Scintica:

Frequently Asked Questions (FAQ)

Living Systems Aeration & Oxygenation

This Frequently Asked Questions document has been designed to help answer some of the most asked questions by people newer to aeration & oxygenation consumables.

Q 1. How do I know how much oxygen to use in a gas mixture to achieve a desired partial pressure of oxygen in physiological saline solution (PSS)?

To answer this question, you need to know your barometric pressure, and the desired partial pressure of oxygen you are trying to achieve.

For example, let's say you are at sea level, where the atmospheric pressure is 760 mmHg, and you want to achieve a partial pressure of oxygen of 100 mmHg in your PSS, which is like the partial pressure of oxygen found in arterial blood. You plan to achieve this oxygen level by aerating your PSS with a gas mixture, so you need to determine the fractional concentration of oxygen in your gas mixture that will yield your desired partial pressure of oxygen in PSS.

To start with, you need to account for the effect of water vapor pressure. Water vapor pressure is independent of barometric pressure, but dependent on temperature. At a physiological temperature of 37 degrees C, water vapor pressure is 47 mmHg in water-saturated air. So, you need to subtract 47 mmHg from 760 mmHg, giving 713 mmHg. Then you divide your desired partial pressure of oxygen by 713 mmHg to obtain the fractional concentration of oxygen needed in your gas mixture to obtain your desired partial pressure of oxygen.

For a desired partial pressure of oxygen of 100 mmHg, the calculation would look like this:

100 mmHg O_2/ (760 mmHg – 47 mmHg) = 100/713 = 0.14, or 14%

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You can use the same approach to determine the percentage of any gas that will yield a desired partial pressure of that gas in solution. For example, say you want to achieve a partial pressure of carbon dioxide of 40 mmHg.

40 mmHg CO_2/(760 mmHg – 47 mmHg) = 40/713 = 0.056, or 5.6 %