

## Oxygen on the Go



Oxygen concentrators have been the source of oxygen for home care use for decades. This technology was introduced in the early 70's. Since room air contains 21% oxygen and 79% nitrogen, the machine takes room air in and filters out the nitrogen allowing the remaining oxygen to be **concentrated**. A series of filters and a molecular sieve produces medical grade oxygen of up to 96% consistently. Unfortunately, the early models were large, bulky, heavy, and were often stationary like a piece of furniture. As the years progressed, so did concentrators. They became smaller and able to be maneuvered from room-to-room with more ease and even used less energy. These units were the most cost-effective way to deliver oxygen to someone who used more than 16 hours a day. The downside, however, was the lack of portability. Being able to go out and about on oxygen involved using small oxygen cylinders (D's and E's) that lasted 1-5 hours depending on liter flow. Besides the weight and awkwardness, the anxiety of running out of oxygen still limited users from venturing out for more than a few hours at a time.

Flash forward to the year 2000, and the introduction of portable oxygen concentrators (POC's). Early designs evolved from bulky, unreliable, and minimal battery life to sleek, smaller units that are very reliable and have longer battery life. Adapters for cars/boats provide even more choices to travel care-free.

### Pulse/Demand-Flow

Manufacturers decided to build a machine that works on your breathing...only providing oxygen when necessary (inhaling) and keeping wasted oxygen to a minimum (exhaling). Most pulse/demand portable oxygen concentrators work on settings which are very much equivalent to a specific LPM (liter per minute). To determine this, the machine works on a bolus system. The bolus size is measured in millilitres and is the "shot" of oxygen released upon inhalation. The size of the bolus on each setting is worked out based on the amount of oxygen inhaled if you were on continuous flow oxygen. Since oxygen isn't required when we exhale, oxygen is normally wasted. This provides a pulse, or demand feature, that is extremely important in the design of POC's. Additionally, there are a few portable oxygen concentrators that produce a continuous flow of oxygen maximized at 3 liters per

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minute (lpm) for those individuals who do not tolerate a pulsing system.

Some models of POC's can vary the size of the bolus based on your breathing rate. This is particularly useful for using a pulse/demand machine while sleeping. Since your breathing rate slows during sleep, a machine with a variable bolus feature detects a slower breathing rate and adjusts the bolus size, so that it's a longer shot of oxygen upon inhalation, but still maintaining your prescribed amount of oxygen.

It is not usually recommended that a pulse/demand device be used during sleep. However, clinical studies have found that **some** pulse devices are just as effective as a continuous flow oxygen concentrator. Pulse/demand POC's are not suitable for patients using BiPAP or CPAP devices required for sleep apnea. Additionally, if you have a tendency to breathe through your mouth instead of your nose while sleeping, you may not be able to cycle the POC effectively in pulse/demand mode.

### Airline Approval

On July 12, 2005, the Federal Aviation Administration (FAA) approved the use of portable oxygen concentrators for use on commercial airlines. Even

though the majority of POC's have been approved for use on commercial airlines, it is still necessary to check in advance whether your model of POC is permitted on a particular airline, since some airlines have policies preventing them from being carried on. Depending on the airline, you may also need to carry some type of documentation signed by your physician in order to board your flight.

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