



rEvo REVISTED

FEATURE **PATRICK VAN HOESERLANDE** PRODUCT PHOTOGRAPHY **rEvo**
UNDERWATER PHOTOGRAPHY **SUSANNE SCHMIDT**

Quality, safety, and robustness comes first, and nothing less!





ABOVE: Breathing can be simulated on the Ansti machine and all kinds of R&D tests can be performed. **TOP RIGHT:** Devices ready to be delivered to future rebreather divers. **BOTTOM RIGHT:** BOV 6 – The rEvo BOV (Bail Out Valve).

Over a year ago, I enjoyed the British documentary series, 'A Night on Earth' on Netflix. In it, the nocturnal lives of animals are followed with light-sensitive cameras, and above all, with a lot of patience. Nature documentaries are high on my list for sole TV nights, especially those about underwater fauna and flora. This series from 2020 is extra special because it tells a story that few have seen. In the episode 'Dark Seas', the camera crew dive at a remote, exotic reef to film mating rituals under a full moon. Suddenly, their brand of rebreathers caught my eye: rEvo. It's not an unknown manufacturer to me, but it's been a while since my last visit with this brand.

Twelve years ago, I wrote an article on homemade rebreathers with a special focus on the build of the first rEvo by Paul Raymaekers. That was followed some seven years later with an interview. I ended that article on a positive note about rebreather diving and rEvo. Curious about the future of this top Belgian product, I wondered if I would ever return for another interview. So, 11 years later, I discovered via Netflix that the little company is still at the top of the rebreather market. It's no surprise a professional camera crew would choose the best equipment available, especially for filming

a moment that only happens once a year. I sent a new e-mail requesting an interview following this, and I received a very prompt and positive reply.

Fortunately, the days of obligatory virtual interviews are over, and one late afternoon, I stepped out of the car, back in front of the building in Bruges where rEvo is homed. I had expected a large neon sign with a clear reference to their recent successes advertising something in the style of a diver and the word 'rEvo'. Nothing could be further from the truth, it was just a subtle billboard indicating rEvo's existence. The large, grey studio with 'Raytech' on it looked familiar. I stepped inside as if I knew it. When I asked for Pieter, a friendly employee directed me to an annex.

Stepping into that building, I immediately knew I was in the right place. The birthplace of Belgian rebreathers had not changed much, but for a few things here and there. It looked just how I remembered it. The company had grown as more people on the shop floor spontaneously greeted me. There are currently five full-time members working in the production area. There is even room for a few more, but even in this industry, it is proving difficult to find new employees. Together, they assemble a few

a day. Besides the production of rebreathers, their maintenance also takes place in this room, and a major overhaul is done every five years to ensure their safe operation.

I was escorted to the office and test room, the innovation centre of this company, so to speak. With a cup of coffee in front of me, we started the interview, with Pieter, Matthias and Bram alternatively taking place. Although all three have a very thorough knowledge of the device and its production processes, their passions for certain aspects complement each other. Sometimes they challenged my knowledge of diving. Little by little, I got a clearer picture of what was happening here.

Since 2012, rEvo has outgrown the early days of the 'do-it-yourself' approach. Quality norms and standards have reassured the market that rebreather diving is no longer an eccentric activity. MARES had also observed this and so they wanted to complement the dwindling sports equipment market with more technical products in their gamma. The idea was to counterbalance sport hopping by offering more opportunities to progress. Their eye fell on rEvo because they offered a unique apparatus with proven design capabilities. MARES wanted to market its





OPPOSITE PAGE TOP L-R: Breathing loop with ppO₂ monitor and HUD; DSV loop 2 – The rEvo DSV (Diver-Surface valve); MAV 3 – The MAV (Manual addition valve) allows the diver to add the desired gas into the counter lungs of the rEvo.

own 'recreational' rebreather but lacked the necessary development expertise. Its testing capacity was also an added advantage and, of course, its knowledge of the standards.

To stay innovative as a company, you occasionally have to push your boundaries and start colouring outside your current pattern of thinking. It is therefore no coincidence that in 2015, around about the same time as MARES was surveying the market, the idea of developing a new type of rebreather gained a foothold at rEvo. This travel-friendly model should represent a sort of intermediate step from recreational to technical diving, at about a third of the price of a rEvo. There was also a need to build a global network to sell and support the successful, extended closed circuit rebreather (CCR) market.

On the 1st of July 2016, the acquisition of rEvo by the brand MARES was announced worldwide. The two had found each other: rEvo could rely on MARES' network and the first brought in the expertise to develop a recreational rebreather. The production of certain components (harness, wing, breathing hoses, regulators, etc) was shifted from external suppliers to the MARES group. This collaboration also led to the production of a semi-closed circuit rebreather (SCR), the Horizon SCR Rebreather. An article on the difference between the Horizon SCR and the CCR rEvo will appear later.

Unlike the rEvo, which is controlled by a Canadian-built Shearwater computer, the

Horizon uses a MARES-built 'controller'. Officially, the design phase started in early 2016 and development led to the first prototype in 2018. The model received the CE mark at the end of 2019. From then on, the Horizon could be commercialised within the EU.

Development of the rEvo is not standing still either, although there are currently no concrete plans to release a rEvo 4. Nevertheless, they are busy experimenting and testing and monitor innovations in the market to collect ideas for further development. In addition, they continue to work with the platform of the rEvo 3. Indeed, the rebreather is modular, allowing for continuous modifications and improvement of modules without the need to design an entirely new device. The company's philosophy eschews selling cosmetic modifications as a new model. Quality, safety, and robustness comes first, and nothing less. Unlike other manufacturers, a new colour or casing does not mean a new model.

The high safety of both SCR and CCR is the result of the combination of a deliberate design-out with a layered safety strategy. The design-out approach ensures that no mistakes can be made during production and maintenance. The company philosophy of keeping the preparation of the device before and the care after a dive simply for the user, plays an important role in this. The diver operates the unit knowledgeably and, in terms of electronics, there is full redundancy.

Various alarms inform the diver of risky states that require intervention. To respond properly

to these, you have the pillar of 'educate in'. This means that before you are allowed to dive with a rEvo, you must have at least taken rEvo's curriculum. These courses are offered by a world-renowned instructor network. Applying simplicity in the design does not mean that diving with the rEvo is easy, it remains a highly technical device. The duration of the course depends on the depth you want to reach. The basic course lasts 5 days and includes modules in which you learn how the rebreather works, how to maintain it, how to run through the checklist before and after the dive, and how to react in different conditions during a minimum of 480 minutes of training in the water.

As an open-circuit diver, I can only listen with fascination to these specialists' explanations. The level of technicality sometimes goes beyond the story I am writing now, but it fascinates me. Diving with the rEvo must be challenging. The amount of info to digest must be overwhelming. For example, you are presented with the partial pressure of oxygen from the three sensors, what do you do if they are all different? What if they differ from the value on your backup monitor? Isn't there a danger of 'task overload'? That is clearly a question that one can only answer when diving with it (after proper training).

I also wonder what a 'recreational' rebreather will look like. Especially when I study the rEvo in front of me. How can you make something like this simpler and still ensure safety? Are you also curious about this manufacturer's recreational rebreather? More on this in my next article.



THE EVOLUTION OF THE REVO REBREATHER

- **rEvo Alfa (2003):** the first rebreather built as a test model, mainly from the conversion of existing rebreathers such as the Dräger Ray.
- **rEvo Beta:** this is the original DIY test model of which only five were built to test them for 18 months. The model has too few 'water inlets' in the housing, but still incorporates several concepts, such as the double scrubber; which are still part of rEvo's DNA. Of the rEvo Beta, there are still a few functioning models maintained regularly. The development of the Alfa and Beta brought the necessary knowledge and insights to arrive at today's comfortable, well-functioning rebreather.
- **rEvo 2 (2007):** an improved, commercial version of which 200 were built for the US market. At that time, rebreathers in Europe were rare.
- **rEvo 3 (2009):** the current model with improvements in design and breathing comfort. This model achieved the CE certification.
- **Micro-rEvo (2011):** a lighter, smaller version of the standard rEvo 3 with the same breathing comfort but more travel-friendly.
- **DiveCan/ rMs (2012):** the 'rEvo Monitoring System' monitors the functioning of the breathing lime and provides an estimate of the remaining scrubber time. This unique concept is optional.
- **rEvo MilSpec (2014):** Development of a MilSpec (Military Specifications) version that meets the requirements for military use.
- **rEvo BOV (2019):** The 'Bail Out Valve', a valve on the mouthpiece that allows for quickly switching to the emergency air supply.