



SMART OXYGEN CAGE

J1509 | USER MANUAL



Oxygen Therapy — An important modality for critically ill patients.

SMART OXYGEN OVERVIEW

The Smart Oxygen unit is designed for the short-term administration of oxygen to patients in respiratory distress, pre and post anesthesia and may also be used for nebulization.

The Smart Oxygen system is comprised of the following components required for both oxygen therapy and nebulization.

CONTENTS

- ▶ **A** 2x Elbow Outlets w/Cups
- ▶ **B** Double Male Connector
- ▶ **C** Venturi Oxygen Blank (Opaque w/no holes)
- ▶ **D** Oxygen Tubing, 7ft
- ▶ **E** Venturi Connector - Set of 5
Each color allows a different % of oxygen to be administered
- ▶ **F** Nebulizer
- ▶ **G** 2x Christmas Tree Swivel Connectors - **J0595C**
- ▶ **H** Temperature/Humidity Monitor
- ▶ **I** Plastic Coated Wire Carrier w/PVC Cover
- ▶ **J** Contents Bag



Figure 1

QUICK START

To provide emergency oxygen therapy to a patient in respiratory distress:

Refer to Figure 1 on Page 2

- ▶ The Smart Oxygen unit has two ports **A** that may be used as inlet and outlet. Keep both ports uncapped and attach the double male connector **B** to one of the ports.
- ▶ Connect the tubing to your oxygen source.
 - ▶ If using an anesthesia machine - Connect the blank Venturi (no holes) **C** to one end of the tubing **D** and attach to the end of the anesthesia breathing circuit.
 - ▶ If using a regulator/flowmeter with a male DISS outlet – Connect the Christmas Tree Swivel Adaptor **G** to one end of the tubing **D** and attach to your oxygen supply.
 - ▶ If using a regulator/flowmeter with a barbed outlet – Connect one end of the tubing **D** directly to your oxygen supply.
- ▶ Connect the green Venturi **E** to the other end of the tubing and attach it to the Smart Oxygen inlet port via the double male connector **B**. The opposite port is considered the outlet now. **Do not cap the outlet port while a patient is inside the Smart Oxygen cage!** If necessary, attach waste gas anesthetic scavenging system tubing to the outlet port.
- ▶ Initially, an oxygen flow rate of 4 L/min for a patient of up to 10 kg is recommended.
- ▶ Place patient inside the Smart Oxygen unit, close all the zips, turn on the oxygen and maintain constant patient observation. Allow the patient to rest briefly in the oxygen-enriched environment before further investigation or handling. For more details in the correct use of the Smart Oxygen unit, you must read all instructions contained within this manual.

Supplementary oxygen should be provided immediately to patients with dyspnea or cyanosis. Improved blood oxygenation of the patient may also be achieved when using the unit pre and post anesthesia. The oxygen percentage within the Smart oxygen unit is determined by the extent of filling it with air and oxygen via the Venturi. Patients in respiratory crisis should be given a high percentage of oxygen initially and then the concentration gradually reduced to the lowest level at which the patient can breathe comfortably. Opening the zips and carrier lid will drop the oxygen level to that of room air almost immediately.

Venturi

This kit contains 5 Venturi in various colors. The colors represent an air to oxygen ratio. Oxygen from your supply flows through the tubing into the attached Venturi. As the oxygen passes through the Venturi, it draws in room air, which then mixes with the oxygen. The larger the size of holes in the Venturi, the more room air is drawn in. The resulting mixture then flows into the Smart Oxygen unit providing the animal with an oxygen rich environment. Each Venturi is labeled with the percent of oxygen it can provide.

INSTRUCTIONS FOR OXYGEN THERAPY

- ▶ The Smart Oxygen unit has two ports **A** that may be used as inlet and outlet. Attach the double male connector **B** to one port **A**.
- ▶ Connect the tubing to your oxygen source.
 - ▶ If using an anesthesia machine - Connect the blank Venturi (no holes) **C** to one end of the tubing **D** and attach to the end of the anesthesia breathing circuit.
 - ▶ If using a regulator/flowmeter with a male DISS outlet – Connect the Christmas Tree Swivel Adaptor **G** to one end of the tubing **D** and attach to your oxygen supply.
 - ▶ If using a regulator/flowmeter with a barbed outlet – Connect one end of the tubing **D** directly to your oxygen supply.

- ▶ Select which Venturi **E** meets the needs of your patient. Connect this Venturi to the other end of the small tubing and attach it to the uncapped Smart Oxygen inlet port **A** via the double male connector **B**.
- ▶ Make your calculations based off the reference tables.
See example calculation on Page 8.
- ▶ Place patient inside the Smart Oxygen unit, close all the zips and maintain constant patient observation. **Turn on the oxygen at the required flow rate. Ensure the outlet port is uncapped to prevent pressure and CO₂ from building up in the system.** Attach waste gas anesthesia scavenging tubing if necessary.
- ▶ Allow the patient to rest briefly in the oxygen enriched environment before further investigation or manipulation. Patient breathing rate should be monitored as it may change due to anxiety, temperature, or humidity.

Oxygen concentration levels rapidly fall when the zips/lid is opened!

Constant patient monitoring and observation must be maintained throughout use!

The Smart Oxygen system is intended for short term use.



INSTRUCTIONS FOR NEBULIZATION

Nebulized medication may be used to support dogs, cats, avian, reptilian, or small mammals with respiratory disease. The aim is to deliver a dose of a required product to the patient as an aerosol in the form of respiratory particles. While the use of medication delivery via inhalant methods is widespread in human medicine (with substantial papers supporting differing drug therapies) veterinary literature and the current use of therapies, is currently, limited in publication.

When the nebulization medication requires dilution, this should be made up with 0.9% sodium chloride (saline). Water for injection, tap or bottled water, etc. should not be used.

- ▶ The Smart Oxygen unit has two ports **A** that may be used as inlet and outlet. Attach the double male connector **B** to one port and the other to your waste gas anesthesia scavenging tubing.
- ▶ Connect the tubing to your oxygen source.
 - ▶ If using an anesthesia machine - Connect the blank Venturi (no holes) **C** to one end of the tubing **D** and attach to the end of the anesthesia breathing circuit.
 - ▶ If using a regulator/flowmeter with a male DISS outlet – Connect the Christmas Tree Swivel Adaptor **G** to one end of the tubing **D** and attach to your oxygen supply.
 - ▶ If using a regulator/flowmeter with a barbed outlet – Connect one end of the tubing **D** directly to your oxygen supply.
- ▶ Unscrew the top half of the nebulizer **F** and add the medication solution. The volume of fluid in the chamber is usually 2 to 4.5 mL, depending on the product being administered. Keep the nebulizer vertical while screwing it back together.
- ▶ Attach the open end of the oxygen tube **D** to the base of the nebulizer and the top of the nebulizer to the double male connector **B**.

- ▶ Make your calculations based off the reference tables.
See example calculation on Page 8.
- ▶ Place the patient inside the Smart Oxygen unit, close all zips and maintain constant patient observation. Turn on the oxygen at the required flow rate to nebulize the medication. Therapy usually takes between 5 and 10 minutes. There will always be a small amount of liquid left in the nebulizer chamber.

After therapy, flush the unit with oxygen before lifting the lid. Failure to do so may result in medication or gas escaping into the procedure area.

Patient breathing rate should be monitored as it may change due to anxiety, temperature, or humidity.

Ensure that all connections are engaged to prevent medication or gas escaping into the procedure area.

Ensure the nebulizer is rinsed with sterile water between dose administration.

Oxygen concentration levels fall rapidly when the zips/lid is opened.

Constant patient monitoring and observation must be maintained throughout use!

The Smart Oxygen system is intended for short term use.

EXAMPLE CALCULATION

A 10 kg patient at 12 breaths per minute on a desired 35% oxygen saturation: placed in a Smart Oxygen unit using an initial flow rate of 5 lpm.

- ▶ Use Table 1 to determine the approximate amount of time (in minutes) to reach the desired oxygen concentration based on Venturi selection and flow rate. This is with no patient inside. With the patient inside, it will take slightly longer to achieve the desired concentration.
 - ▶ **Example** 2.8 mins to achieve desired oxygen concentration

Then, once concentration is achieved:

- ▶ Use Table 2 to determine how much your patient's tidal volume.
 - ▶ **Example** 0.10 lpm base on 10 ml/kg/min tidal volume
- ▶ Use Table 3 to determine the minimum oxygen flow rate needed to maintain the oxygen concentration base on the patient's current respiratory rate.
 - ▶ **Example** 2.4 lpm minimum oxygen flow rate (1/min) to maintain oxygen
- ▶ Use the numbers from Tables 2 & 3 to determine the minimum flow rate needed for the patient. This may change as the patient's respiratory rate changes.
 - ▶ **Example** 2.4 lpm + 0.10 lpm = 2.5 lpm minimum flow rate needed to maintain the desired oxygen concentration

OXYGEN SOURCE

Oxygen from an oxygen tank is the best source for the Smart Oxygen unit. Oxygen concentrators may be used but due to the lower PSI and oxygen concentration, the oxygen concentration inside the Smart Oxygen unit may not be what is expected or stated in the instructions. Using an oxygen analyzer inside the cage can help the user ensure the correct concentration is achieved when using an oxygen concentrator as the oxygen source.

TEMPERATURE & HUMIDITY MONITOR

The Smart Oxygen cage is designed for short term use. Longer term use can result in excessive heat and humidity within the cage. The temperature and humidity monitor can help ensure the patient is in a comfortable environment. The monitor can be placed anywhere inside the cage. It conveniently fits between the metal cage and plastic cover, either on top of the cage or along the wall.

- ▶ Remove the protective film applied to the LCD screen. Slide off the battery compartment cover.
- ▶ Install 1 x AA battery into the compartment as shown & replace the battery cover. Do not use rechargeable batteries.

Avoid placing the monitor in direct sunlight and/or near a heat source. Keep free from dirt and dust.

Temperature is displayed in either Fahrenheit or Celsius. (Press the “°C/°F” button located on the back of the display unit to select Celsius or Fahrenheit.) Humidity is displayed in percent. The lowest and highest temperature & humidity recorded over past 24 hours is also displayed along the right side of the monitor. Humidity Level Icon – The humidity level icon easily conveys a low, high, or ideal humidity level.



WARNING!

Highly concentrated sources of oxygen promote rapid combustion in the presence of naked flames and sparks. Ensure that adequate precautions are taken before, during and after the use of Smart Oxygen.

A maximum of 60% oxygen in the air-oxygen mixture is recommended. It is best practice to decrease the amount of supplemented oxygen as soon as possible.

NEVER leave an animal inside the Smart Oxygen unattended. When the zips are closed and the inlet/outlet are engaged, the unit is airtight. To avoid patient suffocation, metabolic gas (i.e. oxygen) must be flowing.

JorVet assumes no liability for any malfunction, failure, damage, or loss to either equipment or life.

Table 1 Time to Desired Chamber Oxygen Concentration (min) [patient not inside]

Smart Oxygen Large: Cage Internal Volume (L) for 54 x 38 x 38 cm = 78 L
Volume 0.078cu m

	Blue (24%)	White (28%)	Yellow (35%)	Red (40%)	Green (60%)
Air:Oxygen Ratio	25.3:1	10.3:1	4.6:1	3.0:1	1 to 1
Oxygen Flow Rate (L/min)					
1	3	6.9	14	19.5	39
2	1.5	3.5	7	9.8	19.5
3	1	2.3	4.6	6.5	13
4	0.75	1.7	3.5	5	9.8
5	0.6	1.4	2.8	3.9	7.8

Table 2 Patient Tidal Volume

Approx Kg body weight	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
m/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min	l/kg/min
10	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14
Patient Oxygen	15	0.02	0.02	0.03	0.05	0.06	0.08	0.09	0.11	0.12	0.14	0.15	0.17	0.18	0.20
20	0.02	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28

Note: This table is only an approximate guide, account of the clinical condition should be observed.

Table 3 Minimum Oxygen Flow Rate (L/min) to Maintain Chamber Oxygen

Approx kg body weight	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
10	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
11	0.2	0.4	0.7	0.9	1.1	1.3	1.5	1.8	2.0	2.2	2.4	2.6	2.9	3.1	3.3
12	0.2	0.5	0.7	1.0	1.2	1.4	1.7	1.9	2.2	2.4	2.6	2.9	3.1	3.4	3.6
13	0.3	0.5	0.8	1.0	1.3	1.6	1.8	2.1	2.3	2.6	2.9	3.1	3.4	3.6	3.9
14	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.6	3.9	4.2
15	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5
16	0.3	0.6	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	3.5	3.8	4.2	4.5	4.8
17	0.3	0.7	1.0	1.4	1.7	2.0	2.4	2.7	3.1	3.4	3.7	4.1	4.4	4.8	5.1
18	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0	4.3	4.7	5.0	5.4
19	0.4	0.8	1.1	1.5	1.9	2.3	2.7	3.0	3.4	3.8	4.2	4.6	4.9	5.3	5.7
20	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.0
21	0.4	0.8	1.3	1.7	2.1	2.5	2.9	3.4	3.8	4.2	4.6	5.0	5.5	5.9	6.3
22	0.4	0.9	1.3	1.8	2.2	2.6	3.1	3.5	4.0	4.4	4.8	5.3	5.7	6.2	6.6
23	0.5	0.9	1.4	1.8	2.3	2.8	3.2	3.7	4.1	4.6	5.1	5.5	6.0	6.4	6.9
24	0.5	1.0	1.4	1.9	2.4	2.9	3.4	3.8	4.3	4.8	5.3	5.8	6.2	6.7	7.2
25	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5
26	0.5	1.0	1.6	2.1	2.6	3.1	3.6	4.2	4.7	5.2	5.7	6.2	6.8	7.3	7.8
27	0.5	1.1	1.6	2.2	2.7	3.2	3.8	4.3	4.9	5.4	5.9	6.5	7.0	7.6	8.1
28	0.6	1.1	1.7	2.2	2.8	3.4	3.9	4.5	5.0	5.6	6.2	6.7	7.3	7.8	8.4
29	0.6	1.2	1.7	2.3	2.9	3.5	4.1	4.6	5.2	5.8	6.4	7.0	7.5	8.1	8.7
30	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0
31	0.6	1.2	1.9	2.5	3.1	3.7	4.3	5.0	5.6	6.2	6.8	7.4	8.1	8.7	9.3
32	0.6	1.3	1.9	2.6	3.2	3.8	4.5	5.1	5.8	6.4	7.0	7.7	8.3	9.0	9.6
33	0.7	1.3	2.0	2.6	3.3	4.0	4.6	5.3	5.9	6.6	7.3	7.9	8.6	9.2	9.9
34	0.7	1.4	2.0	2.7	3.4	4.1	4.8	5.4	6.1	6.8	7.5	8.2	8.8	9.5	10.2
35	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5
36	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8
37	0.7	1.5	2.2	3.0	3.7	4.4	5.2	5.9	6.7	7.4	8.1	8.9	9.6	10.4	11.1
38	0.8	1.5	2.3	3.0	3.8	4.6	5.3	6.1	6.8	7.6	8.4	9.1	9.9	10.6	11.4
39	0.8	1.6	2.3	3.1	3.9	4.7	5.5	6.2	7.0	7.8	8.6	9.4	10.1	10.9	11.7
40	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0

Note: Flow rates marked in red are either below 0.5 l/min or above the 5 l/min capacity



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