

# Vetamac Vapors

(800)334-1583

www.vetamac.com

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*If you find the topics discussed in our newsletter helpful or if you have questions, please email us at [info@vetamac.com](mailto:info@vetamac.com). If you would like to read past issues, those may be accessed on our website, [www.vetamac.com](http://www.vetamac.com)*

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## Carbon Dioxide Removal Part II

This issue will continue the discussion of the chemical absorption of carbon dioxide from the rebreathing system. Removal is by the chemical process discussed in the previous issue. There are, however, conditions that may cause the absorption to be less efficient than desired.

The canister for the absorbent granules contains more than just the granules. There are four spaces or volumes present in the canister. First is the granular space that is occupied by solid absorbent. The air space occupies 48-55% of the volume of the canister. This air space is divided into the void space and the pore space.

The void space is the space between the granules. This space is directly proportional to the size of the granules—large granules have more space between them, small granules fit close together and there is less void space. The tighter the granules are packed, the less void space present and the higher the resistance to flow. The void space of soda lime is 40-47% of its volume.<sup>1</sup>

The pore space is within the pores of the granules. The pore volume for fresh absorbent is 8% of the total volume. As absorption proceeds, the pore space decreases.

Let's review the four spaces in the canister. Let's assume a canister that has a volume of 4000 ml and that it is filled with soda sorb:

Granular Space (45%)	1000 ml
Air Space (55%)	2200 ml
Void Space (47%)	1880 ml
Pore Space (8%)	320 ml

Improper storage and handling of absorbent can decrease efficiency. Temperatures below freezing will cause the moisture in the granules to expand and create fragmentation. If bulk containers are used, they should be resealed once they have been opened. Granules should be handled gently to prevent fragmentation which in turn creates dust which can be irritating to the eyes and airways of the operator.<sup>1</sup>

Filling the canister should be done gently and packing the granules by tapping the side of the canister should not be overdone. The tighter the granules are packed, the higher the resistance to flow through the canister. DO NOT overfill the canister. Leave 1/2 to 3/4 inch of space at the top of the canister. This helps prevent spillage when the canister is secured to the breathing system.

During evaluation of a rebreathing system, the granules should be tested. Fresh granules of soda sorb are soft enough to be crushed between the thumb and forefinger. Granules that are expended are too hard to crush (remember from Part I that the granules become calcium carbonate which is a form of limestone).



The next issue will discuss canister designs and the flow of gas through the canister.

By Harry Latshaw  
MS, RVT, VTS (Anesthesia)

1. Dorsch JA, Dorsch SE. Understanding Anesthesia Equipment, 4th Edition: Williams and Wilkins, 1999, page 236.

## FAQs

Q: What about the new soda sorb I have heard about that will remain purple after it is expended?

A: A new product called Sodosorb LF is now available. It is made for low flow procedures. The other good benefit of this product is that once it turns violet, it will not return to its original color. This product should be available through your distributor.

*If you have a question you would like answered in our FAQs, please email us at [info@vetamac.com](mailto:info@vetamac.com).*