جامعة الانبار

كلية العلوم التطبيقية – هيت

قسم الفيزياء الحياتية

الاجهزة الطبية

Oxygen concentrator “OC”

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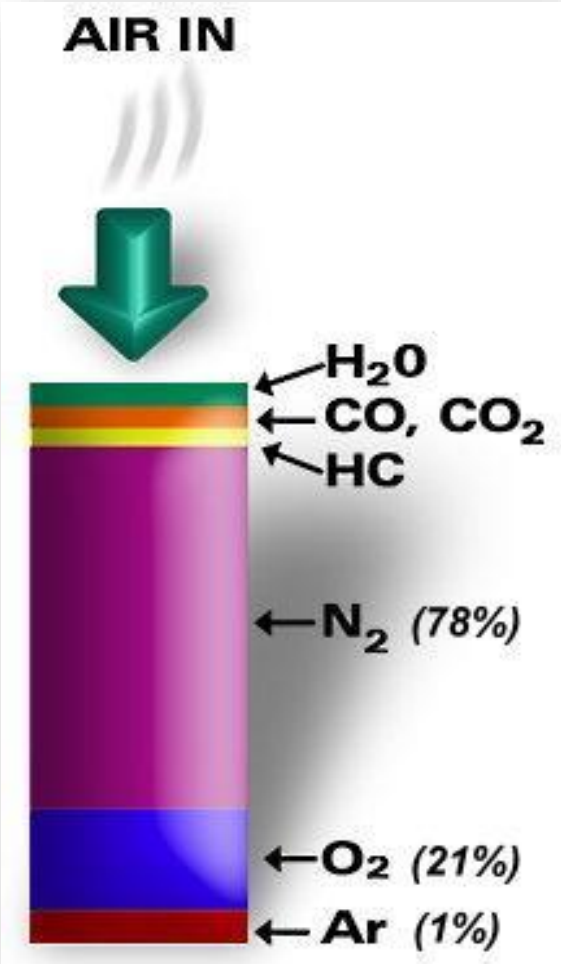
Purpose of OC

- Oxygen concentrators produce an oxygen-rich gas mixture.
- This is done by drawing in room air and extracting nitrogen.
  - Normal room air consists of 78% nitrogen, 21% oxygen, and trace amounts of other gases
- Oxygen concentrators are typically used as stationary sources to provide long-term oxygen therapy



Operation

- The concentrator draws in room air and passes it through a series of filters that remove dust, bacteria, and other particulates.

- **Use of molecular sieves (separator):**

  these types of units have two cylinders containing zeolite, (a nitrogen adsorbent silicate substance that acts as the sieve material)

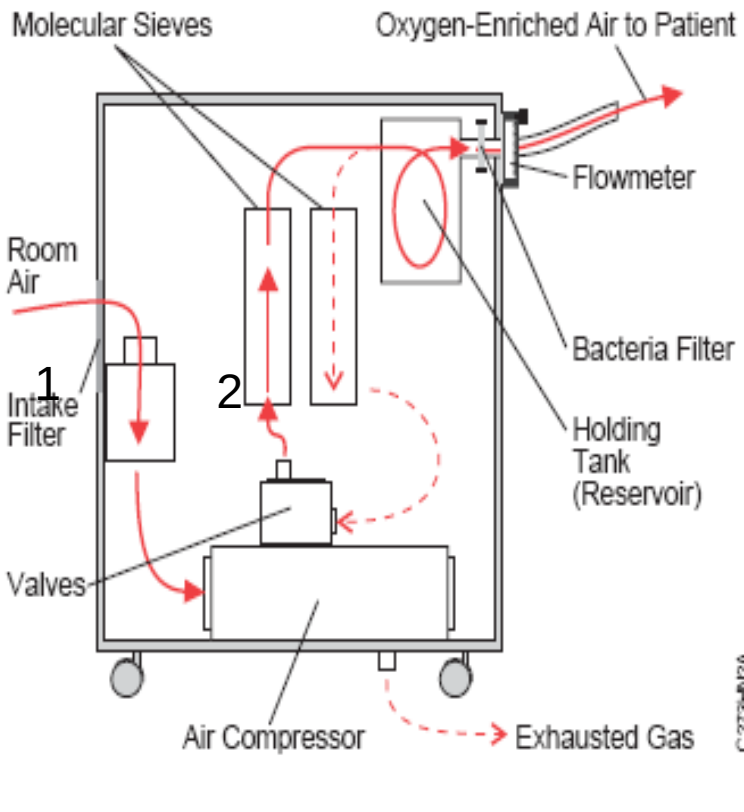
- **Two-part cycle:** high-pressure intake phase followed by depressurizing exhaust phase.

Operation: O2 -Concentration process

- **Step 1**
  - a compressor forces the air into one of the two cylinders containing the sieve material

there, nitrogen is adsorbed, leaving concentrated oxygen and a small percentage of other gases found in room air.

  - Simultaneously, in the other cylinder, nitrogen is desorbed and exhausted into the atmosphere.



Operation: O2 -Concentration process

- **Step 2**

The function of the cylinders is reversed in a timed cycle, providing a continuous flow of oxygen to the patient

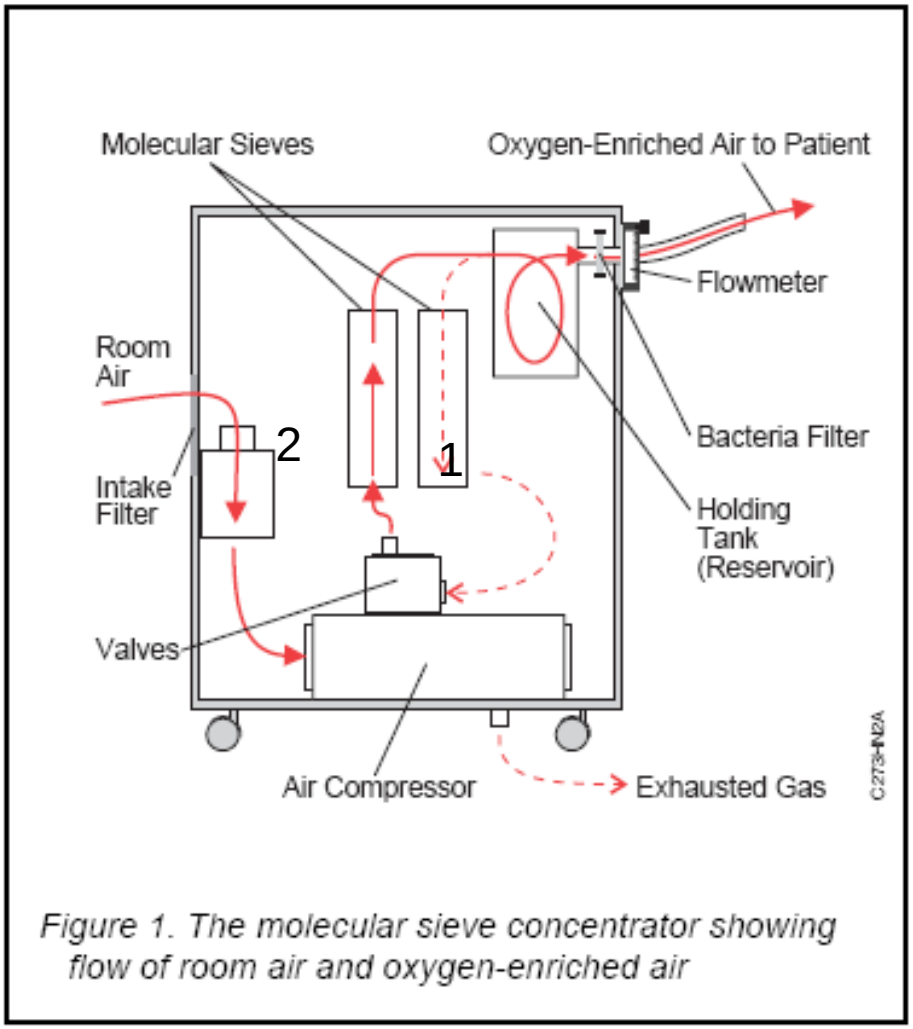


Figure 1. The molecular sieve concentrator showing flow of room air and oxygen-enriched air

Flow Specifications

1. The operator can adjust the flow from 0 to 12 liters per minute (L/min),

2. Final oxygen concentration achieved can vary from up to 95% at 1 to 4 L/min to 85% at 6 L/min.

3. Patients usually receive oxygen through a nasal cannula or mask

Problems

1. Dust
2. Contamination of sieves (Zeolite)
3. High air humidity

Maintenance

1. Cleaning of intake filter
2. Changing humidifier water daily