

Portable Oxygen Tank Use

1. Basics

- Is a drug
- Non-flammable gas
 - ◆ Supports combustion; does not "explode".
- Must be stored away from sources of heat, sparks, or flame
- Use "non-sparking" wrenches.
- Use No petroleum products (oil, grease, or adhesive tapes) on connections or fittings exposed to oxygen.
- Cylinder
 - ◆ Tank color is green
 - ◆ Labeled as "Medical Grade Oxygen"
 - ◆ Typically has "Oxygen" stamped on cylinder stem (yoke)
 - ◆ "Key Pin Index" / "Pin Index Safety System" – series of holes in stem which match medical oxygen regulators only
 - ◆ Must be secured at all times – empty or filled
 - ◆ Must be pressure tested and test date stamped on cylinder. Retest in 5 years or if has "★" in 10 years. Retest when empty.
 - ◆ On/Off valve – may be handwheel, wrench, "toggle" operated
- Full cylinder is nominally 2000 psi (1800 psi - 2200 psi)
- Empty cylinder (out of service) = 200 psi
 - ◆ Safe residual pressure
- A gasket must be used between the cylinder and the regulator.
- A regulator reduces tank pressure to patient useable level

2. Equipment

- O₂ Cylinder – Various sizes (typical portable unit is a "D" tank)
- Regulator/gauge
 - ◆ Shows tank pressure
 - ◆ Reduces tank pressure to user levels
 - ◆ Allows variable flow rates – typical range from 0 to 25 lpm
 - ◆ Barbed fitting for tubing connection for variable liter flows
 - ◆ May have Diameter Index Safety System (DISS) connection (threaded "quick connector") for other delivery devices
- Typical Delivery devices
 - ◆ For Breathing patients
 - Nasal Cannula – 2-6 lpm: (~22%-44%)
 - Simple and rebreather masks – Medium concentration O₂ delivery (35%-60%)
 - Non-Rebreather mask – High concentration. Start at 15 lpm (~90%-95%)
 - Venturi mask Set specific concentrations
 - Flow Restricted Oxygen Powered Ventilation Device (FROPVD) (aka Demand Valve) (~100%)
 - ◆ For non-breathing patients use:
 - Bag-valve-mask (BVM) resuscitator with O₂ and Reservoir (~98%)
 - Positive pressure/demand valve resuscitator (FROPVD) (~100%)
 - Pocket mask with supplemental oxygen connection (~50%)

- ◆ A humidifier adds water vapor to oxygen and can be added to the delivery system

3. Setup/Use

- Support Cylinder
- With O₂ port aimed in a safe direction “Crack” the valve momentarily to assure no debris in port
- Select proper regulator, assure appropriate gasket is in place
- Place Regulator over Cylinder stem (yoke) - Align Key Pin Index
- Tighten regulator “T-Bar” handle to secure to stem
- Select appropriate delivery device and attach to regulator
- Turn cylinder on – check that tank pressure is adequate, check for leaks - correct as necessary
- Adjust liter flow on regulator to desired flow rate (cannula: Max 6 lpm; NRB: 15 lpm)
- Apply delivery device to patient – adjust flow as needed
- Monitor tank pressure/flow rate during use

4. Shut down/disassembly of delivery system

- Remove delivery device from patient
- Turn off regulator, remove delivery device
- Turn off Cylinder
- Release “trapped” pressure in regulator by turning regulator on till pressure gauge reads zero
- Return regulator to "OFF" position
- CONFIRM gauge reads “0” pressure and remove regulator
- Properly secure cylinder

5. To determine the duration of flow in minutes:

$$\frac{(\text{gauge pressure (psi)} - \text{safe residual pressure (psi)}) \times (\text{Conversion Factor})}{\text{Flow rate (lpm)}}$$

Common Sizes of tanks	D	E	M	H
Volume (full at 2000psi)	350L	625L	3000L	7000L
Conversion Factor	.16	.28	1.56	3.14

Ex.: At a flow rate of 15 LPM, a standard D tank with 2000 psi will last for 19.2 minutes.

Ex.: At a flow rate of 10 LPM, a standard D tank with 2000 psi will last for 28.8 minutes.

Ex.: At a flow rate of 15 LPM, a standard D tank with 800 psi will last for 6.4 minutes.