

# Post-Commissioning Assessment Form For Medical Oxygen Plants

Date Published: 12 September 2025

This document was developed by [Build Health International](http://www.bhioxygen.org) to support global medical oxygen infrastructure planning, site preparation, operation, maintenance, and sustainability. Additional technical resources are available at [www.bhioxygen.org](http://www.bhioxygen.org).

**Introduction:** This document is a checklist that should be utilized to confirm that a PSA plant 1) has been correctly installed and 2) is performing optimally. Due to the highly technical nature of the checklist, it is recommended that only staff with the technical skillset and appropriate tools utilize this checklist as a means to verify quality assurance.

Hospital Information		
<b>Form Completed By</b>	<b>Name</b>	<b>Title</b>
<b>Hospital / Facility Name</b>		
<b>Date of Visit</b>		
<b>Hospital Contact Information</b>	<b>Name</b>	<b>Title</b>
	<b>Number</b> (include country code)	<b>Email</b>
	<b>Preferred contact method</b>	<input type="checkbox"/>
	<input type="checkbox"/>	<b>WhatsApp</b>
	<input type="checkbox"/>	<b>Email</b>

In the sections below, the gray box for “Yes” or “No” indicates the desired answer.

Administrative							
1	Who will be responsible for completing the daily checklist for the oxygen plant (PSA Plant Operator)? List their names and contact information here.						
2	Who will review the daily checklist filled out by the PSA Plant Operator (Biomedical Engineer)? List their name(s) and contact information here.						
3	Does the hospital have contact information for the oxygen plant supplier? If yes, include it here. <i>Contact Information:</i>	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
4	Has the hospital identified a focal point to communicate with the supplier? If yes, who is it? <i>Focal Point:</i>	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a

5	Does the oxygen plant have a service agreement? If yes, what is the duration of the agreement?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
6	Have the PSA Plant Operators, Biomedical Engineer, and Hospital Oxygen Advocate read and understood the service contract?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
7	Have the PSA Plant Operators, Biomedical Engineer, and Hospital Oxygen Advocate read and understood the oxygen plant warranty?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
8	Who will be responsible for budgeting for spare parts, electrical bills, pay for staff, and other PSA plant operating costs (Hospital Oxygen Advocate)? Often a person in hospital administration. List their name and contact information here.						
9	Has the hospital included oxygen plant staffing needs in the annual budget?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
10	Has the hospital included provisions for increased electricity costs in the annual budget?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
11	If the hospital <b>does not</b> have a service contract or spare parts kits, has a provision for spare parts and servicing been included in the annual budget?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
12	If the hospital <b>does</b> have a service contract and spare parts kits, are they aware of the need to plan to budget for spare parts after the service contract terminates?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
13	Do hospital technical staff have the tools needed to operate the plant? If no, specify what is missing. Refer to 3.23 tool kit lists.	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a

### Oxygen Plant Area Conditions

*Tools Required: Tape measure*

1	Drop a pin at the oxygen plant location.	<input type="checkbox"/>	Completed				
2	Is the area free of trash and debris that could be a fire hazard, trip hazard or accumulate on cooling vents and filter elements?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
3	Is there sufficient space around the PSA plant for access to operation and maintenance tasks?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
4	Is the plant site located a minimum of 10m away from open flames, smoke, diesel generators, incinerator exhausts, and other similar exhaust emitting equipment or areas to prevent ingestion of fumes?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
5	Is the plant in an area free of standing water and not in an area prone to flooding?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
6	Is the plant protected from blowing dust, dirt, sand, rain, sleet and snow from entering the plant room?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
7	Are the plant & cylinder storage area shaded from direct sunlight?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
8	Is the plant in an area where equipment noise is not objectionable?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
9	Is there a fire extinguisher in the PSA plant container or house?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a

HVAC							
Tools Required: Infrared thermometer temperature gun							
1	Is the space ventilated? Are there louvers or windows to allow for fresh air intake?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
2	Is the air compressor exhaust directly vented/ducted and prevented from immediately returning into the room?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
3	Measure the temperature in the plant room after compressors have been running for a while (at least 30 min). Record temperature and check against the manufacturer specifications to make sure it is below the maximum ambient temperature for compressor operation.	<input type="checkbox"/>	Completed		Temperature:		

Oxygen Plant							
Tools Required: Infrared thermometer temperature gun							
1	Verify oxygen plant specifications by photographing nameplates of: air compressor, air tank, oxygen generator, oxygen tank, booster compressor (if applicable), dryers (external only), and dryer filters (external only).	<input type="checkbox"/>	Completed				
2	Ensure correct phase rotation through one of the following methods: 1. Bump test 2. Phase rotation meter	<input type="checkbox"/>	Completed				
3	Check that the setpoint (for VSD compressors) or the load/unload point (all other motor types) matches manufacturer specification	<input type="checkbox"/>	Completed	Setpoint (psi or bar): Manual (psi or bar): Matching (Y/N)?			
4	Using a clamp meter, measure inrush current after turning on the compressor & following the start sequence specified in the manual.	<input type="checkbox"/>	Completed	Current (A):			
5	Verify that the compressor unloads/stops at the correct pressure as specified in the manual	<input type="checkbox"/>	Completed	Unload pressure (psi or bar): Manual (psi or bar): Matching (Y/N)?			
6	While compressor is running, check for oil leaks. Are there any leaks present?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes		
7	While compressor is running, check for air leaks in the air line. Are there any leaks? If yes, specify where & take photos.	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes		

8	Check Pressure Dew Point (PDP). Value should be between 3-5 degrees C.	<input type="checkbox"/>	Completed	<i>PDP (degrees C):</i>	
9	Refer to manual for instructions on when to read oil level (i.e. while compressor is running, after it is shut off, etc). Is the oil level adequate compared to specifications in the manual?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes
10	Check all condensate drains-- are all of them functional? If no, specify which. - Air compressor - Filters - Dryer - Air tank - Any other drains in system  This can be done by pressing the test button and watching to ensure that water is flushed out. On manual drains, this will need to be done by hand.	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes
11	Verify that condensate is collected in a bucket or piped outside of the building	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes
12	While the compressor is still running, open the inlet and outlet valves to the oxygen concentrator. Turn the concentrator on manual mode. Check feed air regulator setting against the manual	<input type="checkbox"/>	Completed	<i>Setpoint (psi or bar):</i>  <i>Manual (psi or bar):</i>  <i>Matching (Y/N)?</i>	
13	Empty oxygen storage tank(s), run the plant until it is full again, then check the oxygen purity at the output of the tank with a handheld analyzer. This should be between 90% and 96%.	<input type="checkbox"/>	Completed	<i>Purity (%) after 1 hour:</i>  <i>Purity (%) after 2 hours:</i>  <i>Purity (%) after 3 hours:</i>	
14	Observe pressure swing in the sieve beds as purity is building. Note any issues or abnormalities (uneven maximum, minimum, or equalization pressures) and cross-check values against the ranges specified in the manual.	Bed A Max		<i>Pressure range as specified in manual:</i>	
	Bed A Min				
	Equalization A				
	Bed B Max				
	Bed B Min				
	Equalization B				
15	Take a video of the HMI or the pressure gauges as the oxygen concentrator moves through a full cycle	<input type="checkbox"/>	Completed		
16	Turn the oxygen concentrator on Auto mode. Record the pressure in the O2 storage tank when it goes on standby. Cross-check against pressure switch setpoint specified in manual.	<input type="checkbox"/>	Completed	<i>Pressure Setpoint:</i>  <i>Specification in Manual:</i>	

17	Bleed off some oxygen from the tank and record the tank pressure at which the oxygen concentrator resumes generation (while on Auto mode)	<input type="checkbox"/>	Completed	Pressure Setpoint: Specification in Manual:
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Cylinder-Filling System				
<i>Skip this section if the plant does not have cylinder-filling capability</i>				
<i>Tools Required: Handheld oxygen analyzer</i>				
1	Are cylinder valves compatible with the pigtails?	<input type="checkbox"/>	No	<input type="checkbox"/> Yes <input type="checkbox"/> n/a
2	Try turning the booster compressor ON while the output valve of the O2 tank is closed. Confirm that it does not power on, or that it stops quickly if it does.	<input type="checkbox"/>	Completed	
3	Open the valve & turn the booster compressor on to Manual/Hand mode. Record the inlet/suction gauge pressure. Ensure that it matches setpoint specified in the manual.	<input type="checkbox"/>	Completed	Pressure:
	RIX 2V3B should be 30-40PSI			
	RIX 2PS should be 30-40PSI			
	Bailian GOW-15/4-150 0.3-0.4MPa			
	Bailian GOW-3/4-150 0.4MPa			
4	Switch the booster compressor to auto mode & begin filling 1 cylinder. Confirm that the booster compressor shuts off automatically when the cylinder is filled and record the cylinder pressure at that time (should be around 150 bar)	<input type="checkbox"/>	Completed	Pressure (psi or bar):
5	Record the amount of time to fill 1 cylinder. Cross check with booster compressor design filling rate to ensure efficiency.  <i>Booster compressor design filling rate (m3/h or other units of flow):</i>	<input type="checkbox"/>	Completed	Time to fill (h):  Cylinder size (L):  Booster flow (Nm3/h):
6	Check oxygen purity of filled cylinders.	<input type="checkbox"/>	Completed	Number of cylinders checked and purity:

Piping				
<i>Capture existing piping information and/or details of the incoming system if it has been purchased or if a contract has decided what they will install.</i>				
<i>Tools required: Calipers, spray bottle &amp; grease-free dish soap</i>				
1	Record regulator output pressure setting at the outlet of the oxygen storage tank. Cross check against manual.	<input type="checkbox"/>	Completed	Pressure (psi or bar):  Cross check against manual if specified
2	Confirm there are shut off valves between each component and between the PSA plants and the wards.	<input type="checkbox"/>	Completed	
3	If pipeline is supplied directly from the plant, confirm that there is a backup manifold	<input type="checkbox"/>	Completed	

4	Test low oxygen pressure alarm and automatic changeover. Shut off supply to hospital from the tank to confirm that the changeover works (supply should switch to backup manifold - ensure at least 1 full cylinder attached).	<input type="checkbox"/>	Completed				
5	Measurement of main branch pipe (diameter)	<input type="checkbox"/>	Completed			<i>Diameter (mm):</i>	
6	Measurement of ward pipes (diameter)	<input type="checkbox"/>	Completed			<i>Diameter (mm):</i>	
7	Check the pipeline: Are there any deformed pipes or unacceptable bends in the pipe?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
8	Inspect sample of brazing work for quality. Check 1-2 locations for leaks (soapy water test or visual/audible inspection)	<input type="checkbox"/>	Completed			<i>Note locations checked:</i>  <i>Note location of any leaks:</i>	
9	Check the oxygen purity and leaks at the outlets.	<input type="checkbox"/>	Completed			<i>Number of outlets checked and purity:</i>	
10	Are the flow meters compatible with the outlets? <i>Outlet &amp; probe standard:</i>	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
11	Check the location of zone valves/alarms (for fire safety and quick access/detection by nurses).	<input type="checkbox"/>	Completed				
12	Test all zone alarms by shutting the zone valves & confirming that the alarm sounds	<input type="checkbox"/>	Completed				

Oxygen Use							
1	How many cylinders does the hospital have on site? <i>As a rule of thumb, it is recommended to have approximately 3x the number of cylinders you plan to fill in a 24 hour period.</i>	<input type="checkbox"/>	Completed			<i>Quantity:</i>  <i>Size (L):</i>  <i>Note how many are damaged:</i>	
2	Is there a dedicated space for cylinder storage?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
3	Does the cylinder storage space include racks and/or chains to secure cylinders safely?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
4	Speak with hospital staff: are they getting enough oxygen at the oxygen outlet?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a

Spare Parts							
1	Is there a minimum of 1 year of spare parts on site?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a
2	How many years of spare parts are located on site?						
3	Does the PR have a list of all parts received from the supplier?						
4	Is there a dedicated space for storing spare parts that is not inside the plant house room?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a

5	IF YES, Describe the location. <i>How far is it from the plant house? Is it climate controlled? Is it organized? Are there any concerns? Is it secure (locked, access limited to specific staff)?</i>						
6	IF YES, Is there a system to track spare parts inventory?	<input type="checkbox"/>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	n/a