

WHAT IS PORTABLE OXYGEN CONCENTRATOR (POC) ?

It's a portable device used to provide oxygen therapy to patients at substantially higher oxygen concentrations than the levels of ambient air. It is very similar to a home oxygen concentrator, but is smaller in size and more mobile. The portable oxygen concentrator makes it easy for patients to travel freely; they are small enough to fit in a car and many concentrators are now FAA-approved.

HOW DOES IT WORK ?

Portable oxygen concentrators operate on the same principle as a home domestic concentrator, operating through a series of cycles. Air at barometric pressure contains 21% oxygen combined with nitrogen and a mixture of other gases. A miniaturised air compressor inside the machine will pressurise this air through a system of chemical filters known as a molecular sieve. This filter is made up of silicate granules called Zeolite which sieves the nitrogen out of the air, concentrating the oxygen. Part of the oxygen produced is delivered to the patient; part is fed back into the sieves to clear them of the accumulated nitrogen, preparing them for the next cycle. Through this process, the system is capable of producing medical grade oxygen of up to 90% consistently. The latest models can be powered from mains electricity supply, 12v DC (car/boat etc.), and battery packs making the patient free from relying on using cylinders & other current solutions that put a restriction on time, weight, and size.

Most of the current portable oxygen concentrator systems provide oxygen on a pulse (on-demand) delivery in order to maximise the purity of the oxygen. The system supplies a high concentration of oxygen and is used with a nasal cannula to channel oxygen from the concentrator to the patient.

DIFFERENCE BETWEEN PULSE AND CONTINUOUS FLOW:

Most portable oxygen concentrators are built from the size of a binocular case and weigh less than a couple of bags of sugar. The reason for this is because of the on-demand system. It allows the concentrator to be built with smaller components than that of a domestic concentrator. Since patients only inhale oxygen when they breathe in, when exhaling oxygen is wasted. By having the machine work with the patients breathing cycle, only providing oxygen when necessary, the system keeps wasted oxygen to a minimum.

Most on-demand portable oxygen concentrators work on settings which are very much equivalent to a specific LPM (litre 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 the patient was on continuous flow oxygen. Since oxygen isn't required when we exhale, oxygen is normally wasted; hence the reason behind this type of technology.

Technology has progressed in a way so that boluses can be made variable based on the patients breathing rate. This is particularly useful for using an on-demand machine whilst sleeping. Naturally the breathing rate slows whilst sleeping. A machine with a variable bolus detects a slower breathing rate; adjusting the bolus size so that its a longer shot of oxygen upon inhalation, but still maintaining the patients prescription of x amount of litres per minute.

It is not usually recommended that an on-demand device be used during sleep, however clinical studies have found that some on-demand portable oxygen concentrators are just as effective as a continuous flow oxygen concentrator. On-demand devices are not suitable for sleep for patients with the sleeping disorder sleep apnea.

Usually, "demand" or pulse-flow oxygen concentrators are not used by patients while they sleep. There have been problems with the oxygen concentrators not being able to detect when the sleeping patient is inhaling, especially with patients who often breath through the mouth while sleeping. Some larger portable oxygen concentrators are designed to operate in continuous-flow mode in addition to pulse-flow mode. Continuous-flow mode is considered safe for night use when coupled with a CPAP machine.

FAA APPROVAL:

On May 13, 2009, The Department of Transportation (DOT) ruled that air carriers conducting passenger capacity of more than 19 seats, must allow travelers with a disability to use an FAA approved Portable Oxygen Concentrator (POC) on all flights, unless the POC does not abide by valid FAA requirements. POC labeling by the FAA was expected to be complete by May 13, 2009. The DOT rules regarding Oxygen Concentrators have been adopted by many international airlines around the world, but airline customers need to check with their carrier to find out the rules for their particular airline of choice. A list of Portable Oxygen Concentrators approved for air travel is provided on the FAA website.

REFERENCE: WIKIPEDIA.ORG

