INDIANA UNIVERSITY

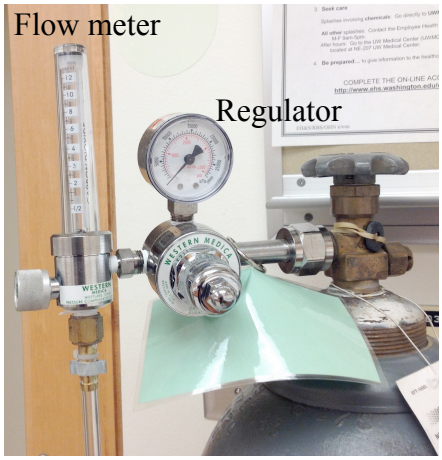
Office of Research Compliance (ORC)
Institutional Animal Care and Use Committee (IACUC)

Guidelines for C02 Flow Rate

Why is it important to know the flow rate?

It is important to ensure the proper flow rate to be consistent with the recommendations of the 2013 AVMA Guidelines on Euthanasia. Improper euthanasia of small laboratory rodents is considered noncompliance with PHS policy and the Guide for the Care and Use of Laboratory Animals and is reportable to the Office of Laboratory Animal Welfare (OLAW) (http://grants.nih.gov/grants/guide/notice-files/NOT-OD-02-062.html).

What is a flow meter?



A flow meter measures the volume of gas passing thru the nozzle per unit of time. Generally, the flow meter will measure the amount of CO2 in liters per minute.

Flow meters are specific for the type of gas they deliver, the amount of pressure at which the gas is supplied, and the rate (liters/min) of gas the flow meter can deliver. Some flow meters deliver smaller amounts of gas, 0.5 - 5 liters per minute, and others higher rates.

A pressure regulator cuts off the flow of the gas at a certain pressure. It cannot be used to deliver a precise volume of gas. Thus, flow meters must be added in series with regulators (see picture below) for accurate delivery of CO2. Note: Some flow meters have regulators incorporated and do not require a separate regulator

How do you determine what flow meter you need?

Please contact LARC for assistance before purchasing a flow meter. They are happy to help investigators figure out exactly what is needed and will consult PIs on set-up. LARC@IUPUI.edu or PH# (317) 274-5886

1. Calculate the volume of your euthanasia chamber.

   Height x length x width = volume

   For example, one type of mouse cage has the following dimensions (microisolator mouse cage with a flat lid) = 26.04 cm x 14.61 cm x 12.07 cm = 4591.96 cm3

2. Calculate the volume of CO2 that needs to be delivered. You need to deliver 30% of the chamber's volume per minute (average 30%/min).

   If the volume in our example is 4591.96 cm3, 30% is 1377 cm3

   1 cubic cm (cm3) = 0.001 liter

   Thus, in this example, you would need to deliver 1377 cm3 or 1.37 liters of CO2 per minute. **If your chamber is a different size, you need to calculate the rate for that size!**

3. Make sure you determine the rate of CO2 that can be delivered by the flow meter. Flow meters can be calibrated for different gases and the rate of delivery is not the same for all gases.

4. Flow meter rates are often reported in standard liters per minute (slpm) which is the number of liters per minute under standard conditions of temperature and pressure. These conditions are similar to what is present in a lab setting and can be used.

5. Flow meters cost between $60-$300 with fittings, hoses and regulators.

6. Flow meters must be mounted vertical (straight up & down) so the ball inside of the flow meter gives an accurate reading.

7. Flow meters can be recalibrated, but at this time, it costs more to recalibrate them than to buy a new one. If there is a change in the rate of gas delivered, the flow meter should either be replaced or recalibrated.