

## Gas Consumption in the CV-2i+

Since gas consumption is an important topic when considering a transport ventilator, the following will show gas consumption comparisons between the MVP-10 and the Crossvent 2i+ in different modes of ventilation.

First of all, we'll use the same typical patient settings for all scenarios:  
 Flow rate = 6 lpm, Inspiratory time = 0.4 seconds, and Respiratory rate = 40  
 (Peak pressure and PEEP settings do not affect gas consumption)

The equation for calculating tank duration on an MVP-10 is as follows:

$$\frac{\text{Cylinder pressure (psi)} \times \text{tank factor}}{\text{Total flow usage}} = \text{minutes remaining}$$

<u>D-Cyl</u>	<u>E-Cyl</u>	<u>G-Cyl</u>	<u>H-Cyl</u>	<u>M-Cyl</u>
.16	.28	2.41	3.14	1.56

Given an average full e-cylinder has 2200 psi of pressure and the fact that the MVP-10 uses 4 lpm of gas for logic gas (to pneumatically power itself), the equation looks like this:

$$\frac{\text{Cylinder pressure} \times \text{factor}}{6 \text{ lpm} + 4 \text{ lpm logic gas}} \text{ or } \frac{2200 \times .28}{10} = 61 \text{ minutes}$$

Since the logic gas usage in the CV-2i is only 2 lpm instead of 4 lpm as in the MVP-10, using the CV-2i in the same constant flow mode as the MVP-10

$$\frac{2200 \times .28}{6+2} = 77 \text{ minutes or } 26\% \text{ longer}$$

When using the Crossvent 2i in the flow triggered mode, the ventilator uses two different levels of flow. During inspiration, whatever flow is set, is used (in our example: 6 lpm). During exhalation there is only 2.5 lpm flow. We will still add 2 lpm for the logic gas. So in order to calculate our total flow to use in our equation above, we'll use the following equation:

$$\frac{(\text{Set flow} \times \text{Ti} \times \text{rate})}{60} + \frac{(2.5 \text{ lpm} \times \text{Te} \times \text{rate})}{60} + 2 \text{ lpm} =$$

$$\text{or } \frac{(6 \times .4 \times 40)}{60} + \frac{(2.5 \times 1.1 \times 40)}{60} + 2 = 1.6 + 1.8 + 2 = 5.4 \text{ lpm}$$

Using the 5.4 lpm flow in the above calculation, the tank will last 114 minutes or 86.89% (almost twice as long) longer than an MVP-10 at the same settings.

Note: The above calculations were based on a situation where the vent was being used at either 100% FiO<sub>2</sub> or 21% FiO<sub>2</sub>. These are the worst case scenarios, as they will deplete one tank the quickest. In the case of other FiO<sub>2</sub> scenario, these times listed above could actually be doubled in cases where the air and oxygen tanks are providing equal portions of the flow.