

Radnoti

Radnoti Membrane Oxygenating Chamber : #130144



The membrane oxygenator is designed to be used to gas solutions for tissues, organs or cells. Gas is supplied via standard gas cylinders and temperature control is through a water circulator. The internal volume of the unit can be adjusted by selecting different sizes and lengths of silicone tubing. Silicone tubing is highly permeant to oxygen and carbon dioxide, as well as most other common gases. This permits rapid equilibration of solutions with most gas mixtures. The oxygenator's are made of borosilicate glass and thermally stable polypropylene, which can be sterilized by autoclaving, or with ethylene gas. The chambers come assembled. It is good practice to clean the oxygenator prior to use. The glass and polypropylene cap, and luer valves and tygon lines can be cleaned with water and soap or general glassware cleaner, then rinsed thoroughly with distilled water. The silicone tubing coil should be flushed copiously with water (1-2 liters). Note that use of certain materials that adhere to silicone tubing may require tubing changes to avoid contamination of the unit.

To obtain the appropriate control of gassing, the gas supply must have a second stage valve regulator that permits precise control of the gas pressure in recommended range. Gas pressure should be a gentle stream when played over the hand. On the larger model, the gas line can be placed in contact with the relief valve access, located on the underside of the lid assembly. If the relief valve activates, the gas pressure is too high. Gas enters the incubator through the inflow check valve assembly and exits through the outflow check valve assembly. Once proper gas pressure has been set, connect the gas line to the inflow check valve assembly. Allow the membrane oxygenator to come to temperature, then pass solutions through the tubing.

To achieve the best temperature control, Radnoti Water-Jacketed Reservoirs should be used to supply solutions.

The internal volume of the unit can be adjusted by selecting different sizes and/or lengths of silicon tubing. The effective gas exchange rate is dependent on the flow rate of the solution through the tubing, the tubing length, wall thickness and internal diameter. This unit was designed to permit the use of several different diameters of tubing, allowing the internal volume of the membrane oxygenator to be changed.

The extent of the oxygenation of the fluid going through the tubing depends directly on the length of the tubing and the amount of time the fluid stays within the chamber and inversely as the surface area/ volume ratio. For example, the standard tubing size .078" I.D. x 0.125" O.D. x 50' permits an exchange of >99% and then drops to 78% at 80ml/min. Internal volumes for this tubing are about 50ml/50'. A gravity fed pressure head, GFPH, of 26" (48mmHg) allows a flow of 9ml/min for 50' and 17ml/min for 25'. For tubing size 0.132x 0.183" tubing (or equivalent), since oxygenation and flow rate can be high. If internal volume must be reduced, the 0.078 x 0.125 or smaller tubing can be used, at the expense of gravity fed flow rate. If very high flow rates are required (such as dog or pig); the fittings and inlet tubing sizes must be increased.

It is the experimenter's duty to verify that the selection of tubing and flow rate yields acceptable gas tensions. This can be done with the installation of electrodes in line at the entrance and the exit of the solution, testing over the selected range of tensions and flow rates.

Tubing Size	Tubing Length	Flow Rate	%Oxygenation	Internal Volume
0.078 x 0.125	50'	80ml/min	>95%	50ml
0.078 x 0.125	25'	35ml/min	>90%	25ml
0.078 x 0.125	25'	80ml/min	>78%	25ml
0.132 x 0.183	50'	48ml/min	>95%	134ml



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