Cylinder filled - oxygen**	13440 Incl.GST :12%	991.2	14431.2
38	**Cylinder filled - Nitrous oxide**	15680 Incl.GST :12%	1156.4	16836.4
39	**Painting**	11.2 Incl.GST :12%	0.83	12.03
40	**4x 4 manifold**	134400 Incl.GST :12%	9912	144312
41	**2x2 manifold**	50400 Incl.GST :12%	3717	54117
42	**Cost of adding additional single cylinder manifold**	8960 Incl.GST :12%	660.8	9620.8
43	**Medical air compressor duplex 10 Hp (type I)**	459200 Incl.GST :12%	33866	493066
44	**Air dryer, filtration, purge control and dew point monitor**	2520000 Incl.GST :12%	185850	2705850
45	**Vacuum pump duplex 15 HP (type I)**	1008000 Incl.GST :12%	74340	1082340
46	**10 x 10 manifold for oxygen**	144480 Incl.GST :12%	10655.4	155135.4
47	**3 x 3 oxygen emergency reserve manifold**	53760 Incl.GST :12%	3964.8	57724.8
48	**Air receiver 1000 Ltrs**	56000 Incl.GST :12%	4130	60130

Item-wise Price Details				
49	**Copper pipe 108mm**	1792 Incl.GST :12%	132.16	1924.16
50	**Copper pipe 76mm**	1680 Incl.GST :12%	123.9	1803.9
51	**Copper pipe 54mm**	1568 Incl.GST :12%	115.64	1683.64
52	**Valve 108 mm**	3640 Incl.GST :12%	268.45	3908.45
53	**Valve 76 mm**	3584 Incl.GST :12%	264.32	3848.32
54	**Valve 54 mm**	3528 Incl.GST :12%	260.19	3788.19
55	**8 x 8 oxygen manifold**	143360 Incl.GST :12%	10572.8	153932.8
56	**6 x 6 manifold**	141120 Incl.GST :12%	10407.6	151527.6
57	**5 x 5 manifold**	137760 Incl.GST :12%	10159.8	147919.8
58	**3 x 3 manifold**	51520 Incl.GST :12%	3799.6	55319.6
59	**2 x 2 Emergency oxygen manifold**	51520 Incl.GST :12%	3799.6	55319.6
60	**1 x 1 Emergency oxygen manifold**	17920 Incl.GST :12%	1321.6	19241.6
61	**2 x 2 manifold for N2O**	50400 Incl.GST :12%	3717	54117
62	**1 x 1 manifold for N2O**	26880 Incl.GST :12%	1982.4	28862.4
63	**Single cylinder emergency manifold for N2O**	25760 Incl.GST :12%	1899.8	27659.8
64	**Medical air compressor duplex 5 Hp (type I)**	456960 Incl.GST :12%	33700.8	490660.8
65	**Medical air compressor simplex 15 Hp (type I)**	644000 Incl.GST :12%	47495	691495
66	**Medical air compressor simplex 10 Hp (type I)**	436800 Incl.GST :12%	32214	469014
67	**Medical air compressor simplex 5 Hp (type I)**	420000 Incl.GST :12%	30975	450975
68	**Air receiver 500 Ltrs**	53760 Incl.GST :12%	3964.8	57724.8
69	**Air receiver 250 Ltrs**	51520 Incl.GST :12%	3799.6	55319.6

Item-wise Price Details				
70	**Vacuum pump duplex 7.5 HP (type I)**	672000 Incl.GST :12%	49560	721560
71	**Vacuum pump duplex 3 HP (type I)**	324800 Incl.GST :12%	23954	348754
72	**Vacuum pump simplex 10 HP (type I)**	616000 Incl.GST :12%	45430	661430
73	**Vacuum pump simplex 7.5 HP (type I)**	560000 Incl.GST :12%	41300	601300
74	**Vacuum pump simplex 5 HP (type I)**	313600 Incl.GST :12%	23128	336728
75	**Vacuum pump simplex 3 HP (type I)**	280000 Incl.GST :12%	20650	300650
76	**Conversion Kit**	8960 Incl.GST :12%	660.8	9620.8
77	**Emergency regulator Conversion Kit**	16800 Incl.GST :12%	1239	18039
78	**Gas outlet (High End)**	7616 Incl.GST :12%	561.68	8177.68
79	**AGSS duplex system**	1444800 Incl.GST :12%	106554	1551354
80	**Oxygen & N2O control panel (High end)**	632800 Incl.GST :12%	46669	679469
81	**Vacuum pump duplex 5 HP (type I)**	308000 Incl.GST :12%	22715	330715
82	**Fully automatic control panel for oxygen**	72800 Incl.GST :12%	5369	78169
83	**Fully automatic control panel for nitrous oxide**	72800 Incl.GST :12%	5369	78169
84	**Matching probes for gas terminal units**	1568 Incl.GST :12%	115.64	1683.64
85	**Horizontal / Vertical Bed head panel 1000mm**	7840 Incl.GST :12%	578.2	8418.2
86	**Horizontal / Vertical Bed head panel 1200mm**	11200 Incl.GST :12%	826	12026
87	**Horizontal / Vertical Bed head panel 1500mm**	14560 Incl.GST :12%	1073.8	15633.8
88	**5 A socket**	201.6 Incl.GST :12%	14.87	216.47
89	**5/15 A socket**	212.8 Incl.GST :12%	15.69	228.49
90	**Switch 5 A**	61.6 Incl.GST :12%	4.54	66.14

Item-wise Price Details				
91	**Switch 15A**	123.2 Incl.GST :12%	9.09	132.29
92	**RJ 45 Data outlet**	280 Incl.GST :12%	20.65	300.65
93	**Telephone Socket**	100.8 Incl.GST :12%	7.43	108.23
94	**Monitor Stand for fixing with bed head panel**	2240 Incl.GST :12%	165.2	2405.2
95	**1 x 1 manifold for CO2**	50400 Incl.GST :12%	3717	54117
96	**Single cylinder emergency reserve manifold for CO2**	39200 Incl.GST :12%	2891	42091
97	**Filled CO2 bulk cyliner**	23520 Incl.GST :12%	1734.6	25254.6
98	**Semi Automatic control panel**	60480 Incl.GST :12%	4460.4	64940.4
99	**Screw / scroll compressor duplex 1000 LPM (type II) with control panel**	1556800 Incl.GST :12%	114814	1671614
100	**Screw / scroll compressor duplex 2000 LPM (type II) with control panel**	1904000 Incl.GST :12%	140420	2044420
101	**Screw / scroll compressor duplex 3000 LPM (type II) with control panel**	2240000 Incl.GST :12%	165200	2405200
102	**Screw / scroll compressor simplex 1000 LPM (type II) with control panel**	1120000 Incl.GST :12%	82600	1202600
103	**Screw / scroll compressor simplex 2000 LPM (type II) with control panel**	1344000 Incl.GST :12%	99120	1443120
104	**Screw / scroll compressor simplex 3000 LPM (type II) with control panel**	1680000 Incl.GST :12%	123900	1803900
105	**Vacuum pump duplex 1000 LPM (type II) with control panel**	1332800 Incl.GST :12%	98294	1431094
106	**Vacuum pump duplex 2000 LPM (type II) with control panel**	2004800 Incl.GST :12%	147854	2152654
107	**Vacuum pump duplex 3000 LPM (type II) with control panel**	2340800 Incl.GST :12%	172634	2513434

Item-wise Price Details				
108	**Vacuum pump simplex 1000 LPM (type II) with control panel**	996800 Incl.GST :12%	73514	1070314
109	**Vacuum pump simplex 2000 LPM (type II) with control panel**	1668800 Incl.GST :12%	123074	1791874
110	**Vacuum pump simplex 3000 LPM (type II) with control panel**	2116800 Incl.GST :12%	156114	2272914
111	**Vacuum pump Single unit duplex system 1000 LPM (type III) with control panel**	6708800 Incl.GST :12%	494774	7203574
112	**Vacuum pump Single unit duplex system 2000 LPM (type III) with control panel**	7828800 Incl.GST :12%	577374	8406174
113	**Vacuum pump Single unit duplex system 3000 LPM (type III) with control panel**	8388800 Incl.GST :12%	618674	9007474
114	**Rate for Area Line Pressure Medical Gas Alarm with networking facility and mobile alert facility**	436800 Incl.GST :12%	32214	469014
115	**Internal wiring charges for all Power socket with switch (Lumpsum rate)**	4032 Incl.GST :12%	297.36	4329.36
116	**Rigid Pendant**	53760 Incl.GST :12%	3964.8	57724.8
117	**Rate for the Vaccum ward unit, imported**	24640 Incl.GST :12%	1817.2	26457.2
118	**Rate for concealing Gas Outlet**	2240 Incl.GST :12%	165.2	2405.2
119	**Rate for concealing area Valve box unit / Alarm unit**	2240 Incl.GST :12%	165.2	2405.2
120	**Rate for concealing pipelines**	784 Incl.GST :12%	57.82	841.82
		58560264	**4318819.47**	**62879083.47**

Annual / Comprehensive Maintenance Charges (Exl.Tax)							
Rate	**4th Year**	**5th Year**	**6th Year**	**7th Year**	**8th Year**	**9th Year**	**10th Year**

Other terms & conditions

1. The supplier shall execute an agreement with the purchaser as per tender conditions (agreement format is given in the tender document).

2. The supplier shall submit performance security amounting to 5% of the value of the supply order.

3. The labour & comprehensive charges of equipment after the completion of warranty period is finalized by KMSCL as mentioned above.

4. Since discount rate is not applicable for equipment under Running Contract of KMSCL, purchase/supply order can be issued directly to supplier at the given rate with tax & other charges (exclusive of KMSCL service charges).

5. If purchase/supply order is issued directly to the supplier, KMSCL service charge need not be paid. But the copy of the said order may be forwarded to KMSCL for information.

Technical Specification

Equipment :Centralized Medical Gas Supply

Should comply with the recommendations made in HTM 02-01 wherever stipulated in the detailed technical specifications

OXYGEN SYSTEM

1 Oxygen Manifold - 2 x 10

1.1 10 + 10 Size Oxygen Manifold should be configured with 2 x 10 nos. of class J (bulk D type) Cylinders and should be suitable to withstand working pressure of 145 Kg/cm2, along with 20 nos. of high-pressure copper annealed tail pipes with end brass adapter suitable for oxygen cylinders and manifold. Brass NRV blocks 20 nos.

1.2 Top frame should comprise of high pressure copper pipes of size 1/2” ID x 15 swg 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” ID x 15 swg.

Middle frame with cylinder holding chains should be provided to hold cylinders safely. The manifold must be tested (hydraulically) at 3500 psig and necessary test certificates should accompany along with the supply.

Only Non-halogenated polymer materials are to be used in the Non return valves supplied along with manifold.

1.3 The central gas bank shall comprise two banks of gas cylinders main and reserve, connected to a manifold. Both main and reserve banks shall be connected to the system; in such a way that only one bank will supply the system at any one time.

1.4 The manifold system should conform to IS 12827 standard

1.5 Cylinder manifolds should be modular systems. The components and the accessories should allow an extension even after installation of the cylinder manifolds to meet the Specific requirements.

Cost of Adding additional single cylinder Manifold (not taken for evaluation)

1.6 Should have facility for providing oxygen either via cylinder manifolds, liquid gas tanks or from Oxygen generators.

2. FULLY AUTOMATIC CONTROL PANEL - OXYGEN

2.1 Fully automatic control panel with flow capacity of minimum 1000 LPM for regulating and controlling the central supply with medical gases from cylinder manifolds and liquid gas tanks in hospitals.

2.2 The Gas change-over to the respective other side must occur fully automatic, once the active side of the cylinder manifold runs empty

2.3 For the change-over between the two active cylinder manifolds, the control panel should have a pneumatic-controlled reversing valve and It will continue to function even there will be a failure in the electricity supply.

2.4 The control unit, integrated into the control panel should monitor all pressures of the active and passive gas sources, which are necessary for the safe and uninterrupted system operation.

2.5 In addition to the shuttle valve, the cabinet contains the line pressure regulators, the line pressure gauge, indicators, a set of by-pass valves for manual operation in case of malfunction and an electronic control board.

2.6 If a pressure parameter deviates significantly from the respective nominal pressure, an alarm system which is integrated into the control panel is activated immediately and send an audible and visual message, to ensure that disturbances in the system are recognized.

2.7 An alarm panel with pilot lamps indicating the “in use”, ”half empty” and “empty” banks, high/low line supply pressure, test and mute buzzer switch button.

2.8 It should have the facility for recording of all alarm messages including the date of occurrence for each message.

2.9 Control panel should provide following displays.

i. display of system pressure.

ii. display of gas flow

iii. display of currently active source

iv. range calculation for the active source

3 Semi Automatic Oxygen Control Panel

3.1 Control panel should have two first stage regulators each capable of delivering 100 - 200 psi g outlet pressure.

Delivery flow capacity : Approx 1000 l/min at 55-60 psi pressure

3.2 Both the first stage regulators in the oxygen control panel should have non halogenated polymer in the high pressure side to ensure that there will be no ignition due to adiabatic compression.

3.3 40 micron filter should be provided at the inlet of each high pressure regulators of the oxygen control panel.

3.4 The first stage regulators should be connected to a common second stage regulator which will deliver an outlet pressure of 60 psi g.

3.5 The first two regulators meant for first stage should be capable of switchover system incorporated from “RUNNING” to “RESERVE” bank due to differential pressure.

3.6 The control panel should be provided 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.

3.7 The control panel should have built in audio-visual signal lamp indications for bank changeover

3.8 The control panel will be covered with aesthetically suitable cover for safe operation indicating the respective services.

3.9 Control panel should have built in transformer to ensure safe operation by low voltage.

4 Oxygen Emergency Reserve Manifold - 3 X 3 Manifold.

4.1 Should include 3 cylinder manifold bank as either side complete with 6 nos. pig tail pipes and 6 nos. non return valves.

4.2 Top frame should comprise of high pressure copper pipes of size 1/2”

ID x 15 swg 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” ID x 15 swg. The manifold must be tested (hydraulically) at 3500 psig

and necessary test certificates should accompany along with the supply.

Only Non-halogenated polymer materials are to be used in the Non return valves supplied along with manifold.

4.3 The emergency reserve manifold shall provide an uninterrupted supply of medical oxygen from equally sized high pressure cylinder banks via a suitable arrangement of pressure regulators, providing a constant downstream nominal pipeline gauge pressure of 400 kPa.

4.4 Cylinder bank shall be fitted with an isolation valve to enable continuity of supply in the vent of primary supply failure.

4.5 The manifold control panel shall provide a minimum flow of 500 l/min to the nominal 400 kPa medical oxygen pipeline system.

4.6 There shall be two separate stages of pressure regulation to enable high peak flow rates without a reduction in line pressure.

4.7 All pressure regulators shall be protected from over-pressurisation by relief valves that are vented to atmosphere.

4.8 The line pressure relief valve shall be provided with easing gear.

4.9 A non-return valve shall be provided within a line pressure manifold block and shall provide gas tight isolation in the event of any upstream component failure. The non-return valve shall automatically bring the emergency reserve manifold into service when the primary supply fails.

4.10 The emergency reserve manifold shall be provided with an isolation valve to enable positive tamperproof isolation for maintenance.

4.11 The manifold system should conform to IS :12827 standard.

4.12 Cost of Adding additional single cylinder Manifold (not taken for evaluation)

NITROUS OXIDE SYSTEM

5 Nitrous Oxide Manifold - 2 x 3.

5.1 3 + 3 Size Nitrous oxide Manifold should be configured with 2 x 3 nos. should be suitable to withstand working pressure of 145 Kg/cm2, along with 6 nos. of high-pressure copper annealed tail pipes with end brass adapter suitable for Nitrous oxide cylinders and manifold.

Cost of Adding additional single cylinder Manifold (not taken for evaluation)

5.2 Top frame should comprise of high pressure copper pipes of size 5/8” ID x 7/8” OD or ½”ID x15 swg 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 3/16” ID x 3/8” OD or ½”ID x15 swg. The manifold should be hydraulically tested to 3500 psig.

5.3 The manifold should be so designed that it should suit easy cylinder changing and positioning. The system should have non-return valves for easy changing of cylinders without closing the bank. The cylinder should be placed with the help of cylinder brackets and fixing chains which shall be zinc plated.

6 FULLY AUTOMATIC CONTROL PANEL – NITROUS OXIDE

6.1 Fully automatic control panel with flow capacity of minimum 300 LPM for regulating and controlling the central supply with medical gases from cylinder manifolds.

6.2 The Gas change-over to the respective other side must occur fully automatic, once the active side of the cylinder manifold runs empty

6.3 For the change-over between the two active cylinder manifolds, the control panel should have a pneumatic-controlled reversing valve and It will continue to function even there will be a failure in the electricity supply.

6.4 The control unit, integrated into the control panel should monitor all pressures of the active and passive gas sources, which are necessary for the safe and uninterrupted system operation.

6.5 In addition to the shuttle valve, the cabinet contains the line pressure regulators, the line pressure gauge, indicators, a set of by-pass valves for manual operation in case of malfunction and an electronic control board.

6.6 If a pressure parameter deviates significantly from the respective nominal pressure, an alarm system which is integrated into the control panel is activated immediately and send an audible and visual message, to ensure that disturbances in the system are recognized.

6.7 An alarm panel with pilot lamps indicating the “in use”, ”half empty” and “empty” banks, high/low line supply pressure, test and mute buzzer switch button.

6.8 It should have the facility for recording of all alarm messages including the date of occurrence for each message.

6.9 Control panel should provide following displays.

v. display of system pressure.

vi. display of gas flow

vii. display of currently active source

viii. range calculation for the active source

7 Semi Automatic Nitrous Oxide Control Panel

7.1 Control panel should have two first stage regulators each capable of delivering 100 - 200 psi g outlet pressure.

7.2 Both the first stage regulators in the nitrous oxide control panel should have nonhalogenated polymer in the high pressure side to ensure that there will be no ignition due to adiabatic compression.

7.3 40 micron filter should be provided at the inlet of each high pressure regulators of the nitrous oxide control panel.

7.4 The first stage regulators should be connected to a common second stage regulator which will deliver an outlet pressure of 60 psi g.

7.5 The first two regulators meant for first stage should be capable of switchover system incorporated from “RUNNING” to “RESERVE” bank due to differential pressure.

7.6 The control panel should be provided 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.

7.7 The control panel should have built in audio-visual signal lamp indications for bank changeover

7.8 The control panel will be covered with aesthetically suitable cover for safe operation indicating the respective services.

7.9 Control panel should have built in transformer to ensure safe operation by low voltage.

7.10 Nitrous Oxide control panel should have inbuilt heating arrangement to ensure that there will be no freezing in the delivery line during high flow requirement.

7.11 Delivery flow capacity : Approx 500 l/min at 55-60 psi pressure

8 Nitrous Oxide Emergency Reserve Manifold - 1 X 1 Manifold

8.1 Should include 2 cylinder manifold bank as either side complete with 2 nos. pig tail pipes and 2 nos. non return valves.

8.2 Top frame should comprise of high pressure copper pipes of size 5/8” ID x 7/8” OD or ½”ID x15 swg 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 3/16” ID x 3/8” OD or ½”ID x15 swg. The manifold should be hydraulically tested to 3500 psig.

8.3 The emergency reserve manifold shall provide an uninterrupted supply of

medical Nitrous oxide from equally sized high pressure cylinder banks via a suitable arrangement of pressure regulators, providing a constant downstream nominal pipeline gauge pressure of 400 kPa.

8.4 Cylinder bank shall be fitted with an isolation valve to enable continuity of supply in the vent of primary supply failure.

8.5 The manifold control panel shall provide a minimum flow of 500 l/min to the nominal 400 kPa medical oxygen pipeline system.

8.6 There shall be two separate stages of pressure regulation to enable high peak flow rates without a reduction in line pressure.

8.7 All pressure regulators shall be protected from over-pressurisation by relief valves that are vented to atmosphere.

8.8 The line pressure relief valve shall be provided with easing gear.

8.9 A non-return valve shall be provided within a line pressure manifold block and shall provide gas tight isolation in the event of any upstream component failure. The non-return valve shall automatically bring the emergency reserve manifold into service when the primary supply fails.

8.10 The emergency reserve manifold shall be provided with an isolation valve to enable positive tamperproof isolation for maintenance.

8.11 The manifold system should conform to IS :12827 standard.

8.12 Cost of Adding additional single cylinder Manifold (not taken for evaluation)

9. MEDICAL AIR PLANT SYSTEM

9 General

9.1 Should supply, install and commission the compressed air plant (for medical air duplex type). receivers, filters and dryers, regulators, drain taps and relief valves.

9.2 The installed system shall have oil free, non lubricated, dust free.

Generating pressure of medical air (7&4 bar). Isolating valve shall be fitted wherever appropriate to enable maintenance of duplex units and without completely shutting down of plant. Safety relief valves shall be fitted at suitable positions to protect plant from damage; and shall vent to a safe place

10 Air Compressor Pumps (Type I)

10.1 The Duplex medical air system package shall include two 15 HP oil-free reciprocating, air cooled, air compressors, each having capacity above 1000 LPM (Free Air Delivery). with common 1000 litres receiver tank along with filter, non-return Valve, isolation valves, dual desiccant air dryer, dual pressure reducing station, etc. Suitable for both continuous and frequent start / stop operation.

10.2 The medical air compressor shall operate in a “Duty” and “standby mode”, with each compressor being able to be selected to carry out either role. Each compressor shall be capable of supplying the system design flow rate on its own. An inlet filter shall be fitted to the inlet of each compressor. The contractor shall take all suitable precautions to prevent vibration being transmitted from compressor/motor units to the building structure. Suitable anti vibration mountings shall be provided.

Should have individual to each compressor motor starters, ammeter and an hour run meter. Should be supplied with control panel to work with power from an MCB. Should have an auto on/ off pressure switch.

11 Air Receiver

11.1 Air receiver shall be 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.

Should have phase sequence relays that prevent unintentional reverse operation of the compressors.

Receiver capacity should not be less than 1000 litre (Approx).

12 Filtration/Dryer System

12.1 3 stage air filtration unit with filters (Duplex system). And capable of isolating each unit for maintenance purpose.

12.2 The dryers (Duplex system) shall be the double absorber 'heatless' type, fully automatic and use activated alumna desiccant. Re-activation shall be on a time cycle using a bleed of purge air from the in-service dryer assembly. Dust filters shall be fitted after the dryer to ensure air quality

Two separate system each having two towers

13 Pressure Control

13.1 The compressor shall be supplied with regulator arrangements to with moisture separator, regulate the pressure to: 4 bar +/-0.12 medical air. (Duplex). provision should be made to isolate each regulator separately.

13.2 The compressor shall be supplied with regulator arrangements to with moisture separator, regulate the pressure to: 7 bar +/-0.12 medical air. (Duplex). provision should be made to isolate each regulator separately.

14 OPTIONAL SCREW/SCROLL COMPRESSOR (type II) (not taken for evaluation)

14.1 Should supply, install and commission the compressed air plant (for medical air duplex type), with plant and associated equipment including control equipment, monitoring and alarm instrumentation, receivers, filters and dryers, regulators, drain taps and relief valves. The Air system shall in all respects comply with the recommendation made in HTM 02-01 standards and shall conform to EN ISO 7396-1.

14.2 The installed compressor system shall have oil free, dust free, breathing air, Generating pressure of 10 bar (to convert 7 & 4 bar) shall be as per HTM 02-01 standards. Isolating valve shall be fitted wherever appropriate to enable maintenance of duplex units and without completely shutting down of plant. Safety relief valves shall be fitted at suitable positions to protect plant from damage; and shall vent to a safe place

15 AIR COMPRESSOR (optional) (not taken for evaluation)

15.1 The Duplex medical air system package shall include two 10 HP Rotary screw/scroll type, air cooled, air compressors each having capacity above 1000 LPM (Free Air Delivery), working pressure at 10 bar. Suitable for both continuous and frequent start / stop operation. There should be emergency stop button on each compressor. Should have NRV for each compressor.

The control panel of each compressor should be digital type and capable of Monitoring and showing Hrs run, Technical alarms, fault alarms, service menu, low and High pressure set, running pressure, Temperature of the system etc.

If Rotary screw compressor is used, there should be in built oil separator and moisture separator.

There should be automatic loading and unloading facility for each compressor.

There should be automatic drain valve and manual drain valve for each compressor.

The medical air compressor shall operate in a "Duty" and "standby mode", with each compressor being able to be selected to carry out either role. Each compressor shall be capable of supplying the system design flow rate on its own. An inlet filter at inlet of each compressor and silencer shall be fitted to the outlets. The contractor shall take all suitable precautions to prevent vibration being transmitted from compressor/motor units to the building structure. Suitable anti vibration mountings shall be provided.

15.2 Compressor should be from high quality internationally approved manufacturer. There should be provision to connect to BMS. All the test certificate should be supplied.

16 AIR DRYER/FILTRATION SYSTEM (optional) (not taken for evaluation)

16.1 The manufacturer of air Filtration/Dryer system should be ISO 13485: 2003 certified or Should have safety certificate from a competent authority CE issued by a notified body registered in European Commission as class II medical device and also the equipment should be imported. The copy of certificate should be attached along with technical bid.

Two separate system each having two towers

16.2 On leaving the air receiver the air should pass through a 3 stage air purifier unit with moisture separator, dust and oil filter and twin column dryer assembly, each leg shall be capable of passing the full flow of one air compressor. The prefilters shall be in accordance HTM 02-01 standards with an efficiency of 95%. Oil filters shall be of the coalescing absorption type, removing 99% of oil and water particles between 5 and 40 microns.

Filtering should ensure complete oil removal so that only oil free air enter the heatless regenerative desiccant dryer.

Should also have dust/activated carbon filters, hopcolite filters and bacterial filters with autoclavable element. There should be visual indication to replace the cartridge.

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/m³

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

Test Certificate should be provided.

16.3 The dryers shall be the double absorber ‘heatless’ type, fully automatic and use activated alumna desiccant. Dust filters shall be fitted after the dryer to ensure that air quality complies with

HTM 02-01 standards. Each dryer assembly shall incorporate

a dew point alarm to enable automatic changeover to the stand by dryer,

in the event of the dew point rising to above 0ºC at 7.2 bar or - 26ºC at atmospheric pressure.

Dryer Purge Control

There should be purge control for dryer.

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 ±10C in the range -20 to -800C atmospheric dew point and 4-20mA analogue output. An alarm condition shall trigger on the dryer control panel if the dew point exceeds a -460C 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 hospital department. Volt free contacts shall be included to enable the dew point alarm signal to be connected to a central medical gas alarm system. 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.

VACUUM PLANT

17 General

17.1 Shall supply, install and commission the vacuum plant and associated equipment. This shall include a packaged duplex pump and reservoir(s) system complete with all necessary controls, drainage traps, filters and individual exhaust lines.

17.2 The medical vacuum pipeline system should be designed to maintain a vacuum of at least 300 mm Hg (40 kPa) at each terminal unit during the system design flow tests. The filtration system shall be duplexed such that each filter can be isolated for replacement of the filter cartridge.

18 Vacuum Pump Units (Type I)

18.1 The pump installation shall be duplex system consisting of two 10 HP Dry type vacuum pump each of which shall be capable of independently producing designed systems flow rate.

Each pump should have capacity of minimum 130 cfm. Pump should be capable of providing a vacuum of not less than 650 mm Hg (87 kPa).

Each vacuum pump shall have an oil separator to ensure a virtually oil-free exhaust.

Should have individual to each compressor motor starters, ammeter and an hour run meter. Should be supplied with control panel to work with power from an MCB.

19 Optional Vacuum Pump Single unit type Imported (type II) (not taken for evaluation)

19.1 Shall supply, install and commission the vacuum plant and associated equipment. This shall include a packaged duplex pump and reservoir(s) system complete with all necessary controls, drainage traps, filters and individual exhaust lines. The vacuum system shall in all respects comply with the recommendation made in HTM 02-01 standards and shall conform to EN ISO 7396-1. Shall supply, install, test and commission a complete and fully operational medical vacuum plant as per recommendation of HTM 02 -01 standard. The capacity should be greater than or equal to 1000 LPM / 2000 LPM / 3000 LPM per unit in the duplex system.

Should have individual to each compressor motor starters, ammeter and an hour run meter. Should be supplied with control panel to work with power from an MCB.

Should offer the rate of the 1000 LPM, 2000 LPM, 3000 LPM systems in the BOQ.

19.2 The medical vacuum pipeline system should be designed to maintain a vacuum of at least 300 mm Hg (40 kPa) at each terminal unit during the system design flow tests. The filtration system shall be duplexed such that each filter can be isolated for replacement of the filter cartridge.

20 Vacuum Pump Units (optional) (not taken for evaluation) imported Type III

20.1 The pump installation shall be duplex system consisting of two identical rotary vane pumps each of which shall be capable of independently producing designed systems flow rate equal to or above 1000 / 2000 /3000 lpm per unit.

The pump shall be clearly marked with its performance, both its free air displacement and its volumetric throughput. Each pump should have capacity of above 1000 /2000 / 3000 LPM. Pump should be capable of providing a vacuum of not less than 650 mm Hg (87 kPa).

Pump inlets shall include filter and non-return valve to prevent oil suck back and pressure increases in the vacuum system.

Each vacuum pump shall have an integrated oil separator to ensure a virtually oil-free exhaust. Each pump shall be fitted with anti-vibration pads between the pump foot and mounting frame

The oil level on the vacuum pump should be visible with marking of high and low level.

Should offer the rate of the 1000 LPM, 2000 LPM, 3000 LPM systems in the BOQ.

20.2 The driving motor shall directly drive the pump unit and it shall be manufactured in accordance with HTM 02-01 recommendations.

20.3 The manufacturer of vacuum pump should be ISO 13485: 2003 certified. The copy of certificate should be attached along with technical bid.

20.4 Each pump shall have a non-return valve and pressure switch such that inadvertent reversal of the motor will not pressurize the reservoir or the distribution system. Pump should be of reputed make as per international standards.

21 Reservoir Vacuum

21.1 The reservoir shall be provided with a manual drain valve. Reservoir capacity should not be less than 1000 liters. There should be vacuum gauge.

22 Filters

22.1 A filter shall be fitted between each pump and the reservoir, which shall have replaceable elements and each shall be capable of passing the total design flow. The filters shall be arranged such that one filter can be taken out for servicing without interrupting or restricting the vacuum service as a whole. Should provide bacteria filters for patient safety.

23 Vacuum Pump Exhaust

23.1 The exhaust gas shall be discharged outdoors above the roof level of the plant room, and not in the building in the immediate vicinity, windows and air intakes in order to ensure that the discharge does not constitute a health hazard. Each pump shall have its own exhaust line and each shall be fitted with suitable drain valves and transparent jars at the lowest points. The outlets shall be suitably protected to prevent the ingress of rain, and wind pressure. A weatherproof notice shall be provided at the

discharge points which states:“Medical Vacuum Discharge Point – DO

NOT OBSTRUCT.” The exhaust system shall be designed so that the back pressure does not exceed 80 mm Hg (1.0 psi) at the design flow rate. A length of flexible pipe work shall be included before the exhaust passes through a wall in order to isolate the building structure from pump

vibration. Anti-vibration mountings shall be used for the pumps.

24. Oxygen flow meter with Humidifier Bottle

24.1 Back Pressure Compensated flow meter should be of accurate gas flow

measurement with following feature .

24.2 Control within a range of 0 – 15 LPM. (calibration within ±10%)

24.3 It should meet strict precision and durability standard.

24.4 The flow meter body should be made of brass chrome plated materials.

24.5 The flow tube and shroud components should be made of clear, impact resistant polycarbonate.

24.6 The flow tube should have large and expanded 0-5 lpm range for improved readability at low flows.

24.7 Inlet filters of stainless steel wire mesh to prevent entry of foreign particles.

24.8 The humidifier bottle should be made of unbreakable polycarbonate material and autoclavable at 1210/ 1340 Centigrade temperature

24.9 Should be supplied with suitable connector probe to match with Oxygen

outlets.

25. Vacuum regulator with Suction bottle (ward)

25.1 Should be of light weight and compact.

25.2 Should have a regulator with 0 – 760 mm gauge.

25.3 Should have a 600 ml. reusable collection jar, made of unbreakable poly carbonate /poly sulfone material and fully autoclavable at 1210/ 1340 Centigrade temperature.

25.4 Should have wall bracket for mounting the jar assembly on the wall.

25.5 The vacuum regulator with instant ON / OFF switch should be infinitely adjustable and with vacuum gauge which will indicate suction supplied by the regulator. Safety trap must be provided inside the jar to safeguard the regulator from overflowing.

25.6 Should be supplied with suitable connector probe to match with Vacuum

outlets.

25.7 Should be provided with secretion trap and bacteria filters

26.Theater vacuum units

26.1 The unit should consist of two reusable 2000ml shatter resistant bottle, each made of polycarbonate material and fully autoclavable at 121o Centigrade

26.2 A vacuum regulator with instant ON/OFF switch and a three way selector switch with facility to operate either left, right or both

26.3 All the above items should be mounted on a trolley having free moving castor wheels.

26.4 Should be supplied with suitable connector probe to match with Vacuum

outlets.

27.Gas/Vacuum Outlets

27.1 Front loading type terminal outlets should be designed to dispense medical gases (or an inlet for medical vacuum) to the secondary equipment (flow meters, Surgical Tools, Suction regulators, etc.) at the point of use and it should be gas specific so that secondary devices cannot be “attached” to the wrong gas.

27.2 When not in use, the gas should be in a non-flowing state within the Outlet (Terminal unit) sealed by “O” ring. The adapter when inserted pushes the poppet inside and the gas starts flowing and sealing is ensured by the “O” ring or a seat.

27.3 The outlets should Quick Connect Type and gas specificity is accomplished by "Diametric indexing." / Geometric indexing/ BS/ DIN/ NFPA.

27.4 Should have Push to insert and press-to-release mechanism for probes.

27.5 Allows plugging of probes from front.

27.6 Parking Type probe / connector/ (wherever applicable).

27.7 Self-sealing valve on disengaging the probe (Quick disconnect)

27.8 Smooth quite action

27.9 Non return valve for on line servicing/ repairing

27.10 Indexed to eliminate inter-changeability of gas services

27.11 Color-coded gas specific front plate

27.12 Flow rate exceeds the requirements of ISO 9170 – 1.

27.13 Totally leak proof, safe & easy to operate

27.14 Configurations possible: surface, flush & Bead-head.

27.15 Body shall be of one piece brass construction.

28. Copper Pipes

28.1 The copper pipes shall be manufactured from phosphorous de-oxidised non-arsenical copper of grade CW024A (Cu-DHP), manufactured EN 13348:2008 to metric outside diameters and having mechanical properties, pipes shall be of R250 (half hard)temper. Pipes shall be degreased suitable for oxygen use and cleanliness is to be maintained by filling each pipe with dry, clean, oil and oxygen free nitrogen, fitting suitable end caps and protectively wrapping.

Solid drawn, seamless, deoxidised, non- arsenical, half hard, tempered and degreased copper tubes manufactured to metric outside diameters and should have mechanical properties in accordance with HTM 02-01 and conforming to EN13348:2008.

28.2 All indigenous copper pipes should be inspected and certified by Third Party Inspecting Agency Lloyds' Register Services before dispatch and the pipes should be delivered capped at both ends. Imported Copper pipe should have equivalent certification. The pipes should also be accompanied with manufacturer’s test certificate for the physical and chemical composition. Copper Fittings should be as per HTM 02-01. All plastic saddles should have brass screws.

The pipe sizes to be used are from among as under:

108mm OD x 1.5 mm thick

76mm OD x 1.5 mm thick

54mm OD x 1.2 mm thick

42mm OD x 1.2 mm thick

35 mm OD x 1.2 mm thick

28mm OD x 0.9 mm thick

22mm OD x 0.9 mm thick

15mm OD x 0.9mm thick

12mm OD x 0.7 mm thick

28.3 Rates of above mentioned copper pipes should be mentioned in the price bid so that variable quantity can be calculated and paid accordingly. Valves and lines additional sizes if required may be quoted as optional.

28.4 Medical Gas Pipeline Fittings shall be end feed type, manufactured from the same grade of copper as the pipes and be in accordance with the requirements of BS EN 1254-1:1998 Part 1. The manufacturing company should comply with BS EN ISO 9001:2000. Fittings should be factory degreased suitable for oxygen use. Fittings should be certified for medical use and accompany with oil analysis certificate and conformity certificate indicating suitability for medical use.

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.

VALVES – LINE VALVES

29.1 Line Valves shall be provided for use in plant rooms and to facilitate the isolation of areas or areas where area zone valve are unnecessary. These shall be of the ball valve type and shall be constructed of a nickel plated brass body, PTFE seats and brass chrome plated ball. The valve shall be operated by a manual operating lever by 90º turn. All medical gas line ball valves shall provide a full bore flow and shall be cleaned for oxygen service and fully tested. The valve assembly shall terminate in copper stub pipes to enable brazing directly into the distribution system using the flux less brazing technique. Line valves shall be located in readily accessible areas of ducts and shafts, however care should to ensure safety to prevent danger from leakage. Line valve installation should be carried out as per HTM 02-01 standards.

Valve Size are indicated

12mm Ball Valve

15mm Ball Valve

22mm Ball Valve

28mm Ball Valve

35 mm Ball Valve

42 mm Ball valve

54mm Ball valve

76mm Ball valve

108mm Ball valve

AREA VALVE SERVICE UNITS (AVSU)

30.1 The Area Valve Service Unit (AVSU) shall provide area isolation facility for use either in an emergency or for maintenance purposes. The area valve service unit shall be labeled to identify the Medical gas service

30.2 The assembly shall be housed in a valve box which shall be capable of both surface or concealed mounting incorporate a hinged lid which opens through 180 degree, to provide maximum access. The hinged door shall be fitted with a glass panel to enable a visual check on the line valve selected position and for access in an emergency.

30.3 Area or Zone identification facilities shall be provided. The hinged doorshall normally be locked closed and area zone valves installed adjacent to each other shall be operated by different key lock combinations.

30.4 Area/Zone service units shall be fitted in readily accessible locations adjacent to the area which they serve and shall be clearly labeled to indicate function, valve position and area.

30.5 Scope:

The tenderer of Medical gas shall supply, install, test and commission all safety required for the medical gas system safety relief valves as specified in HTM 02-01/ NFPA standards.

b. The tenderer of Medical Gas supply shall install test and commission all area valve and service unit AVSU in the hospital as per requirement as specified in HTM 02-01, to all necessary equipment, pipe work fittings, boxes, accessories, connectors pressure gauges, switches including the zone pressure alarm panel and all related electrical works to have complete and full operational AVSU unit.

c. The tenderer of Medical Gas shall supply, install, test and commission all required valves, check valves for the medical gases and vacuum system.

30.6 Rate to be offered for 2, 3, 4 and 5 gas units

31. Area Line Pressure Medical Gas Alarm

31.1 Four channel microprocessor controlled alarm for pneumatic & vacuum services.

31.2 Digital display of line pressure for all the services with factory calibrated pressure sensors.

31.3 Color coded LED display of line pressure status (High-caution-normal-caution-low)

31.4 Audible Alarm for High & Low pressure condition.

31.5 Test and Alarm Acknowledge (Mute) facility. (Alarm knowledge (mute) time span is programmable from 1 to 60 minutes). Protected programming facility of alarm limits.

31.6 The electronic circuitry should be such that if the pressure / vacuum in the gas pipeline drops below the present limit, the equipment should give an audio-visual alarm. Visual alarm should remain active even after pressing of “Mute” button. It should come to normal condition only when gas pressure / vacuum return to normal level.

31.7 Small and compact design.

31.8 Mounted on a powder coated MS box.

31.9 Nut & Nipples should be provided for connection with Pneumatic supply

line.

31.10 Low voltage internal operation for safety with input power supply of 230

V,50 Hz AC.

31.11 Wall mounting facility.

31.12 Facility to connect to remote alarm box by potential free contacts provided in alarm box.

31.13 Rate to be offered for 2, 3, 4 and 5 gas units

31.14 Rate for Area Line Pressure Medical Gas Alarm with networking facility and mobile alert facility shall be offered in the BOQ which will not be taken for evaluation.

32. Horizontal / vertical Bed Head Panel

32.1 Minimum length 1/1.2/1.5 metres

32.2 It should be made of High Strength Anodised Aluminium Profiles with integrated rail system for mounting accessories.

32.3 Should be powder coated (color as per user choice). Should provide back side cover

32.4 The panel should be designed to have provision to accommodate the following:

Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required (for one bed head panel).

The rate for the following shall be offered in the BOQ and will be taken for evaluation.

a. 5A socket

b. 5/15 A socket

c. Switch 15A

d. Switch 5A

e. RJ 45 Data outlet

f. Telephone socket

g. Rate for internal wiring of bed head panel, Lumpsum rate shall be offered – Not taken for evaluation.

Supplying and fixing following Modular base & cover plate on existing modular metal boxes etc. as required.

a. 6 Module 3 No's

b. 1 or 2 Module 2 No's

Gas Outlets – Provision for Two Oxygen, 2 Vacuum and One air

Syringe Infusion pump mounting pole with adapters for mounting at least two pumps

32.5 Segregation of services i.e low voltage supplies, high voltage supplies and medical gases should be maintained throughout.

33. Ceiling Pendents

33.1 Heavy duty Anesthesia Pendent Systems should have the facility to provide convenient positioning of medical equipment, medical gas terminal units, electrical and specialty services in operation theatre.

33.2 Pendant shall be single arm, movable, ceiling mounted and have modular head. Column length to be fabricated for the specified ceiling height. Arm length should be minimum 800 mm and vertical length of pendant workable area should be at least

1 meter

33.3 Should have aluminium powder coated rectangular body with one monitor mounting facility.

33.4 Shall be provided with electrical 5 & 15A / 230V power socket with indicator -8 nos with internal wiring.

33.5 Should have provision for gas outlets oxygen-2nos., Medical Air (4 Bar)- 2nos.,Vaccum – 2nos., Nitrous oxide -1nos. complete with hose assemblies can be accommodate within the pendant

33.6 Shall be provided with 2nos. of I.V pole with bracket

33.7 Carrying capacity of the arm should be not less than 150kgs

33.8 Each pivot point should rotate up to 330degree

33.9 Should have complete separation between gas outlets and electrical sockets.

33.10 Monitor stand should be provided as per the following specification and the rate shall be quoted separately.

a. Monitor stand - extruded Aluminum, powder coated.

b. Load bearing capacity 20 kgs approximately.

c. Should have provision to store ECG cables, SPO2 probes, NIBP Cuffs and other accessories of monitor.

33.11 Rate for the Rigid pendant shall be offered in BOQ which will not be taken for evaluation.

33.12 In all the pendants the electrical sockets, data socket and the wiring shall be done by the bidder.

34. MATCHING PROBES FOR GAS TERMINAL UNITS – O2, Mair, N2O, and Vac

34.1 The probe should comply with BS 5682:1998 for gases & Vacuum.

34.2 Matching probes with one end suitable for hose/ flow meter and other end suitable for Imported & Indigenous Medical Gas terminal units which complies and fully meets with the latest standard HTM02-01 and C11

35. INSTALLATION & TESTING

35.1 Installation of piping shall be carried out with utmost cleanliness. Only pipes, fittings and valves, which have been degreased and brought in polythene sealed bags, shall be used at site. Pipe fixing clamps shall be of non-ferrous or non-deteriorating plastic suitable for the diameter of the pipe.

35.2 Where pipes are cut on site, the wheel cutter should be used (avoid using hacksaw blade) and should be cut square and de-burred, re-rounded and cleaned off before use.

35.3 All pipe joints shall be made using flux less brazing method.

Heat/Flame Source: Brazing shall be carried out using Oxy-acetylene/ Diluted Acetylene flame source capable of achieving brazing temperatures of above 600 degrees and below the melting point of the base metal. Liquid Petroleum Gas (LPG) should not be used for brazing of copper pipes.

Copper to Copper Brazing – should be made using a silver-copper-phosphorous brazing alloy CP104 (5% Silver Brazing Filler metals Rod) to BS EN 1044-1999, no flux to be used.

Copper to Brass Brazing – should be carried out using AG 203 (43% Brazing Filler metal Rod) to EN 1044 with an appropriate flux. Brazing of Copper to brass should not be carried on site and the flux residue should be chemically removed and if necessary the complete assembly is cleaned and degreased for oxygen service.

Oxygen Free Nitrogen (Inert Gas Shield) Purging – Brazing should be carried out using Oxygen free Nitrogen as an internal inert gas shield to prevent the formation of oxides on the inside of the pipes and fittings. Oxygen free nitrogen should be supplied to the inside of the pre-assembled, un-brazed pipe work while brazing through a pressure regulator and flow controller of flow regulating device. This method leaves a bright, clean bore. A slight burnishing may occur in some cases; however purging is still required to remove internal shield gas and the other particulate matter not associated with Brazing operation. Nitrogen purging is not required for AGS disposal systems.

Capping – Sections of pipeline should be capped as soon as they are completed so as to prevent the ingress of debris.

35.4 Adequate supports shall be provided while laying pipelines to ensure that the pipes do not sag. The spacing of supports shall not exceed 1.5 meter for any size of pipe. Suitable sleeves shall be provided wherever pipes cross through walls / slabs. All pipe clamps shall be non-reactive to copper.

35.5 After erection, the pipes should be flushed with dry nitrogen gas and then pressure tested with dry nitrogen / Medical Air at a pressure equal to twice the working pressure for a period of not less than 24 hours. All leaks and joints revealed during testing should be rectified and re-tested till the pressure in pipes stands for at least 24 hours.

35.6 Installation, Testing and Commissioning of Medical gas pipelines should be carried out as per HTM 0201 standards.

35.7 All the piping system should be tested in the presence of authorized representative of the user institute or tender inviting authority.

36. COLOUR CODING

36.1 All exposed pipes should be painted with two coats of synthetic enamel paint and colour codification should be as per ISO standards.

Oxygen Line – White

Nitrous oxide – Blue

Air Line- Black and White

Vacuum Line – Yellow

37. Cylinders

37.1 Bulk ‘D’ type cylinders for oxygen and nitrous oxide

37.2 Should be supplied with key.

37.3 Cylinder should have ISI mark.

37.4 Cylinder should have explosive safety certificate and should be provided along with each cylinder during installation.

37.5 Gas filled cylinder should be supplied

38 Two laminated copies of “ as fitted “ schematic shall be provided

39. Conversion kit

39.1 Conversion kit for anaesthesia machine / workstation from wall gas outlet. Outlet probe with 5 meters high pressure hose.

40. Emergency regulator conversion kit

40.1 Conversion kit for anaesthesia machine / workstation direct from bulk oxygen cylinder. Connector with regulator and 5 meters high pressure hose.

41. Gas Outlet (Highend) (optional) (not taken for evaluation)

41.1 NFPA/ DIN/ BS/ ISO Standard, Quick connect, Metalic, Double locking, parking, Geometric indexed gas specific safety, Imported, It Should have safety certificate from a competent authority CE issued by a notified body registered in European Commission.

42. AGSS Duplex System (optional) (not taken for evaluation)

42.1 1560 L/M capacity, Duplex System, Imported Active System, remote switch.

43. Oxygen and Nitrous oxide control panel (High end) Imported (optional) (not taken for evaluation)

43.1 Fully automatic control panel with flow capacity of minimum 1500 LPM for regulating and controlling the central supply with medical gases from cylinder manifolds and liquid gas tanks in hospitals.

43.2 The Gas change-over to the respective other side must occur fully automatic, once the active side of the cylinder manifold runs empty

43.3 For the change-over between the two active cylinder manifolds, the control panel should have a pneumatic-controlled reversing valve and It will continue to function even there will be a failure in the electricity supply.

43.4 The control unit, integrated into the control panel should monitor all pressures of the active and passive gas sources, which are necessary for the safe and uninterrupted system operation.

43.5 In addition to the shuttle valve, the cabinet contains the line pressure regulators, the line pressure gauge, indicators, a set of by-pass valves for manual operation in case of malfunction and an electronic control board.

43.6 If a pressure parameter deviates significantly from the respective nominal pressure, an alarm system which is integrated into the control panel is activated immediately and send an audible and visual message, to ensure that disturbances in the system are recognized.

43.7 An alarm panel with pilot lamps indicating the “in use”, ”half empty” and “empty” banks, high/low line supply pressure, test and mute buzzer switch button

43.8 It should have the facility for recording of all alarm messages including the date of occurrence for each message.

43.9 Control panel should provide following displays.

i. display of system pressure.

ii. display of gas flow

iii. display of currently active source

iv. range calculation for the active source

43.10 Pressure reducers should be flame proofed by an authorized certification agency and specially certified for medical gases such as oxygen and nitrous oxide. It Should have safety certificate from a competent authority CE issued by a notified body registered in European Commission and all the regulators should be adiabatic certified.

43.11 The control panel should fulfil all requirements of EN ISO 7396 – 1: 2007/ HTM-02-01 and have and other relevant international standards.

44 The bidders should have Authorised Person (Medical gas as per HTM) with valid certificate. The Authorised Person shall sign completion certificate and submit to KMSCL

45 Rate for the Vacuum ward unit, imported, autoclavable shall be offered in the BOQ and will not be taken for evaluation.

NOTE :

1. The installation shall be done strictly as per the conditions mentioned above.

2. Optional rate shall be provided for items as per the specification mentioned above. Rate will not be taken for evaluation.

3. Optional rate shall be provided for fully automatic control panel as per the specification mentioned above. Rate will not be taken for evaluation.

4. Optional rate shall be provided for type II air and vacuum system as per the specification mentioned above.

5. Rates were also requested for civil works required for construction of manifold room. If required the work will be entrusted with the L1 bidder and the rate is not taken for evaluation.

6. The AMC / CMC rates in percentage shall be offered. This percentage will be applicable for executing AMC/ CAMC by the hospital authorities for the desired items.

If order for any of the optional item is given then the CMC rate for the same shall be calculated based on the percentage of CMC rate offered for the item taken for evaluation.