Bethlehem Apparatus
Bethlehem Burners
890 Front St., P.O. Box Y, Hellertown, PA 18055 Phone: 610/838-7034 FAX: 610/838-6333

Oxygen Concentrators and Bethlehem Torches

Flame workers often use oxygen concentrators (oxy-cons, oxygen generators) as an alternative to tanked oxygen when fueling their Bethlehem torch. Before choosing an oxygen concentrator for your Bethlehem torch, please review the information below.

Pressure Settings and Fuel Consumption Rates

Pressure and flow are the **MOST** important factors when choosing an oxygen concentrator for your Bethlehem Torch. Before choosing an oxygen concentrator, you must know your torches recommended pressure settings (*PSI Setting) and the torches MAXIMUM OXYGEN CONSUMPTION RATE (*LPM. This is the amount of oxygen that will be consumed when the torch is set to its largest and hottest flame setting). Once you know your torches pressure settings and fuel consumption rates, you can choose a concentrator that is right for your torch and flame working needs.

Alpha Torch
Recommended PSI setting: 2-PSI gas and 8-PSI oxygen.
Maximum fuel consumption rate: 2 LPM propane and 10 LPM oxygen.

Bravo Torch
Recommended PSI setting: 2-PSI gas and 8 PSI oxygen.
Maximum fuel consumption rate: 6 LPM propane and 30 LPM oxygen.

Champion Torch
Recommended PSI setting: 5-PSI gas and 20 PSI oxygen.
Maximum fuel consumption rate: 8 LPM propane and 40 LPM oxygen.

Grand Torch
Recommended PSI setting: 5-PSI gas and 20 PSI oxygen.
Maximum fuel consumption rate: 12 LPM propane and 60 LPM oxygen.

PSI vs. LPM

It is important to know the difference between PSI and LPM when fueling your Bethlehem flame-working torch.

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PSI stands for *pressure per square inch* and refers to the pressure the oxygen is under when traveling through the torch. The pressure the oxygen is under coupled with the internal design of the torch, will determine the speed in which the oxygen will be traveling when leaving the torch.

LPM stands for *liters per minute* and refers to the amount of oxygen leaving the torch every minute. There are a couple of different units of measurement that represent flow rate. The most popular are LPH (liters per hour) and ft3/hr. (Cubic feet per hour).

A high PSI setting does not equal a large LPM rate.

When choosing an oxygen concentrator, make sure to pay close attention to the amount of oxygen flow (LPM) the concentrator can produce and not just the pressure (PSI) setting. All flames require oxygen to burn, the more oxygen you have, the more gas you can burn. If a concentrator can only flow 8 LPM of oxygen, no matter how fast the oxygen is leaving the concentrator, your Bethlehem torch will only be able to produce a flame as large as 8 LPM of oxygen can combust.

Imagine two water balloons, one red and one blue. The red balloon represents a 10 LPM at 20-PSI oxygen concentrator and the blue balloon represents a 10 LPM at 10-PSI oxygen concentrator. Each balloon contains one cup of water. The water represents the 10 LPM the oxygen concentrator can produce in one minute. The red balloon has a small diameter coffee stirrer straw attached to the opening of the balloon while the blue balloon has a large diameter soda straw attached its opening.

Each balloon is capable of holding 1 cup of water and each balloon can empty that cup of water through the straw attached to the balloon openings. Only, the red balloon would need to be squeezed much harder then the blue balloon in order to get all of the water out of its small diameter straw in the same amount of time it takes the blue balloon to empty all the water through its large diameter straw. The amount of water exiting the two balloons is exactly the same but the speed in which the water exits the balloons is very different. The red balloon needs more pressure to squeeze out the same amount of water as the blue balloon, making the speed of the water exiting the red balloon faster then speed of the water exiting the blue balloon.

Since Bethlehem torches do not need a high PSI to flow large LPM of oxygen, be sure to look for an oxygen concentrator that can produce a large amount of oxygen and not just a high PSI setting.

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A Little Oxygen Goes a Long Way

When fueling your Bethlehem torch, you do not need a concentrator to produce the maximum amount of oxygen the torch can flow to get a balanced and efficient flame. The maximum fuel consumption rate represents the amount of oxygen flowing through the torch when the torch is producing its ***largest and hottest flame.*** Very rarely will a flame worker need to set their torch to its maximum flame setting. This means that when choosing an oxygen concentrator, we recommend looking for a concentrator(s) that can produce 50% to 100% of the oxygen required to produce the torches largest and hottest flame. This amount of oxygen will provide your torch with a large range of fuel mixtures that will allow you to make a wide variety of flame styles, sizes and temperatures.

Alpha
Recommended Oxygen Concentrator LPM Output – **5 to 10**

Bravo
Recommended Oxygen Concentrator LPM Output – **15 to 30**

Champion
Recommended Oxygen Concentrator LPM Output – **20 to 40**

Grand
Recommended Oxygen Concentrator LPM Output – **30 to 60**