

Annexure-1 - PSA Mock Drill Introduction & Guidelines

Introduction to Mock Drills

4100+ PSA plants have been installed under various funding sources across States/UTs. These plants augment the total medical oxygen capacity in the country and increase the on-site production capability of medical oxygen. Mock Drill is an important tool for States/UTs to ensure that these plants are able to produce oxygen with adequate purity, pressure, have no leakages and subsequently be used for administering oxygen to patients. The aim of Mock Drill is below:

- Ensure plants go through a standard operating procedure to operate, measure and record important metrics
- Check operational status and full functionality of the PSA plants
- Identification of issues for agency / vendor and subsequent redressal of the same at the earliest

General Instructions

- The drill should be conducted by the hospital Biomedical engineer/ PSA technicians and under the supervision of the HNO/competent authority, Senior officials in the state/ Health facilities such as CMO/MS etc. should oversee the mock drill and ensure compliance.
- If a facility has more than one PSA, then mock drills should be conducted for each PSA. A Google Form must be filled for each PSA plant, mentioning all relevant details as per Annexure - 2

Instructions for day of the Drill

- The minimum duration of the drill should be 6 hours, starting preferably at 9 am. Hospital authorities are recommended to run the PSA plant at full capacity (maximum rated flow rate) during the mock drill.
- Oxygen purity should be checked in the PSA control panel display every 2 hours for a total of 3 readings at 11 am, 1 pm, and 3 pm. Oxygen purity for each PSA plant should be 90-96%. If purity is not attained in this timeframe, then the drill can be extended to 12 hours. In case purity is not attained, concerned authorities and service engineers must be notified.
- Check and ensure that the PSA plant is connected to facility MGPS and there are no leakages either in the linked MGPS pipeline and manifold. If leakages are found, the competent authority (HNO, Hospital Administration etc.) should raise the issue with the respective vendor and the implementing agency (DRDO/HITES/CMSS)
- Oxygen pressure and flow rate should be measured at the oxygen outlet at the patient bedside (while the pressure at bedside should be ~4.2 bar). The Oxygen pressure from PSA should be ranging between 4 and 6 bar.
- Total machine runtime (oxygen generation module runtime) should be measured from the main control panel
- Adequate availability of fire safety prevention and precaution systems in the facility, as recommended under the IPHS guidelines or relevant state level healthcare system guideline, should be checked, and ensured

- The identified gaps should be reported and immediately resolved by the competent state agency/PSA supplier

Reporting of the mock-drill results

- All the information should be recorded in a standardized format (a sample format has been attached as Annexure-2) for all PSA plants across the state and reported to the relevant authorities.
- If the plant is being used continuously for patients requiring oxygen therapy, please fill the reporting form for metrics which do not impact the oxygen delivery process (Eg. Oxygen Purity % from control panel, PSA output pressure) and can avoid bedside metrics (purity & pressure) while filling the form
- The results should be shared positively before 2pm the day after the mock drill is conducted in a standard format.
- The result of mock-drills for each PSA plant should be signed by both the respective hospital administration and the supervising executive engineer or equivalent authority
- It is recommended that the State government use the shared Google Form (bit.ly/psamockdrill3) to collect mock drill results for each PSA plant.

Data-entry guidelines:

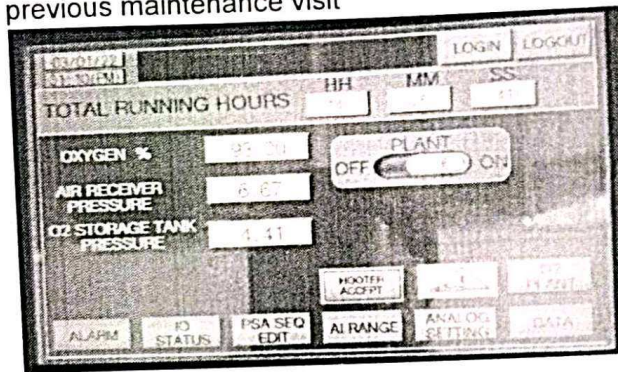
- If the plant isn't commissioned or functional at all,
 - kindly fill all the PSA and facility related details such as HNO name, contact number, training status, vendor details etc.
 - For every parameters related to a functional PSA plants such as purity, pressure, leakage, please enter 0, and
 - Mention the issue in detail in the comment section
- Don't enter multiple entries for a particular PSA plant. Some states had shared multiple duplicate entries in mock drill Round 1, please be careful in data entry and follow the recommended process

Directions for checking oxygen flow, pressure and purity at Main control Panel / Wall outlet / bed head pendant during mock drill

- O2 purity, flow to be measured using O2 analyzer and external flow meter. This will help assess calibration of in-built measuring devices in PSA.
- Visually check all wall outlets / bed head panels for leakage
- Ensure flow meter connector and humidifier bottle are tightly fitted, check oxygen flow functional check before clinical use.
- Flow can be measured through a flow meter
- Pressure can be recorded at area alarms installed at nursing stations /floor / zone wise
 - Pressure can be checked using the ventilator inlet pressure or a pressure gauge
- Purity can be measured with the help of ventilator Fio2 feature or an oxygen analyzer. If the facility does not have an analyzer, it is recommended to be used for this exercise.

Directions for measuring total Oxygen generation module runtime (in hrs)

- Oxygen generation module runtime is measured from the control panel
- This metric can help in the following:
 - Can be utilized to measure the total oxygen generated from the equipment
 - May indicate when the next maintenance visit is required based on the runtime over the previous maintenance visit



Logbook Template for PSA plants

- Mock drill results should be noted in the PSA log book, a format for the same is provided below

Daily logbook templates for PSA plant:
 PSA plant: (Plant 1 / Plant 2/ Plant 3)
 PSA Plant Capacity: (LPM)

Date	Time	Air compressor running hours reading			Air receiver (Buffer Storage) tank pressure	Oxygen Purity	Oxygen Flow rate	Oxygen Pressure	Oxygen receiver (Buffer storage) tank pressure	Status of air inlet filter / Cleaning	Signature of duty operator / technician	Remarks (If any failure)
		ON	OFF	Total								

Note: Record the down time.

- Record the PSA parameters on a daily basis (as given in above template) - Performance of air compressor, PSA generator, filter status, purity, and pressure of system
- Templates may be different as per vendor recommendation.
- If there is any indication of sub-optimal performance, the plant operator must intimate the facility manager and register a complaint for service support. Hospital nodal Officer should escalate issues to respective vendors/ implementing agencies/suppliers
- Samples of actual log books provided below:

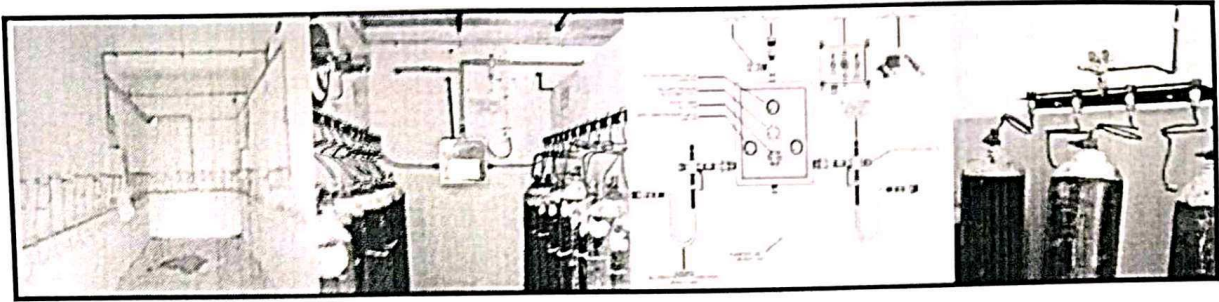
O2 GENERATOR DAILY STATUS

Date	Time	Pressure Bar-g	Purity %	Flow Lpm	Tech name	Shift	Status
11/11/21	9:30 AM	4.71	93.00	535	Premar	Shift	OK
12/11/21	9:30 AM	4.50	93.00	203	Premar	Shift	OK
13/11/21	9:30 AM	4.74	95.30	218	Premar	Shift	OK
14/11/21	9:30 AM	4.89	93.00	658	Premar	Shift	OK
15/11/21	11:00 AM	4.72	93.00	477	Premar	Shift	OK

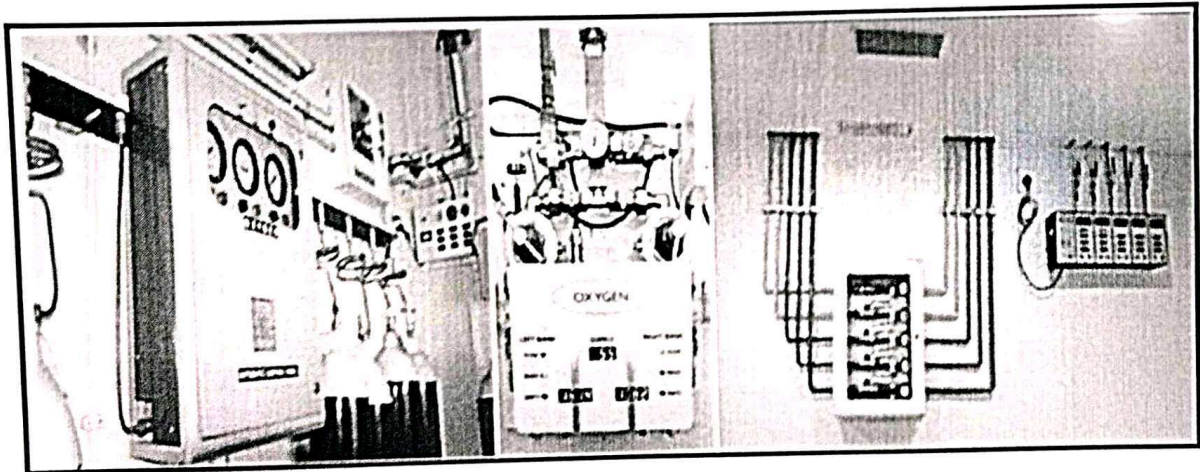
दिनांक	चलाने का समय	बन्द होने का समय	गुण मिनट/एनए	चलाने का नाम	पद	हस्ताक्षर
11-11-21	9:30 AM	6 PM	4 hrs	Premar	Operator	OK
12-11-21	9:30 AM	2:15 PM	4 hrs 45 min	Premar	Operator	OK
13-11-21	10:10 AM	2:00 PM	3 hrs 50 min	Premar	Operator	OK
14-11-21	11:10 AM	1:00 PM	1 hr	Premar	Operator	OK
15-11-21	10:10 AM	10:30 AM	1 hr	Premar	Operator	OK
16-11-21	9:30 AM	2:00 PM	4 hrs	Premar	Operator	OK
17-11-21	1:30 PM	2:00 PM	30 min	Premar	Operator	OK

Key Components of Oxygen System

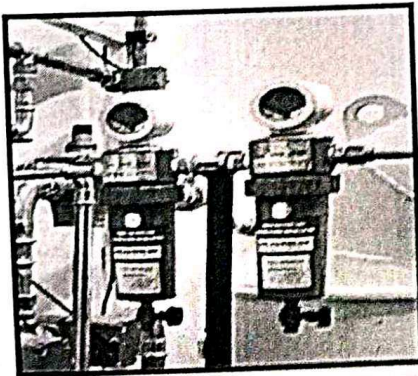
Manifold Room



- (a) Manifold room
- (b) Manifold room with oxygen cylinder arrangement
- (c) Manifold room control arrangement
- (d) Emergency Manifold arrangement



- (a) Oxygen Manifold control panel (analog)
- (b) Oxygen Manifold control panel (digital)
- (c) Floor isolation valves and area alarm system



Inlet Filter Status

If the gauge needle is in green marking - This means filter in usable condition.

If the gauge needle is near to red marking - This means the filter needs to be replaced soon.

If gauge needle in red marking area - This means filter needs to be replaced immediately

Frequently Asked Questions (FAQs)

- 1. *What if the patients are on oxygen therapy, should I conduct mock drills? Or PSA is working fine and is under use, do I need to fill the form?*

If PSA is being used for oxygen therapy to patients and is under use, then the administration should record parameters per the prescribed format (google form) without disrupting the oxygen therapy to patients and conclude the mock drill accordingly

- 2. *If the plant is not functional at all, what should I report? Or If the plant is not commissioned yet, what should I report?*

If the plant isn't functional at all or not commissioned, follow the below steps:

- i. Kindly fill all the PSA and facility related details such as HNO name, contact number, training status, vendor details etc.
- ii. For every parameters related to a functional PSA plants such as purity, pressure, leakage, please enter 0
- iii. Mention the issue in detail in the comment section
- iv. HNO should raise the issue to SNO, vendor and agency accordingly