

# Radnoti

## Radnoti 130144 Membrane Oxygenator



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 or lengths of silicone tubing. Silicone tubing is highly permeant to oxygen and carbon dioxide, as well as most other common gasses. This permits rapid equilibration of solutions with most gas mixtures. The Oxygenator is made of borosilicate glass and thermally stable polypropylene which can be sterilized by autoclaving or with ethylene gas as described below. Do not use this equipment unless you have read and understand the following instructions.

### Disassembly instructions:

The 130144 comes assembled. It is good practice to clean the oxygenate prior to use. The glass and polypropylene cap, 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: The use of certain materials that adhere to the silicone tubing may require tubing changes to avoid contamination of the unit. All components should be air dried.

### Autoclaving:

Loosen the Lid Assembly from the Main Body. Wrap the lid assembly and main body. Secure the wrap with autoclave tape and place on a tray. Use safety gloves when placing or removing materials in the autoclave. Autoclave using the wrapped settings (Temperature 1220C for 30 minutes or more.) Allow to cool. Inspect for damage prior to use. Alternately, the unit may be gas sterilized. When sterile, hand tighten the lid assembly to the Main Body.

### Use of the 130144 Membrane Oxygenator

As in the case with all research, good sterile techniques, as well as adequate training in the use of biological, chemical and radioisotope materials is essential for good experimental results and safe laboratory practices. The researcher is expected to have been properly trained in the use of safety equipment such as a lab coat, gloves and protective glasses and to have developed a written laboratory protocol prior to the use of this or other laboratory equipment. connect water lines, turn on the water circulator, check the fittings for leakage and then adjust the temperature setting.



### Radnoti LLC

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**THE OXYGENATOR SHOULD NOT BE SUBJECTED TO GAS PRESSURES IN EXCESS OF 3 PSI. DO NOT ATTACHE THE OXYGENATOR TO A GAS SUPPLY THAT DOES NOT HAVE A PROPERLY SET SECOND STAGE REGULATOR.**

To insure personal safety as well as the correct gas pressure, the gas lines should be turned on and pressure adjusted prior to attachment to the Oxygenator. To obtain the appropriate control of gasing, 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. If there is a question regarding gas flow 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. If used for long-term, unattended oxygenation, it is always advisable to place the water circulator on emergency power line to reduce the risk of failure.

**DISCONNECT THE GAS LINE PRIOR TO TURNING OFF THE GAS SUPPLY. FAILURE TO DISCONNECT THE GAS LINE PRIOR TO TURNING OFF THE GAS SUPPLY MAY RESULT IN DAMAGE TO THE OXYGENATOR AND/OR CREATE A PERSONNEL HAZARD.**

After completion of the experiment, the unit may be cleaned and sterilized as described above.

## **Customizing the unit for different exchange conditions:**

The internal volume of the unit can be adjusted by selecting different sizes and /or lengths of silicone tubing. The effective gas exchange rate is dependent on the flow rate of 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.



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## Tubing size:

The extent of 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 of .078" I.D. x 0.125" O.D. x 50' permits an exchange of >99%. Oxygen at a flow rates of up to 80ml/min are at least 95% oxygenated,

Tubing Size	Tubing Length	Flow Rate	%Oxygenation
Using 95% O2			
5% CO2 Internal Volumes			
0.078 x 0.125	50'	80ml/min	>95% 50ml
0.078 x 0.125	25'	35/min	>90 25ml
0.078 x 0.125	25'	80ml/min	>78 25ml
0.132 x 0.183	50'	48/min	>95% 134ml

TUBBING SIZE	TUBBING LENGTH	FLOW RATE	% OXYGENATION USING 95% O2	INTERNAL VOLUMES
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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