

## **AMSORB MUST NOT BE USED IN DIVING SCRUBBERS** by Martin Parker

As you all know the only CO<sub>2</sub> absorbent currently tested and approved by APD is Sofnolime 797. ( Why did we concentrate on that? - because QinetiQ told us it was good and all our tests have concentrated on it)

But, we are in the process of extending our trials and investigating other materials -but don't hold your breath for the results as these tests take time.

But, if we discover any shockers that information will be released immediately.

We recently tested AMSORB and although the tests aren't completed, it has become obvious that AMSORB MUST NOT BE USED IN ANY diving REBREATHING. ( our testing is limited to the diving application).

AMSORB is a CO<sub>2</sub> absorbent used in anaesthesia machines. It's made by Armstrong Medical - The manufacturer's state it must not be used in Closed Circuit Anaesthesia machines and the material loses it's capability when it becomes wet but I'm sure that all users would read the data sheet.

The manufacturer's website is here:

<http://www.armstrongmedical.net/products/amsorb/amsorb-main.htm>

It looks like slug pellets, it's packing density isn't good. An Inspiration canister takes about 2.5kg of 797, we could only get 2.2kg of AMSORB in. (so you are giving up quite a bit of absorbency capability before you start). It's claim to fame is that it doesn't have any Sodium Hydroxide in it. My understanding is that NaOH (there's about 4% in 797) acts as a catalyst to the main reaction so without this, the reaction is slower to start which makes it wholly unsuitable for our application.

The test conditions were the standard European Standard test conditions:

4C, 40RMV, 1.6lpm CO<sub>2</sub>, depth 100m.

CO<sub>2</sub> and breathing machine are started on the surface and gas monitored externally on a fast response (calibrated) analyser for the whole descent and then the depth is held constant until we've seen enough - usually between 2- 5.0kPa PCO<sub>2</sub>. The sample line is inserted in the breathing hose prior to the mouthpiece.

CO<sub>2</sub> started coming through straight away. It goes past 0.5kPa PCO<sub>2</sub> very quickly.

1.6 lpm CO<sub>2</sub> is seen as an average rate. IF the diver worked harder then he would get significant levels of CO<sub>2</sub> coming through the scrubber immediately!

Worryingly - the material just doesn't get hot. 797 gets hot and then cools rapidly as the reaction is finished. AMSORB gets warmish then dies but retains some heat which makes the Scrubber monitor appear as though the scrubber is working. We ran the test to 4.0kPa PCO<sub>2</sub> and the scrubber monitor still hadn't reached it's warning levels - which is extremely dangerous. With the 797 the first scrubber warning is prior to 0.5kPa PCO<sub>2</sub> and the 2nd warning prior to 1.0kPa PCO<sub>2</sub>.

**THE APD SCRUBBER MONITOR DOES NOT WORK WITH AMSORB.  
AMSORB DOES NOT ABSORB CO<sub>2</sub> FAST ENOUGH FOR DIVING APPLICATIONS.**

If you have any further questions please contact me direct.

Please feel free to forward this message where you see fit.

Best regards

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