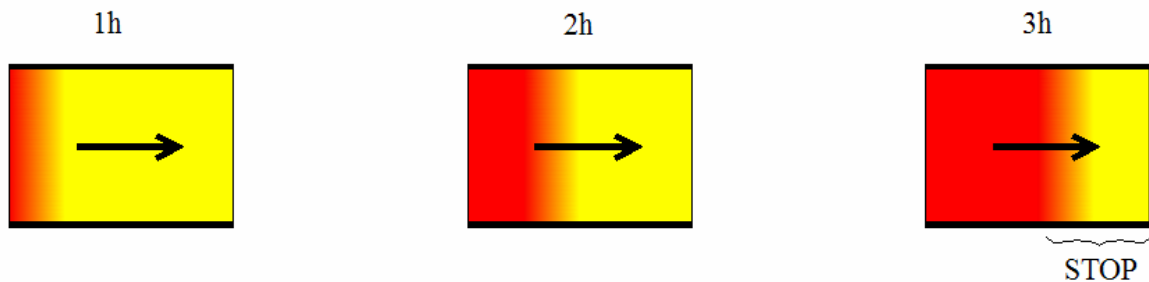


The dual scrubber V060511

How to work with the dual scrubber.

The rEvo uses a unique system of two scrubbers in series: each contains approx. 1.35 kg absorbent, they are connected through a channel in the cover.

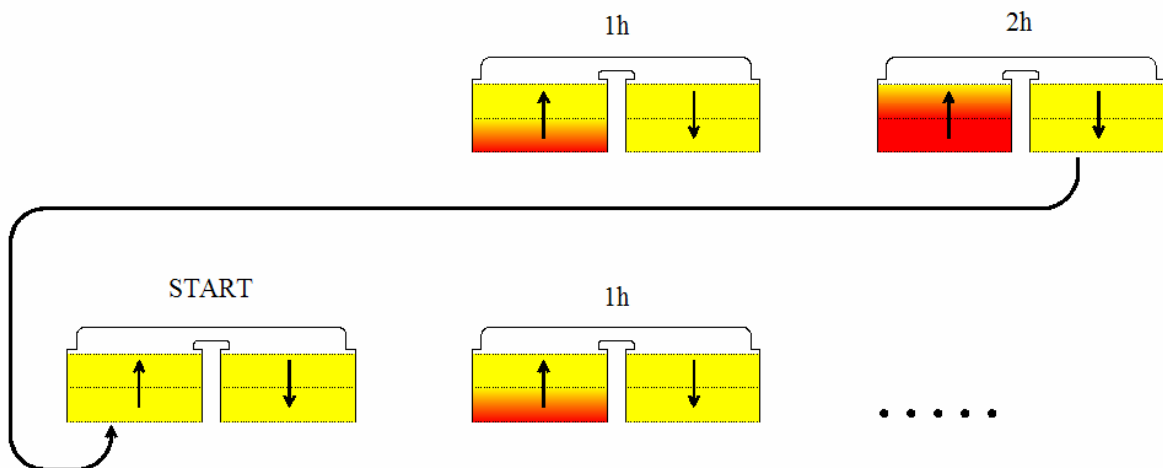
In practice the area where the gas flows into the scrubber will be the first part to be saturated. The other end of the scrubber will never be saturated, because the scrubber will be changed before it is completely used. You never know exactly how far the scrubber is used: all the time a large amount of unsaturated absorbent must be available as safety-margin for a sudden increased effort. So when changing scrubbers, you know that a large amount of unused absorbent is thrown away.



Drawing of scrubber saturation after a 1, 2 and 3 hour diving. Saturated scrubber: red, unsaturated scrubber: yellow.

The system of double serial canisters will improve the scrubber use, if and only if, the right changing procedure is followed. Start with two new fresh scrubber cassettes. Number one is placed in the upper scrubber cavity, above the exhale lung, number two below in the lower scrubber cavity (on the inhale lung). There are printed numbers on the cassettes to avoid mistakes.

After a certain amount of time, cassette number one is removed from the exhale lung and emptied. Cassette number two is placed on top on the exhale lung and the fresh number one cassette is placed at the bottom on the inhale lung. One can dive the same amount of time. And so the cycle goes on...



Drawing of scrubber saturation after one and two hours diving: after two hours the scrubber at the inhale lung is not saturated yet: there is always a substantial amount of unused scrubber available in case of extra CO₂ production (hard work). However the scrubber will be changed, because the scrubber on the exhale lung is nearly exhausted: so now nearly no unused scrubber will be thrown away.

In summary: at every cycle half of the total amount of absorbent will be thrown away (the part that has been used most: the part on the exhale lung where the exhaled gas flows in first).

The least (or not yet) used scrubber will be placed in front of the breathing cycle: on the exhale lung where gas flows in first. This will completely scrub the exhaled gas from CO₂. In case there is any small amount of remaining CO₂ after the first cassette, it will be taken out by the second, fresh cassette.

In practice, the partial changing of the used absorbent, results in an increased absorbent-use time by at least 50%, without affecting the safety margins, compared with a single scrubber where the complete amount of absorbent is changed in one time.

If only the same total use-time of a single scrubber with the same amount of absorbent, is followed, the safety margins are increased considerably.

Example of recommended durations:

using sofnozyme 797 and water temperature < 15°C, a normal dive with a normal workload, maintaining the PPN2 lower than 4 bar: 120 minutes of dive time per cycle (1.35 kg scrubber), or 180 minutes of dive time, and then refilling both scrubbers (totals 2.7 kg).

This means: when the 'used' scrubber-time plus the planned dive-time are over 2 hours, execute one changing cycle. If the used and planned dive time together is more than 3 hours, refill both cassettes. (Maximum dive time in cold water on 2 fresh cassettes without changing cycle: 3 hours)

In order to execute the partial refilling of the absorbent series correctly, it is absolutely necessary to always know which cassette is in the top scrubber cavity in the rebreather, and what the used dive-time is for that cassette.

Use a special form or indicate it clearly in your diving logbook, or even on a sticker on the cassette or the inside of the cover!

Summary:

As scrubber performance is depending on the water temperature, we give different recommendations for cold and warm water.

When we refer to a 'cycle', this means that only one canister (the one that was on the exhale lung) is refilled with fresh sorb, and that canister is put in the lower position of the rebreather: on top of the oxygen sensors on the inhale lung.

So correct cycling is always done like this: remove the top canister (the one on the exhale lung, on top of the orifice and ADV), and empty that canister. Take the remaining canister out of the lower position, and put it in the top position, on the exhale lung. Refill the empty canister and put it in the lower position, on top of the oxygen sensors. **ALWAYS MARK YOUR CANISTERS AND write DOWN IN WHAT POSITION THEY ARE PUT!**

Sofnolime 797:

rEvo with standard axial scrubbers:

water temp > 4°C: one cycle every 2 hours, or refilling both canisters after 3 hours

water temp >15°C: one cycle every 3 hours, or refilling both canisters after 4.5 hours

rEvo with optional radial scrubbers:

water temp > 4°C: one cycle every 3 hours, or refilling both canisters after 5 hours

water temp >15°C: one cycle every 4.5 hours, or refilling both canisters after 7 hours

Intersorb 812

rEvo with standard axial scrubbers:

water temp > 4°C: one cycle every 1 hour 45 min, or refilling both canisters after 2.5 hours

water temp >15°C: one cycle every 3 hours, or refilling both canisters after 4.5 hours

rEvo with optional radial scrubbers:

water temp > 4°C: one cycle every 2.5 hours, or refilling both canisters after 4 hours

water temp >15°C: one cycle every 4.5 hours, or refilling both canisters after 7 hours