

## Section II: Schedule of Requirements - PSA Oxygen Generating Plants

eSourcing reference: **ITB/2022/43573**

Link for technical design documents:

[https://drive.google.com/drive/folders/1cGu\\_M7LmGXfUTcqTMM0mkRpMFhv-TuvR?usp=sharing](https://drive.google.com/drive/folders/1cGu_M7LmGXfUTcqTMM0mkRpMFhv-TuvR?usp=sharing)  
(Djerba)

[https://drive.google.com/drive/folders/1cEvpb8\\_JLqmrJcyjtbDGj8b3BCbZTMXX?usp=sharing](https://drive.google.com/drive/folders/1cEvpb8_JLqmrJcyjtbDGj8b3BCbZTMXX?usp=sharing)  
(Msaken)

### Summary of Requirements

Item	Description of requirement	Quantity	Location & address
1	<p>Design, supply, installation, testing, commissioning and training of:</p> <ul style="list-style-type: none"> <li><b>Pressure Swing Adsorption (PSA) technology based Oxygen generating Plant in Djerba Regional hospitals in TUNISIA with a nominal continuous capacity of 50 Nm<sup>3</sup>/hr and the appropriate distribution network including related components to supply 14 ICU beds with Oxygen produced.</b></li> </ul> <p>The medical Oxygen gas production plant will be located in close proximity to the Central medical gas distribution station.</p>	1	<p>Djerba Hôpital Sadok Mokaddem Houmt Souk, Tunisie 33.874584465442894 , 10.864191048068614</p>
2	<p>Design, supply, installation, testing, commissioning and training of:</p> <ul style="list-style-type: none"> <li><b>Pressure Swing Adsorption (PSA) technology based Oxygen generating Plant in M'Saken Regional hospitals in TUNISIA with a nominal continuous capacity of 30 Nm<sup>3</sup>/hr and the appropriate distribution network including related components to supply 25 ICU beds (two with Oxygen produced.</b></li> </ul>	1	<p>Msaken Av. Taieb M'HIRI  4070 Msaken Sousse 35.73757328694 1284, 10.57257582600 3044</p>

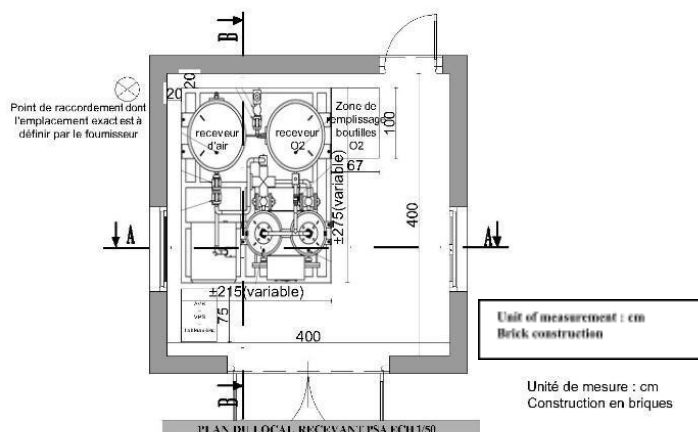
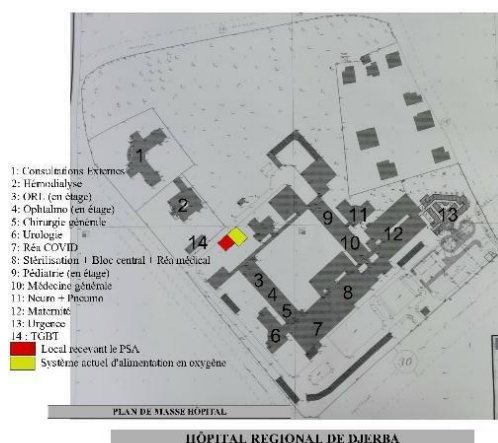
	The medical Oxygen gas production plant will be located in close proximity to the Central medical gas distribution station.		
--	---	--	--

#### Installation Site Data (Djerba Regional Hospital)

**Djerba Regional Hospital** serves a population of around 163,000 people, city and surrounding area (Djerba is an Island). The hospital has 229 beds, 239 outlets of oxygen (O<sub>2</sub>), compressed air and medical vacuum distribution network in each of the 14 units of the institution. The entire distribution network is centralized and connected to the primary electrical source. The hospital has a 160 KVA emergency generator equipped with an Auto Transfer Switch for the main building and a second generator of 80 KVA capacity to support the emergency unit. The Djerba hospital has a residual electrical power of 300 KVA at the primary supply level of the hospital with a 250A circuit breaker.

**The COVID unit has 14 beds.** The current monthly demand for O<sub>2</sub> is around 16 bottles (B15), 16 x 3.2 for a flow rate of 51.2 cubic meters plus, 26 bottles (B5), 26 x 1.1 for a flow rate of 28.6 cubic meters. The overall distribution network is in good working conditions and functions very well. The hospital needs to improve its O<sub>2</sub> distribution as it wants to implement 40 new fully equipped units. One location is envisioned to sit the new PSA Plant and is next to the current installation. Only limited rehabilitation is requested. Planned location is concrete made, secured, well ventilated and equipped with fire extinguishers.

## Djerba Regional hospital Floor Plans



### Technical specifications for Goods and Comparative Data Table

**Important Note:** Bidder shall fill the 'Bidder Offer' column within the technical specifications, with clear and accurate answers, and shall outline any deviation from the technical specifications. The bidder shall state the reference (i.e. location and exact page-number) within the brochure/datasheet/etc that proves the compliance with the technical specifications.

Item No	UNOPS minimum technical requirements	Is the bid compliant? Bidder to complete	Details of goods offered. Bidder to complete Insert detailed specifications for each parameter
<b>1</b>	<b>General</b>		
1.1	<p>Power requirements:</p> <ul style="list-style-type: none"> <li>- Plant operations: 380 VAC <math>\pm</math> 15% - 3 phase / 50 Hz.</li> <li>- Power consumption: Less than 80KW</li> <li>- Control system operations: 220 VAC <math>\pm</math> 15% - 1 phase / 50 Hz (Through UPS- Uninterruptible Power Supply with an autonomy of Thirty Minutes, complete including protection, inverter and batteries).</li> </ul> <p>Electrical Interconnection: Industrial Disconnecter Switch or Industrial Plug of adequate rating.</p> <ul style="list-style-type: none"> <li>- Electrical protection by resettable circuit breakers, fitted in both neutral</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		and live lines, Surge Arresters of high sensitivity and protection level, Earthing Terminals shall be provided.		
	1.2	An emergency power supply (standby generator) equipped with an Auto Transfer Switch to support the power supply of the PSA installation offered in case of the primary power source failure.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	1.3	The equipment will be installed in the premises of the Beneficiary	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>2</b>		<b>Description of Functions</b>		
	2.1	A <b>Compact structure</b> PSA Oxygen Plant is to be installed to supply uninterrupted high-quality medical oxygen through a central medical gas pipeline system to the hospital facility. <b>The PSA plant here should be single configuration not duplex.</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	2.2	The backup oxygen supply system is provided by the Beneficiary hospital facility. An interconnection between the Backup System and the PSA Oxygen Plant shall be made and tested to ensure that the backup system is operational whenever the PSA oxygen plant is not (for any malfunction, or other reasons: maintenance, etc..)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	2.3	The equipment proposed shall be of highest quality, heavy duty and produced by well-known International manufacturers	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	2.4	The plant should consist of at least: Power supply, Screw type air compressor, air dryer, filters & Filtration system (micron, bacteria etc.), air tank, oxygen generator, oxygen buffer tank, Emergency bottles (Back up), bottle filling system, medical gas system monitoring and analyzer, regulation and alarm system, pressure transducers, flowmeters,	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		<p>valves, controls, distribution network (piping and accessories) and any other component needed to make the system fully functional.</p> <p>Installation must include a self-switching Manifold meeting ISO standards and designed with regulators tested at a high pressure, connected to two different sources of supply primary and secondary source of oxygen (one from the new PSA and the other of the hospital's old PSA). The switch mounted on the control panel allows switching between the two sources.</p> <p><b>Oxygen booster capacity to be used in filling oxygen cylinders is at least 130 Cyl/day for Djerba Site @ 4-5 Bars to match the automatic manifold specifications described in the tender document.</b></p>		
	2.5	The maximum noise level of the system shall not exceed 65 dB @ 1m	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	2.6	The Plant components and the entire plant shall be a heavy duty medical Oxygen gas generator plant that shall be able to operate 24/365 days with full capacity and at the requested specifications, at the Beneficiary's site. The system shall be designed and able to operate normally under the conditions of the purchaser's specific place (e.g. Power Supply, Climate, Temperature, Relative Humidity, Altitude A.S.L etc.). The ratings of the plant shall be guaranteed for the specific Geographical and Climatic conditions prevailing at the site of installation and the system shall be designed to operate in a perfect manner under the said conditions	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	2.7	The plant should be preassembled of the containerized model- ISO	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		Container ("Plug and Play" type) to facilitate rapid installation. The <b>Containerized Plant</b> shall be fully integrated and assembled at the Manufacturer's Industries. <b>The container must be CSC approved.</b>		
	2.8	The Supplier shall plan for the equipment to be installed, tested and commissioned by certified qualified personnel; any prerequisites for installation with full details shall be communicated to the Employer within three weeks from the Contract Signature	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>3</b>		<b>Oxygen Generator (OG)</b>		
	3.1	The OG shall operate on (PSA) Pressure Swing Adsorption principle	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.2	The OG should have <b>at least</b> the following features:		
	a	Max/peak oxygen flow: <b>60 Nm<sup>3</sup>/h</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	Continuous oxygen flow: <b>50 Nm<sup>3</sup>/h +/- 10%</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	@ 4-6 Bar outlet pressure (noting that the pressure reaching the oxygen outlets inside the hospital should not be less than 4 bar)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	Oxygen Purity should be at least 93±3%	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.3	The OG components must be made from non-corrosive materials (like aluminium and stainless steel), as standard for all process components	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.4	The OG shall be robust. Column vessels should be manufactured according to the pressure equipment directive with a handhole. Adsorbent material must be of highest quality, long-life molecular sieve [ZEOLITE]	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.5	The OG shall be manufactured by industry leading energy air Manufacturers. The warranty for ZEOLITE must be 10 years and	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		commitment of the same by the Manufacturer shall be provided		
	3.6	The OG shall be provided with special protection of the molecular sieve against moisture and shocks	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.7	The <b>Minimum</b> Output Oxygen quality requirements:		
	a	Oxygen purity: 93% +/- 3%	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	Water content: ≤ 67 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	Oil ≤ 0.1mg/m <sup>3</sup>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	CO: ≤ 5 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	e	CO <sub>2</sub> : ≤ 300 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	f	SO <sub>2</sub> : ≤ 1 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	g	NO <sub>x</sub> : ≤ 2 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.8	The OG shall be supplied with Ethernet connection to the main central control system. Alarm management and password-controlled access for different levels of the program and SMS alert functionality	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.9	The OG shall be provided with a continuous oxygen concentration monitoring system. The sampling should be done before the oxygen tank inlet valve	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.10	The OG shall have safety system by self-cutting valve mounted before the oxygen tank, ensuring a cut-off of production in case of low purity	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.11	The OG shall have automatic regulation to follow the hospital oxygen consumption variations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.12	Oxygen dew point: - 40°C	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.13	Oxygen sensor should be a Zirconium Oxide Sensor	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.14	Oxygen Generator shall be according to standard European pharmacopoeia or US pharmacopoeia and complies with ISO standards	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>4</b>		<b>Monitoring &amp; Controls</b>		
	4.1	The Monitoring and Control System shall have a minimum of 5.7"	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		(Preferably larger 7") size touch screen control panel for continuous monitoring and control (SD card and USB Port included). Should support both the English and French languages		
	4.2	It should have alarm management with audit trail for raised alarms & alarm notification with automatic push email and sms (remote monitoring)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.3	It should have automatic service reminder for periodic maintenance due date	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.4	It should have an external audio/visual alarm in one unit and can be placed anywhere. Visual alarm should be active whenever an alarm is present in the system. Audio should turn on when an alarm appears but could be turned off from the control panel.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.5	All components shall have a control panel (Air Compressor, Oxygen Generator etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.6	Components should have automatic restart in case of power failure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.7	The system should display the main operative parameters and measurement values:		
	a	Continuous display and monitoring of Oxygen purity [%](continuously monitored by a <b>medical gas analyzer</b> )	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	Oxygen current flow [m3/hr, l/min] and total consumption (accuracy class should be $\pm 1,5\%$ of measured value- If this measurement is done by an online digital flowmeter, the material should be of stainless steel suitable for medical oxygen and it should have a remote reading as well)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	Continuous display and monitoring of oxygen outlet pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	Operating hours (with history)	<input type="checkbox"/> Yes <input type="checkbox"/> No	



	e	System Status	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	f	Automatic service reminders for periodic maintenance due	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	h	CO <sub>2</sub> concentration in the oxygen produced (continuously monitored by a <b>medical gas analyzer</b> )	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	i	CO concentration in the oxygen produced (continuously monitored by a <b>medical gas analyzer</b> )	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	j	O <sub>2</sub> Dew point (Via dew point sensor)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	k	Air tank pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	l	O <sub>2</sub> tank pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	m	Sensor values	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	n	Display of trends	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	o	Real time curves display to monitor the evolution of oxygen purity and pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.8	The system should have visual and audible alarm, for at least, the following:		
	a	Low oxygen purity [%]	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	Low/High oxygen outlet pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	Low pressure columns	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	High CO <sub>2</sub> & CO concentrations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	e	Quick stop / E-Stop	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	f	Power or system failure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	g	High temperature	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	h	Alarm on air compressor	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	i	Alarm related to air dryer (malfunction and air dryer pressure dew point (>3 °C))	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	j	Alarm when automatic back-up engaged, as configured (e.g. liquid oxygen tank or reserve cylinders from ancillary manifold or etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.9	Data logging should be available	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.10	Remote monitoring and remote alarm should be available (TCP / IP module for remote access system via ethernet / internet)	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	4.11	All the alarm set points and the sensors status should be programmable	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>5</b>		<b>Air Tank</b>		
	5.1	It should have one set of Air Tank made of medical non corrosive Steel having medical grade epoxy inner coating of capacity 1500 L, (or if other sizing is deemed more suitable for this OG system please provide suggestions with justification) (tested to 15 Bar), working pressure 11 bar, with inlet and outlet valves, safety valve, pressure gauge and level sensing auto-drain valve. It should have a hand hole. It must have PED 97/23/EC. (kindly include certificate)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>6</b>		<b>Oxygen Buffer Tank</b>		
	6.1	It should have one set of Oxygen Buffer Tank made of medical non-corrosive Steel having medical grade epoxy inner coating of capacity 1000 L (or if other sizing is deemed more suitable for this OG system please provide suggestions with justification) (tested to 15 Bar), working pressure 11 bar, with inlet and outlet valves, safety valve, pressure gauge and level sensing auto-drain valve. It should have a hand hole. It must have PED 97/23/EC. (kindly include certificate).	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>7</b>		<b>Air Compressor</b>		
	7.1	It should be Rotary Screw type and Air-Cooled air compressor of efficient motor capacity ( <b>Minimum 390 cfm</b> )	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.2	Model and motor capacity to be mentioned in the bid	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.3	Built-in Oil Separator and Air Filter. Controls should be Suction Throttle	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		valve type with On-off line control & Motor stop-restart control		
	7.4	Filled lubricating oil should be mineral oil	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.5	It should have LCD digital display indicating: Operation data, Failure and Records of at least 24 hrs	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.6	It should have automatic safety shutdown for main motor overload inverter trip (Fan Motor overload), air end outlet high discharge air temperature, air/oil separator outlet high discharge air temp, high oil case pressure, phase reversal and phase failure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.7	Digital control should show discharge air pressure, operating hours, discharge air temperature, control settings, unload counter, Load factor, Error code	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.8	The Compressor shall be provided with soft start or Variable Speed Drive (VSD)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>8</b>		<b>Air Dryer</b>		
	8.1	The air dryer shall be microprocessor based and provide constant dew point temperature even with sudden load variations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	8.2	There should be one set of refrigerant types with suitable capacity air dryer with dew point of +3 °C.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	8.3	It shall be provided with level sensing, auto drain valve, integral heat exchanger and shall utilize Eco Friendly Gas only	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	8.4	It should display alarm in case of technical fault or dew point fault	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>9</b>		<b>Filtration System</b>		
	9.1	Air quality after air dryer and filters should meet the ISO	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		8573.1:2010.2.4.1. Dew Point + 3°C. Filtration Grade 0.01 micron		
	9.2	The Filtration System shall consist of:	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	a	1 set of Coal Tower made of mild steel with food grade epoxy coating (alternatively activated carbon filter)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	1 set of Pre-filter for filtration level up to 1 micron with auto-drain	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	1 set of Micron filter of 0.01 micron level with auto-drain	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	1 set of Bacterial / Sterile Filter	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>10</b>		<b>Automatic Changeover &amp; Backup System</b>		
	10.1	In case of fault in the system (or for any other specified need), the oxygen supply source should be able to switch automatically from the oxygen generator to the backup oxygen supply system provided by the hospital facility) The main and first backup oxygen supply system shall be the oxygen tank existing at the hospital whereas the second backup system shall be the existing oxygen cylinder ramp	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	10.2	The plant shall be provided with: Automatic/ final Pressure Reduction system and Automatic changeover System integrated with the backup oxygen supply system (provided by the hospital) without manual resetting	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	10.3	The Reducer Changeover sub-assembly should consists of the following components: Filtering purge valves, HP and MP reducer with pressure gauge, non-return valve, pressure gauge for indicating output pressure, and other items as might deemed necessary to ensure proper interconnection	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	10.4	The Supplier shall closely and thoroughly coordinate with the Beneficiary's Engineers and Technicians to ensure proper interconnection and interfacing with the existing BACK-UP System. The Supplier shall provide and interconnect the Oxygen plant generator and the Back- Up system and perform all the necessary alterations. The Supplier shall provide the sub-assembly and all components to make the changeover possible and functional	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>11</b>		<b>Main Electrical Control Panel</b>		
	11.1	Fully automatic electric Control Panel consisting of all the MCCB's, MCB's, Digital Timer Phase Sequencer, automatic Hi/Low voltage control relay and Switches, Surge Arresters for medical grade equipment, etc. must be provided	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	11.2	The panel should be provided with all Ampere Meters, Voltmeters for visual indication of the electric supply and LED indicators for each phase	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	11.3	All the main components and equipment of oxygen generator plant should be integrated and power controlled through one control	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	11.4	It should fully comply and meet with the requirements of the standards (IEC, etc..)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>12</b>		<b>Automatic Voltage Stabilizer (AVS) or AVR (Automatic Voltage Regulator)</b>		
	12.1	The whole system (Main and Control) shall be supplied with Automatic Voltage Stabilizer (AVS) or AVR (Automatic Voltage Regulator) to stabilize the voltage supplied to the	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		system (voltage surges, fluctuations, and drops)		
<b>13</b>		<b>Quality Standards &amp; Safety Requirements</b>		
	13.1	Submit certification documents along with the bid:		
	a	Free Sales Certificate (FSC), favorable provided by any of the following countries: Australia, Canada, Japan, USA and European Community (e.g. FDA and/or CE certificate given by a third certified party for the specific medical devices proposed.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	valid EN ISO 13485:2012. Standards, for the manufacturer	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	Valid ISO 9001:2008. Standards, for the manufacturer	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	Valid ISO 14001:2004/2007	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	e	PED97/23/EC Module B+D, MDD97/42/EC (Medical Device Directives),	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	f	ISO 7396-1: Medical gas pipeline systems — Part 1: Pipeline systems for compressed medical gases and vacuum.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	g	ISO 8573-1: Compressed air – Part 1: Contaminants and purity classes.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	h	ISO 8573-2: Compressed air – contaminant measurement – Part 2: Oil aerosol content.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	i	ISO 8573-4: Compressed air – contaminant measurement – Part 4: particle content.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	j	ISO 5011: Inlet air cleaning equipment for internal combustion engines and compressors – performance testing.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	k	ISO 21969: High pressure flexible connections for use with medical gas systems.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	13.2	All pressurized vessels to be:		
	a	designed according to PED or ASME VIII, or equivalent;	<input type="checkbox"/> Yes <input type="checkbox"/> No	

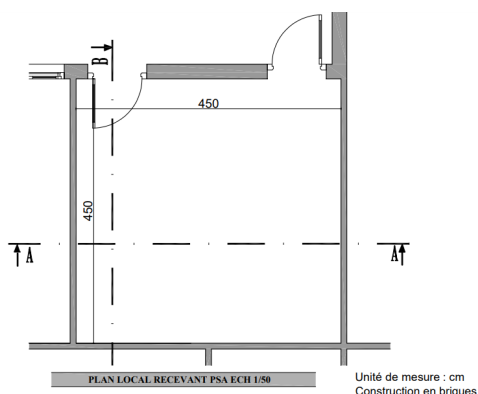
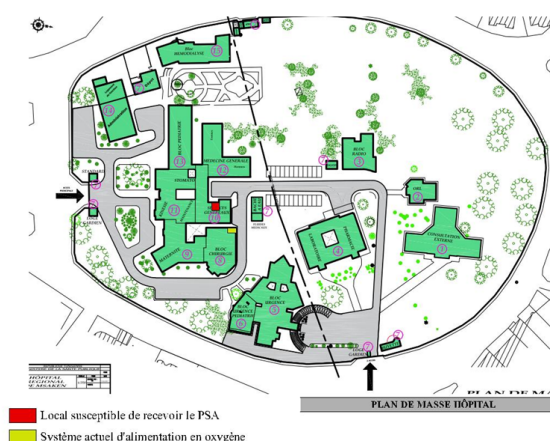
	b	certified PED or ASME III, or equivalent;	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	Cleaned according to ISO 15001, ASTM G93, or equivalent.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	13.3	CE and/ or FDA certificates for Oxygen Generator System, air compressor, air dryer, micron filters, Auto changeover system and Oxygen Flowmeter	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	13.4	Certificates attesting that the Oxygen Generator complies with European pharmacopoeia, or US pharmacopoeia and ISO 10083	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	13.5	Standards, for the manufacturer: Manufacturer should provide valid quality certificates: Certified Quality Management System for medical devices (e.g. ISO 13485, ISO 9001)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>14</b>		<b>Distribution network (piping and accessories)</b>		
	14.1	Quantitative and qualitative description of the pipes and accessories necessary for the distribution of the medical oxygen produced to the stations or units to be served and provided for in this installation		
<b>15</b>		<b>Self-switching Manifold</b>		
	<b>15.1</b>	A self-switching Manifold meeting ISO standards and designed with regulators tested at a high pressure, connected to two different sources of supply primary and secondary source of oxygen (one from the new PSA and the other of the hospital's old PSA). The switch mounted on the control panel allows switching between the two sources.		
<b>16</b>		<b>Risk Classification</b>		
	16.1	Class C (GHTF Rule 11); FDA Class II (USA); Class IIA (EU and Australia); Class II (Canada).	<input type="checkbox"/> Yes <input type="checkbox"/> No	

### Installation Site Data - M'Saken Regional Hospital

**M'Saken Regional Hospital** serves a population of around 100,000 people, city and surrounding area. The hospital has 98 beds, 125 outlets of oxygen (O<sub>2</sub>), compressed air and medical vacuum distribution network in each of the 7 units of the institution. The entire distribution network is centralized and connected to the primary electrical source. The hospital has a 170 KVA emergency generator equipped with an Auto Transfer Switch. The residual electrical power at the primary electrical power source is 300KVA while the emergency power source (standby generator) is already operating at full load.

Currently, the permanent distribution includes 12 B50 bottles (2x6) for a flow of 80 cubic meters per hour. The current demand obliges a change of bottles every 2-3 hours. **The COVID unit has 25 beds.** The current demand for O<sub>2</sub> is around 75 bottles per day, i.e., a flow rate of 31.25 cubic meters per hour. The overall distribution network is in good working conditions and functions very well. The hospital needs to improve its O<sub>2</sub> distribution as current installation requests a constant change of bottles too many times daily. Two locations are envisioned to sit the new PSA Plant and both are next to the current installation. Only limited rehab/construction is requested. Both locations are concrete made, secured, well ventilated and equipped with fire extinguishers.

### M'Saken Regional hospital Floor Plans





## Technical specifications for Goods and Comparative Data Table

**Important Note:** Bidder shall fill the 'Bidder Offer' column within the technical specifications, with clear and accurate answers, and shall outline any deviation from the technical specifications. The bidder shall state the reference (i.e. location and exact page-number) within the brochure/datasheet/etc. that proves the compliance with the technical specifications.

Item No		UNOPS minimum technical requirements	Is the bid compliant? Bidder to complete	Details of goods offered. Bidder to complete Insert detailed specifications for each parameter
<b>1</b>		<b>General</b>		
	1.1	Power requirements: - Plant operations: 380 VAC $\pm$ 15% - 3 phase / 50 Hz. - Power consumption: Less than 60KW - Control system operations: 220 VAC $\pm$ 15% - 1 phase / 50 Hz (Through UPS- Uninterruptible Power Supply with an autonomy of Thirty Minutes, complete including protection, inverter and batteries). Electrical Interconnection: Industrial Disconnect Switch or Industrial Plug of adequate rating. - Electrical protection by resettable circuit breakers, fitted in both neutral and live lines, Surge Arresters of high sensitivity and protection level, Earthing Terminals shall be provided.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	1.2	The equipment will be installed in the premises of the Beneficiary	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>2</b>		<b>Description of Functions</b>		
	2.1	A <b>Compact structure</b> PSA Oxygen Plant is to be installed to supply uninterrupted high-quality medical oxygen through a central medical	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		gas pipeline system to the hospital facility. <b>The PSA plant here should be single configuration not duplex.</b>		
	2.2	The backup oxygen supply system is provided by the Beneficiary hospital facility. An interconnection between the Backup System and the PSA Oxygen Plant shall be made and tested to ensure that the backup system is operational whenever the PSA oxygen plant is not (for any malfunction, or other reasons: maintenance, etc..)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	2.3	The equipment proposed shall be of highest quality, heavy duty and produced by well-known International manufacturers	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	2.4	The plant should consist of at least: Power supply, Screw type air compressor, air dryer, filters & Filtration system (micron, bacteria etc.), air tank, oxygen generator, oxygen buffer tank, Emergency bottles (Back up), bottle filling system, medical gas system monitoring and analyzer, regulation and alarm system, pressure transducers, flowmeters, valves, controls, distribution network (piping and accessories) and any other component needed to make the system fully functional. Installation must include a self-switching Manifold meeting ISO standards and designed with regulators tested at a high pressure, connected to two different sources of supply primary and secondary source of oxygen (one from the new PSA and the	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		<p>other of the hospital's old PSA). The switch mounted on the control panel allows switching between the two sources.</p> <p><b>Oxygen booster capacity to be used in filling oxygen cylinders is at least 90 Cyl/day for Msaken site @ 4-5 Bars to match the automatic manifold specifications described in the tender document.</b></p>		
	2.5	<p>The maximum noise level of the system shall not exceed 65 dB @ 1m</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	2.6	<p>The Plant components and the entire plant shall be a heavy duty medical Oxygen gas generator plant that shall be able to operate 24/365 days with full capacity and at the requested specifications, at the Beneficiary's site. The system shall be designed and able to operate normally under the conditions of the purchaser's specific place (e.g. Power Supply, Climate, Temperature, Relative Humidity, Altitude A.S.L etc.). The ratings of the plant shall be guaranteed for the specific Geographical and Climatic conditions prevailing at the site of installation and the system shall be designed to operate in a perfect manner under the said conditions</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	2.7	<p>The plant should be preassembled of the containerized model- ISO Container ("Plug and Play" type) to facilitate rapid installation. The <b>Containerized Plant</b> shall be fully integrated and assembled at the Manufacturer's Industries.</p> <p><b>The container must be CSC approved.</b></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	2.8	The Supplier shall plan for the equipment to be installed, tested and commissioned by certified qualified personnel; any prerequisites for installation with full details shall be communicated to the Employer within three weeks from the Contract Signature	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>3</b>		<b>Oxygen Generator (OG)</b>		
	3.1	The OG shall operate on (PSA) Pressure Swing Adsorption principle	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.2	The OG should have <b>at least</b> the following features:		
	a	Max/peak oxygen flow: <b>40 Nm3/h</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	Continuous oxygen flow: <b>30 Nm3/h +/- 5%</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	@ 4-6 Bar outlet pressure (noting that the pressure reaching the oxygen outlets inside the hospital should not be less than 4 bar)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	Oxygen Purity should be at least 93±3%	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.3	The OG components must be made from non-corrosive materials (like aluminium and stainless steel), as standard for all process components	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.4	The OG shall be robust. Column vessels should be manufactured according to the pressure equipment directive with a handhold. Adsorbent material must be of highest quality, long-life molecular sieve [ZEOLITE]	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.5	The OG shall be manufactured by industry leading energy air Manufacturers. The warranty for ZEOLITE must be 10 years and commitment of the same by the Manufacturer shall be provided	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	3.6	The OG shall be provided with special protection of the molecular sieve against moisture and shocks	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.7	The <b>Minimum</b> Output Oxygen quality requirements:		
	a	Oxygen purity: 93% +/- 3%	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	Water content: ≤ 67 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	Oil ≤ 0.1mg/m <sup>3</sup>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	CO: ≤ 5 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	e	CO <sub>2</sub> : ≤ 300 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	f	SO <sub>2</sub> : ≤ 1 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	g	NO <sub>x</sub> : ≤ 2 ppm	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.8	The OG shall be supplied with Ethernet connection to the main central control system. Alarm management and password-controlled access for different levels of the program and SMS alert functionality	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.9	The OG shall be provided with a continuous oxygen concentration monitoring system. The sampling should be done before the oxygen tank inlet valve	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.10	The OG shall have safety system by self-cutting valve mounted before the oxygen tank, ensuring a cut-off of production in case of low purity	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.11	The OG shall have automatic regulation to follow the hospital oxygen consumption variations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.12	Oxygen dew point: - 40°C	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.13	Oxygen sensor should be a Zirconium Oxide Sensor	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	3.14	Oxygen Generator shall be according to standard European pharmacopoeia or US pharmacopoeia and complies with ISO standards	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>4</b>		<b>Monitoring &amp; Controls</b>		
	4.1	The Monitoring and Control System shall have a minimum of	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		5.7" (Preferably larger 7") size touch screen control panel for continuous monitoring and control (SD card and USB Port included). Should support both the English and French languages		
	4.2	It should have alarm management with audit trail for raised alarms & alarm notification with automatic push email and sms (remote monitoring)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.3	It should have automatic service reminder for periodic maintenance due date	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.4	It should have an external audio/visual alarm in one unit and can be placed anywhere. Visual alarm should be active whenever an alarm is present in the system. Audio should turn on when an alarm appears but could be turned off from the control panel.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.5	All components shall have a control panel (Air Compressor, Oxygen Generator etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.6	Components should have automatic restart in case of power failure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.7	The system should display the main operative parameters and measurement values:		
	a	Continuous display and monitoring of Oxygen purity [%](continuously monitored by a <b>medical gas analyzer</b> )	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	Oxygen current flow [m3/hr, l/min] and total consumption (accuracy class should be $\pm 1,5\%$ of measured value- If this measurement is done by an online digital flowmeter, the material should be of stainless steel suitable for medical oxygen and it	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		should have a remote reading as well)		
	c	Continuous display and monitoring of oxygen outlet pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	Operating hours (with history)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	e	System Status	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	f	Automatic service reminders for periodic maintenance due	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	h	CO <sub>2</sub> concentration in the oxygen produced (continuously monitored by a <b>medical gas analyzer</b> )	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	i	CO concentration in the oxygen produced (continuously monitored by a <b>medical gas analyzer</b> )	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	j	O <sub>2</sub> Dew point (Via dew point sensor)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	k	Air tank pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	l	O <sub>2</sub> tank pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	m	Sensor values	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	n	Display of trends	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	o	Real time curves display to monitor the evolution of oxygen purity and pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.8	The system should have visual and audible alarm, for at least, the following:		
	a	Low oxygen purity [%]	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	Low/High oxygen outlet pressure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	Low pressure columns	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	High CO <sub>2</sub> & CO concentrations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	e	Quick stop / E-Stop	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	f	Power or system failure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	g	High temperature	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	h	Alarm on air compressor	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	i	Alarm related to air dryer (malfunction and air dryer pressure dew point (>3 °C))	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	j	Alarm when automatic back-up engaged, as configured (e.g. liquid oxygen tank or reserve cylinders from ancillary manifold or etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.9	Data logging should be available	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	4.10	Remote monitoring and remote alarm should be available (TCP / IP module for remote access system via ethernet / internet)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.11	All the alarm set points and the sensors status should be programmable	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>5</b>		<b>Air Tank</b>		
	5.1	It should have one set of Air Tank made of medical non corrosive Steel having medical grade epoxy inner coating of capacity 1500 L, (or if other sizing is deemed more suitable for this OG system please provide suggestions with justification) (tested to 15 Bar), working pressure 11 bar, with inlet and outlet valves, safety valve, pressure gauge and level sensing auto-drain valve. It should have a hand hole. It must have PED 97/23/EC. (kindly include certificate)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>6</b>		<b>Oxygen Buffer Tank</b>		
	6.1	It should have one set of Oxygen Buffer Tank made of medical non-corrosive Steel having medical grade epoxy inner coating of capacity 1000 L (or if other sizing is deemed more suitable for this OG system please provide suggestions with justification) (tested to 15 Bar), working pressure 11 bar, with inlet and outlet valves, safety valve, pressure gauge and level sensing auto-drain valve. It should have a hand hole. It must have PED 97/23/EC. (kindly include certificate).	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>7</b>		<b>Air Compressor</b>		



	7.1	It should be Rotary Screw type and Air-Cooled air compressor of efficient motor capacity ( <b>Minimum 250 cfm</b> )	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.2	Model and motor capacity to be mentioned in the bid	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.3	Built-in Oil Separator and Air Filter. Controls should be Suction Throttle valve type with On-off line control & Motor stop-restart control	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.4	Filled lubricating oil should be mineral oil	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.5	It should have LCD digital display indicating: Operation data, Failure and Records of at least 24 hrs	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.6	It should have automatic safety shutdown for main motor overload inverter trip (Fan Motor overload), air end outlet high discharge air temperature, air/oil separator outlet high discharge air temp, high oil case pressure, phase reversal and phase failure	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.7	Digital control should show discharge air pressure, operating hours, discharge air temperature, control settings, unload counter, Load factor, Error code	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	7.8	The Compressor shall be provided with soft start or Variable Speed Drive (VSD)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>8</b>		<b>Air Dryer</b>		
	8.1	The air dryer shall be microprocessor based and provide constant dew point temperature even with sudden load variations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	8.2	There should be one set of refrigerant types with suitable capacity air dryer with dew point of +3 °C.	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	8.3	It shall be provided with level sensing, auto drain valve, integral heat exchanger and shall utilize Eco Friendly Gas only	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	8.4	It should display alarm in case of technical fault or dew point fault	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>9</b>		<b>Filtration System</b>		
	9.1	Air quality after air dryer and filters should meet the ISO 8573.1:2010.2.4.1. Dew Point + 3°C. Filtration Grade 0.01 micron	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	9.2	The Filtration System shall consist of:	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	a	1 set of Coal Tower made of mild steel with food grade epoxy coating (alternatively activated carbon filter)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	1 set of Pre-filter for filtration level up to 1 micron with auto-drain	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	1 set of Micron filter of 0.01 micron level with auto-drain	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	1 set of Bacterial / Sterile Filter	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>10</b>		<b>Automatic Changeover &amp; Backup System</b>		
	10.1	In case of fault in the system (or for any other specified need), the oxygen supply source should be able to switch automatically from the oxygen generator to the backup oxygen supply system provided by the hospital facility) The main and first backup oxygen supply system shall be the liquid oxygen tank existing at the hospital whereas the second backup system shall be the existing oxygen cylinder ramp	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	10.2	The plant shall be provided with: Automatic/ final Pressure Reduction system and Automatic changeover System	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		integrated with the backup oxygen supply system (provided by the hospital) without manual resetting		
	10.3	The Reducer Changeover sub-assembly should consists of the following components: Filtering purge valves, HP and MP reducer with pressure gauge, non-return valve, pressure gauge for indicating output pressure, and other items as might deemed necessary to ensure proper interconnection	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	10.4	The Supplier shall closely and thoroughly coordinate with the Beneficiary's Engineers and Technicians to ensure proper interconnection and interfacing with the existing BACK-UP System. The Supplier shall provide and interconnect the Oxygen plant generator and the Back- Up system and perform all the necessary alterations. The Supplier shall provide the sub-assembly and all components to make the changeover possible and functional	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>11</b>		<b>Main Electrical Control Panel</b>		
	11.1	Fully automatic electric Control Panel consisting of all the MCCB's, MCB's, Digital Timer Phase Sequencer, automatic Hi/Low voltage control relay and Switches, Surge Arresters for medical grade equipment, etc. must be provided	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	11.2	The panel should be provided with all Ampere Meters, Voltmeters for visual indication of the electric supply and LED indicators for each phase	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	11.3	All the main components and equipment of oxygen generator plant should be integrated and power controlled through one control	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	11.4	It should fully comply and meet with the requirements of the standards (IEC, etc..)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>12</b>		<b>Automatic Voltage Stabilizer (AVS) or AVR (Automatic Voltage Regulator)</b>		
	12.1	The whole system (Main and Control) shall be supplied with an Automatic Voltage Stabilizer (AVS) or AVR (Automatic Voltage Regulator) to stabilize the voltage supplied to the system (voltage surges, fluctuations, and drops)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>13</b>		<b>Quality Standards &amp; Safety Requirements</b>		
	13.1	Submit certification documents along with the bid:		
	a	Free Sales Certificate (FSC), favorable provided by any of the following countries: Australia, Canada, Japan, USA and European Community (e.g. FDA and/or CE certificate given by a third certified party for the specific medical devices proposed.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	Valid EN ISO 13485:2012. Standards, for the manufacturer	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	Valid ISO 9001:2008. Standards, for the manufacturer	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	d	Valid ISO 14001:2004/2007	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	e	PED97/23/EC Module B+D, MDD97/42/EC (Medical Device Directives),	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	f	ISO 7396-1: Medical gas pipeline systems — Part 1: Pipeline systems	<input type="checkbox"/> Yes <input type="checkbox"/> No	

		for compressed medical gases and vacuum.		
	g	ISO 8573-1: Compressed air – Part 1: Contaminants and purity classes.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	h	ISO 8573-2: Compressed air – contaminant measurement – Part 2: Oil aerosol content.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	i	ISO 8573-4: Compressed air – contaminant measurement – Part 4: particle content.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	j	ISO 5011: Inlet air cleaning equipment for internal combustion engines and compressors – performance testing.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	k	ISO 21969: High pressure flexible connections for use with medical gas systems.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	13.2	All pressurized vessels to be:		
	a	designed according to PED or ASME VIII, or equivalent;	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	b	certified PED or ASME III, or equivalent;	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	c	cleaned according to ISO 15001, ASTM G93, or equivalent.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	13.3	CE and/ or FDA certificates for Oxygen Generator System, air compressor, air dryer, micron filters, Auto changeover system and Oxygen Flowmeter	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	13.4	Certificates attesting that the Oxygen Generator complies with European pharmacopoeia, or US pharmacopoeia and ISO 10083	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	13.5	Standards, for the manufacturer: Manufacturer should provide valid quality certificates: Certified Quality Management System for medical devices (e.g. ISO 13485, ISO 9001)	<input type="checkbox"/> Yes <input type="checkbox"/> No	

<b>14</b>		<b>Distribution network (piping and accessories)</b>		
	14.1	Quantitative and qualitative description of the pipes and accessories necessary for the distribution of the medical oxygen produced to the stations or units to be served and provided for in this installation		
<b>15</b>		<b>Self-switching Manifold</b>		
	<b>15.1</b>	A self-switching Manifold meeting ISO standards and designed with regulators tested at a high pressure, connected to two different sources of supply primary and secondary source of oxygen (one from the new PSA and the other of the hospital's old PSA). The switch mounted on the control panel allows switching between the two sources.		
<b>16</b>		<b>Risk Classification</b>		
	16.1	Class C (GHTF Rule 11); FDA Class II (USA); Class IIA (EU and Australia); Class II (Canada).	<input type="checkbox"/> Yes <input type="checkbox"/> No	

#### A. UNOPS Requirements

<b>UNOPS Requirements</b>	<b>Is the bid compliant?</b> Bidder to complete	<b>Details</b> Bidder to complete <b>Insert details</b>
<b>I. General</b>		
All medical equipment shall be 100% new and from current manufacturer production lines. It must NOT be discontinued at the time of signing the Contract.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The plant shall have a life span designed for a minimum of 10 years, guaranteed by a letter from the Manufacturer (not only from the Bidder or the authorised distributor). This guarantee ensures that the equipment and spare parts will not be discontinued during the 10 years after procurement.	<input type="checkbox"/> Yes <input type="checkbox"/> No	

<p>The plant shall be preassembled and skid mounted ("Plug and Play" type) inside a container complete including equipment, piping, panels, wiring, Heating Ventilation and Air conditioning and filtration.</p> <p>The Bidder shall indicate explicitly in its proposal the following aspects to match infrastructure capabilities within the health facility:</p> <ul style="list-style-type: none"> <li>- Floor works, piping and wiring installation in view of the proper installation of the plant;</li> <li>- Fire safety, Exhaust, Ventilation requirements;</li> <li>- Schematics of the plant with dimensions;</li> <li>- Weight and Dimensions of the plant L x W x H. (indicate if 20 feet or 40 Feet Container);</li> <li>- Clearance requirements from all sides for ease of access and maintenance;</li> <li>- Isolation from flammable materials (e.g. oil, grease and petroleum-based or other flammable products)</li> <li>- Electrical Requirements (acceptable mains capacity, Power consumption of the Plant in KVA and the MCCB needed for protection inside the Hospital's Main Distribution Board- MDB);</li> <li>- Compatibility with back-up power supply (e.g. generator);</li> <li>- Appropriate connections/adaptors for piping and interconnection with existing systems;</li> <li>- Infrastructure requirements for operation e.g. roofing, etc.</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>If there was any safety advisory notice, or urgent field safety notice, or recall (FDA/CE or from the manufacturer) for any of the proposed components in the past 5 years, attach it with the explanation of the rectifying action that was taken.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p align="center"><b>II. Full functionality</b></p>		
<p>The offered medical equipment shall include a full set of compatible parts, components, accessories, software, hardware, hardware/software interfaces, start-up consumables and howsoever required to put the Plant into fully operational condition.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>Any parts, components, adapters, software, hardware etc, that are not mentioned in the detailed technical offer or purchase order, but required to put the Plant into fully operational condition shall be deemed part of the awarded Plant and must be provided by The Supplier.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	

All medical equipment shall contain the latest software version at the time of shipment, wherever applicable.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All medical equipment, or its component, that will be permanently built-in or mounted on floor, wall or ceiling shall include all needed fixtures, supports, arms, mounting parts/interfaces, anti-vibration pads, finishing seals, and howsoever required to mount the unit and complete the installation, as per the manufacturer recommendation, and to the satisfaction of UNOPS.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All ceiling suspended equipment must include the design, supply and installation of the interface steel structure between the false-ceiling and concrete ceiling, as well as false-ceiling covers and seals, based on latest drawings and site conditions. For locally fabricated/customized steel structures, a Structural engineer of record, on behalf of The Supplier, shall certify the design and installation of the complete interface steel structure.	N/A	N/A
The Supplier shall be responsible to coordinate and liaise with UNOPS, the Beneficiary, Contractors and The Suppliers of other medical equipment, to provide complete, integrated and fully functional and coordinated solutions wherever applicable.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall provide new fully functional batteries for all equipment with internal batteries to the end-user at the time of taking over, if such components are required for the proper operation of the System.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
For electrically operated equipment, The Supplier must provide original medical grade power connection (Secure Electric Panel with Emergency Stop). Such connection shall be weather proof and prevent the ingress of dust, insects, animals into the Plant, as might be requested by UNOPS/Beneficiary. It shall be appropriately sized and designed for the given application.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier must provide all appropriate parts such as hoses, probes, fittings and regulators that are required for fully operational equipment. The medical gas outlet fittings should follow the existing installations, as might be requested by UNOPS/Beneficiary.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
For equipment that require water for its operation, The Supplier must stipulate the minimum and recommended acceptable water quality requirements. Hoses, adapters, filters etc shall be provided (wherever applicable).	<input type="checkbox"/> Yes <input type="checkbox"/> No	



The Supplier is responsible to provide equipment that are fully compatible and integrate-able with each other, whenever applicable, and to the satisfaction of UNOPS.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Wherever applicable, The Supplier for equipment that are connected to Hospital Information System (HIS), Electronic Medical Records (EMR), Radiology Information System (RIS), Picture Archiving and Communication System (PACS) etc; shall provide all necessary information, drawings, licenses of all types, software, accessories, adapters, hardware, programming services and howsoever required to facilitate the integration, and shall perform the required programming to integrate all system hardware and software components into the hospital network environment. Additionally, each medical equipment The Supplier will support the deployment of its equipment as well as the project overall IT integration during the integration phase. Each piece of medical equipment noted as requiring HIS/EMR integration, shall be provided with all specific integration/interface requirements. It shall be HL7 compliant and The Supplier is responsible for this integration, to the satisfaction of UNOPS.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All electrically operated equipment must be designed to run on the Tunisian standard AC power (voltages and frequencies).	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Equipment operated at voltage level of 110V and 60Hz frequency (with and without transformers) <b><u>shall NOT be acceptable.</u></b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All Electrically operated equipment should comply with the latest version of IEC 60601-1, UL/ANSI/CSA or equivalent	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>III. Pre-installation requirements</b>		
The Supplier shall visit the sites to ascertain accessibility, site conditions and nature of the site, local conditions, onsite measurements, and other matters affecting the execution of their works.	<input type="checkbox"/> Yes <input type="checkbox"/> No	

<p>For Architectural Significant Equipment (ASE), i.e. equipment that are permanently attached to the building, with Architectural/Structural requirements and/or equipment that requires permanent connection to electromechanical services (such as: single or 3-Phase electric power, medical gases, IT/data points, steam, HVAC, vents/exhausts, water, drain, etc), then The Supplier is responsible for providing the following drawings (hereinafter referred to as “the Drawings”):</p> <ul style="list-style-type: none"> <li>• Detailed shop drawings;</li> <li>• Elevation drawings;</li> <li>• Reflected Ceiling Plans (if the item is ceiling suspended);</li> <li>• Floor ducting plans (if the item is fixed to the floor, or require floor ducting for services, cables, pipes etc); and</li> <li>• Health, Safety, Security and Environmental measures to be considered in the Design of the Plant and the surrounding installations.</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Drawings shall be submitted to UNOPS -in PDF and AutoCAD formats- within 14 days of signing the contract.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Drawings shall be provided for all TYPICAL rooms pertaining to the medical equipment supplied by The Supplier.</p>	<p>N/A</p>	
<p>The Drawings shall be based on the latest plans, drawings, and onsite measurements, and in liaison with UNOPS, the Beneficiary and Contractor (if any).</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Supplier shall liaise with UNOPS, the Beneficiary and Contractor (if any) to produce coordinated drawings, wherever applicable.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Drawings shall clearly specify the Beneficiary’s obligations as well as The Supplier’s obligations for site preparation, in line with the manufacturer recommendations and the requirements mentioned herein. This shall include, but not limited to electrical, IT, networking, mechanical, medical gases, other gases, steam, vents/exhausts, HVAC, environmental, plumbing, structural, cutouts, back-supports, ceiling/wall/floor loading, space requirements, shielding (if applicable), special utilities, access requirements, and howsoever required to complete the installation of the medical equipment, as per the manufacturer recommendation, and to the satisfaction of UNOPS.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	

<p>If The Supplier fails to provide correct, accurate, timely based, and clear information/drawings regarding pre-installation requirements, The Supplier shall be held responsible for the remedial works, materials and costs needed for abortive works to complete the installation, to the satisfaction of UNOPS.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Supplier shall provide user manuals, service manuals, installation manuals, technical data sheets and site-planning guides that will assist in preparing the site for the Plant. However, providing such documents does NOT relieve The Supplier from submitting the hereinabove mentioned site-specific Drawings.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>Where appropriate, such as for certain types of medical imaging systems, The Supplier for these systems shall provide the Manufacturer's recommended shielding requirements (RF, Magnetic and/or Lead shielding).</p>	N/A	N/A
<b>IV. Packaging, Shipping, Storage and Delivery</b>		
<p>The Plant package shall be well labelled, with instructions for handling, lifting, etc.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Plant itself and its packaging shall be provided with durable nameplates to carry the name and contact details of the Supplier, the Local Agent the Manufacturer, model number, year of manufacture, name and quality label of the manufacturer and the standards in force, Electrical power input requirements (voltage, frequency, etc.); Rating of the Plant (nM3/Hr, Pressure, etc..), labelling for medical use according to standards, Information for storage conditions (temperature, pressure, light, humidity).</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Plant shall be packaged in a way to withstand handling, loading, unloading, temperature, humidity and other extremes likely to be encountered during shipping and transport.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Supplier shall be responsible for shipping and delivery of the Plant within the time frame stipulated in the Invitation to Bid.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Supplier shall be responsible to provide appropriate stores for the Plant until the site is ready for immediate installation.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>The Supplier shall monitor the storage space before, during and after shipment to ensure appropriate environmental conditions that match the published</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	

manufacturers' instructions, including temperature and humidity control.		
The Supplier shall ensure that the Plant will not be delivered to the site before such time that the Beneficiary's facility is ready and confirmed by the UNOPS for immediate installation.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All equipment shall be preserved and packaged in accordance with the manufacturer's standard practices, and to avoid damage to the Plant while in transport and shipment to its final destination.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall be responsible for taking all appropriate actions to ensure that the Plant can be brought safely into the Beneficiary's facility and to the allocated locations. It shall be the responsibility of The Supplier to deliver the Plant in good condition. Any equipment damaged in shipping, transportation, or rigging shall be promptly replaced regardless of the status of any claims filed against the carrier.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
During the warranty period, and if deemed necessary, The Supplier shall relocate the Plant to other locations at no additional cost.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>V. Factory Acceptance Test, Installation, Testing &amp; Commissioning, and Inspection (ITCI) On Site</b>		
<b>a. General</b>		
The following inspections and tests shall be performed: <i>(Bidders should submit a written statement with adherence to the below mandatory requirements)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Only experienced and authorized engineers from the manufacturer shall conduct the Installation, Testing & Commissioning. Competency and Training certificates for the installers, issued and letter headed by the manufacturer, shall be submitted during the inspection, whenever requested by UNOPS.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Installation, Testing & Commissioning Inspection shall demonstrate proper and safe installation and operation of the Plant as per the published manufacturer's specifications and protocols, applicable standards, and to the satisfaction of UNOPS.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Installation, Testing & Commissioning Inspection forms/checklists shall be filled by The Supplier, and submitted to UNOPS and to the Beneficiary.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Letter from the bidder guaranteeing that the proposed equipment will fit in the defined space.	<input type="checkbox"/> Yes <input type="checkbox"/> No	

<b>b. Quality Assurance Tests- QAT (Factory Acceptance Test- FAT)</b>		
Quality Assurance Tests- QAT (Factory Acceptance Test- FAT) shall be performed at the manufacturer site, prior to shipment. It shall ensure high quality, proper and reliable functionality, and applicable standards conformity. UNOPS reserves the right to have the attendance by any of its representatives (Own staff or third party).	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All the components of the Plant shall pass the QAT successfully, and the test certificates shall be duly stamped by the manufacturer. QAT certificates shall be submitted to UNOPS, whenever requested.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Certificate of calibration, inspection and testing from the factory should be provided to UNOPS prior to shipping.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
QAT certificates shall indicate the serial number of the medical equipment tested, date of the test, types of tests, and acceptance criteria.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Once the equipment is delivered to site (i.e. to the location mentioned in the Invitation to Bid), the equipment shall be inspected in the presence of UNOPS representatives and MOPH/Beneficiary representatives. The Supplier shall demonstrate that the right equipment/component has been delivered, in terms of manufacturer, model number, components part numbers, and quantities.		
The Supplier shall submit original (or authenticated copy, issued by pertinent authorities) of the CE certificate and/or FDA approval and/or the Japanese Pharmaceutical and Medical Device Agency PMDA pertaining to each equipment type and model during the delivery inspection.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>c. Inspection</b>		
UNOPS shall be notified within a reasonable time in advance to attend the inspection.		
The Supplier shall demonstrate to UNOPS that the delivery note (or packing list) and the labels on delivered crates match the approved offer (Purchase Order) in terms of: manufacturer, model, components' part numbers and quantities.		
Prior to delivery inspection, The Supplier shall submit to UNOPS a justification letter -with supporting document from the manufacturer- for any deviations from the approved offer (if any), such as for changing part		

numbers, updated models, part numbers that include sub-components etc. Such deviations shall be subjected to UNOPS approval. At the time of delivery inspection, The Supplier shall provide a copy of UNOPS approval to such deviations.		
Upon completion of inspection, any equipment failing this inspection shall be replaced/ rectified before proceeding with equipment installation.		
Appropriate checklists and forms shall be filled by The Supplier and submitted to UNOPS and to the Beneficiary/ MOPH representative.		
Whenever deemed necessary, The Supplier shall repeat the inspection, fully or partially, at the time of handing over the Plant to the Beneficiary/ MOPH.		
During the delivery inspection, the crates/packages shall be inspected externally to demonstrate that the delivered equipment and/or packaging are intact, undamaged and free from defects. Crates/boxes shall not be opened during the delivery inspection, nor their contents be checked. This is to maintain security and to ensure that no damage or loss takes place between delivery and installation. This inspection, therefore, is for checking the total number of crates/boxes, their labels and their condition, but not verifying the correctness or condition of the contents against the delivery note nor to verify the proper functionality of the equipment. Correctness and condition of equipment etc shall be checked at a subsequent stage, i.e. during the Installation, Testing and Commissioning inspection.		
Whenever deemed necessary and appropriate (by UNOPS), The Supplier shall unpack and inspect the equipment in the presence of UNOPS and MOPH/Beneficiary representatives. The Supplier shall be responsible to re-pack and secure the equipment after the inspection.		
<b>d. Installation</b>		
The Supplier shall assemble, mount, install, configure, calibrate, test and commission the medical equipment as per the published manufacturer's instructions, applicable international & local standards, and to the satisfaction of UNOPS/ Beneficiary.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Any materials or work found to be defective, not in conformity to the requirements herein, or damaged shall	<input type="checkbox"/> Yes <input type="checkbox"/> No	

be removed immediately, and new materials or work substituted without delay.										
The Supplier's work-in-progress activities (delivery, storage, rigging, installation, inspection, etc) shall be subjected to verification, at any time by UNOPS. UNOPS will notify The Supplier of any observed deficiencies or non-conformity, which could cause suspension of acceptance of the proposed system until corrective action has been demonstrated.	<input type="checkbox"/> Yes <input type="checkbox"/> No									
After installation and prior to conducting the 'Testing & Commissioning Inspection (TCI)', The Supplier shall undertake its own pre-checks to verify that the Plant, its installation and its performance conform to the published manufacturer's specifications. All required parts, accessories and start-up consumables shall be included.	<input type="checkbox"/> Yes <input type="checkbox"/> No									
<b>e. Testing &amp; Commissioning, and Inspection (ITCI)</b>										
Whenever deemed necessary by UNOPS, The Supplier shall provide testing equipment, tools, instruments, analyzers, etc to verify proper function/performance of the equipment as per the published manufacturer's specifications. All testing equipment, tools, instruments, analyzers, etc used for testing of medical equipment and systems shall be calibrated as per its manufacturer recommendation. Certificate of valid calibration shall be provided upon request.	<input type="checkbox"/> Yes <input type="checkbox"/> No									
<p>Below are the minimum requirements for commissioning:</p> <table border="1" data-bbox="148 1283 895 1682"> <tr> <td data-bbox="148 1283 228 1361">a</td> <td data-bbox="228 1283 895 1361">Note and report any signs of external or internal damage upon device delivery</td> </tr> <tr> <td data-bbox="148 1361 228 1518">b.</td> <td data-bbox="228 1361 895 1518">Verify oxygen concentration, flow and pressure level meets specifications when device is operational, and hospital load is being applied.</td> </tr> <tr> <td data-bbox="148 1518 228 1597">c.</td> <td data-bbox="228 1518 895 1597">Verify operation of oxygen analyzer and all alarms, including power failure alarms.</td> </tr> <tr> <td data-bbox="148 1597 228 1682">d.</td> <td data-bbox="228 1597 895 1682">Verify automatic switch to secondary supply when failure occurs or when needed</td> </tr> </table>	a	Note and report any signs of external or internal damage upon device delivery	b.	Verify oxygen concentration, flow and pressure level meets specifications when device is operational, and hospital load is being applied.	c.	Verify operation of oxygen analyzer and all alarms, including power failure alarms.	d.	Verify automatic switch to secondary supply when failure occurs or when needed	<input type="checkbox"/> Yes <input type="checkbox"/> No	
a	Note and report any signs of external or internal damage upon device delivery									
b.	Verify oxygen concentration, flow and pressure level meets specifications when device is operational, and hospital load is being applied.									
c.	Verify operation of oxygen analyzer and all alarms, including power failure alarms.									
d.	Verify automatic switch to secondary supply when failure occurs or when needed									
Initial operations will be performed by the manufacturer/supplier for a period of 3 days, with frequent or continuous supervision. After 3 days of successfully running the operations of the plant, it will be handed over to the Beneficiary	<input type="checkbox"/> Yes <input type="checkbox"/> No									

The Supplier shall submit a printed (as well as soft copy) list of Serial Numbers, Model Numbers, Manufacturer's name of all equipment installed inside the Plant.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>VI. Training</b>		
<p>Following a successful Installation, Testing &amp; Commissioning inspection, The Supplier shall conduct training sessions for the staff onsite.</p> <p>The Supplier/ Manufacturer or his qualified agent (with training certification) shall train the Beneficiary's Engineers and Technicians and perform on-site training for installation, use, and maintenance for a minimum number of five trainees and for a minimum period of four days, unless otherwise instructed by UNOPS or the Beneficiary.</p> <p>Training shall include, but not be limited to, training for Engineers and Technicians. Following the completion of training, The Supplier shall, if requested, certify that trained personnel have completed the training program.</p> <p>The training shall include operation and maintenance routines, including but not limited to:</p> <ul style="list-style-type: none"> <li>a. Operation of the Plant and its equipment</li> <li>b. Cleaning routines of the PSA plant considering the electrical safety precautions</li> <li>c. Cleaning routines for the filters, if applicable (i.e. reusable)</li> <li>d. Testing of alarms</li> <li>e. Testing of operating pressures</li> <li>f. Testing of oxygen concentration</li> <li>g. Frequency of the recommended maintenance routines</li> <li>h. Safety precautions on management of oxygen</li> <li>i. Advanced maintenance tasks required that shall be carried out by a third-party trained technician authorized by the manufacturer (e.g the supplier's technician)</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall submit a detailed description of the scheduled training for the personnel for the Plant and all of its components. This should include, but not limited to, detailed description of the training, location, scheduled	<input type="checkbox"/> Yes <input type="checkbox"/> No	



time, duration, content, qualifications of instructor, and a list of the qualifications of who should attend the training.		
<b>VII. Manuals/ Documentation (Hard and soft copies, in English and French languages as requirement and local language as preference)</b>		
The Supplier shall accept to provide, if selected: - at least 3 original user manuals; - at least 3 original technical service manuals for the Plant and its equipment; and - at least 3 original Handovers of the training manual.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Soft copy of the manuals (on CD/USB) shall be also provided.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Technical service manuals shall include spare parts lists, electronic circuits schematic diagrams, Single Line Diagram, P&I drawings, and detailed troubleshooting guides (where applicable), specific protocols for operation, procedures required for troubleshooting, calibration, and routine maintenance.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All level Password to configuration, user and service mode shall be provided to the Beneficiary.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Cleaning, disinfecting and/or sterilization of all medical equipment must comply with the latest editions of Centers for Disease Control (CDC) guidelines or equivalent international standards.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier must provide the published manufacturer's method statement for cleaning/disinfection for all the Plant's equipment and Components.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall specify appropriate cleaning methods, procedures, and agents.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>VIII. Warranty Period and Maintenance Obligations</b>		
Warranty offered (minimum <b>24 months</b> after successful installation and satisfactory inspection)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All maintenance and services must be provided by qualified and trained employees, they shall be duly certified by the Manufacturer.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall provide durable stickers/labels on the Plant, stating the dates for scheduled preventive maintenance during the warranty period, as well as the expiration date of the warranty period (as approved by UNOPS)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall conduct scheduled Preventive Maintenance (PM) according to the Original Equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Manufacturer (OEM) recommendations, applicable standards, and accrediting agencies.		
The Supplier shall provide on-site and remote support for use, troubleshooting, repair and maintenance of the System.		
Documented PM reports shall be submitted, and signed by the biomedical engineers/technicians onsite.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Response to service calls by factory-trained service engineers shall be within 2 hours. If the Supplier fails to adhere to this requirement, then the free warranty period for the Plant shall be extended 1 week per each incident.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall fix malfunctioning equipment/parts within a very short period guaranteeing that the Maximum downtime allowed is 1.5 working days per month.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall replace or repair all defective equipment/parts and software, and shall correct any defects -without charges for parts or labor- both during and after regular working hours, during the warranty period.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall provide -without charges for parts or labor- replacement of any defective equipment/parts that cannot be repaired or corrected to the satisfaction of UNOPS/MOPH/Beneficiary during the warranty period.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The following effectiveness level provisions shall apply to the Plant during the warranty and subsequent support periods. Uptime is defined as the state when the system is working and/or available for use, to UNOPS/MOPH/Beneficiary satisfaction. Downtime is defined as the state when the system is NOT operable due to breakdown, performance of repairs, or failure to perform according to specifications. The period of downtime shall be from notification of the manufacturer's service representative until the equipment is returned/presented to the designated UNOPS/MOPH/Beneficiary representative properly functioning and ready for use.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Scheduled routine preventive maintenance, scheduled upgrades of equipment or software, and external failures (i.e., due to power loss etc) shall not be considered downtime.	<input type="checkbox"/> Yes <input type="checkbox"/> No	

The Supplier must guarantee an uptime of 95% calculated yearly during warranty, unless otherwise requested by UNOPS/MOPH/Beneficiary to follow current protocols applied by MOPH/Beneficiary. Maximum downtime allowed is 1.5 working days per month.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Preventive maintenance work, software upgrades and other non-urgent services shall be performed at predetermined times convenient to UNOPS/MOPH/Beneficiary. These times may include off-hours.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
During the warranty and/or service period, all documentation shall be updated by The Supplier to reflect any revisions, within 14 days of their release by the manufacturer.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All software upgrades/updates to the equipment shall be provided by The Supplier during the life span of the equipment, within 14 days of their release by the manufacturer.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall provide a replacement of any defective equipment or components that cannot be repaired or corrected to the satisfaction of UNOPS/MOPH/Beneficiary during the warranty or service contract period. The replacement/substituted equipment shall be new and technically equivalent and with similar quality of the defective equipment.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All warranties and rights shall be transferable from UNOPS to the MOPH/Beneficiary upon transfer of ownership, the date of which shall be agreed between UNOPS and the MOPH/Beneficiary.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall provide in its offer all the Tools/ Consumables/ Reagents (Including filters, PM kits, cleaning and lubricant materials), required to operate the equipment for the first 2 years during the Warranty Period. The items shall be clearly defined in a disaggregated list comprising part numbers, descriptions, frequency of replacement, and unit cost, as well as indicating brand/model specifics by the manufacturer.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The Supplier shall provide in its offer the price of Yearly Preventive Maintenance Services including labor, valid for 2 years after the expiration of the warranty period. The items shall be clearly defined in a disaggregated list indicating unit cost.		

<p>The Supplier shall provide in its offer the list of prices of all types of spare parts (including all Preventive Maintenance kits, Spare Parts), and consumables/reagents (where applicable). The supplier shall confirm the sole availability up to 8 years after the expiration of the warranty period. The items shall be clearly defined in a disaggregated list comprising part numbers, descriptions, frequency of replacement, and unit cost, as well as indicating brand/model specifics by the manufacturer (e.g. for circuit breaker, printed circuit board, sieve beds, compressor components, valves, wheels, motor capacitor, analyser, etc.).</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>After the expiration of the warranty period, under a new spare parts supply contract, the Supplier shall be responsible to deliver any requested PM kits, Spare Parts, and consumables within 40 days, from the date of award of the spare parts supply contract.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	

#### B. Delivery requirements and Comparative Data Table

UNOPS Requirements		Is the bid compliant? Bidder to complete	Details Bidder to complete
Delivery time	Bidder shall deliver the Plant, including installation and testing, within a <b>maximum period of 7 months</b> following contract signature	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="text" value="Insert details"/>
	The Supplier shall provide a Time Schedule for the Plant, indicating the starting date and finishing date (or duration, in days) for all activities related to The Supplier works, including delivery, installation, training etc	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Delivery place and Incoterms rules	Djerba Hôpital Sadok Mokaddem Houmt Souk, Tunisie  Msaken Av. Taieb M'HIRI	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="text" value="Insert details"/>

	4070, Sousse - Tunisie		
<b>Consignee details</b>	UNOPS/MOPH/Beneficiary	<input type="checkbox"/> Yes <input type="checkbox"/> No	<b>Insert details</b>

### C. Miscellaneous Requirements

- Detailed brochures and technical data sheets for the machine to be submitted with the bid
- Same safety standards applied on the machines should be applied on all supplied consumables as well
- Supplied consumables must be made by the Original Equipment Manufacturers (OEM) or manufacturers approved by the OEM.
- Installation, Testing, commissioning and Training as well as After-sale services (PM, CM, ensuring spare parts availability and replacement) shall be provided by The Supplier. In case The Supplier has no presence in Tunisia, The Supplier shall engage a highly specialized local company to perform such services. A signed agreement in this respect between The Supplier and the Local Company shall be submitted in the proposal, along with documentation that demonstrates that the local company would be able to perform the requested services as per the UNOPS requirements. The specialized local company shall be subject to the approval of UNOPS. Nevertheless, the full responsibility shall remain that of The Supplier.
- During testing of the equipment, The Supplier is responsible for providing any necessary supplementary tools, consumables and resources to perform the testing and commissioning.
- The Container shall be externally painted (The two long sides of the Container) with durable UV Resistant Weather- proof Paint Label.