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# Mares MR22 Abyss Regulator

*An excellent instrument with a stiff hose*

I've used Mares regulators since the early 1970s. I've always liked their simple, no-nonsense design and rugged resistance to abuse. The company has been a pleasure to deal with, too.

The MR12-II and MR12-III were the first regulators to incorporate a second-stage bypass tube that channeled air directly to a point just shy of the mouth-piece, rather than pumping it into the main cavity of the second stage. It was a major advance in regulator design, permitting high maximum-flow rates while remaining remarkably stable.

The MR12-III, which was adopted by scores of military units all over the world, gradually gave way to the MR12-IV and MR12-V, which had essentially the same stability and breathing characteristics but were made of less expensive materials. I've never felt much of a breathing difference among them. All shared the same basic first stage.

## **Gotta Go Deeper, Gotta Stay Longer**

The Navy Experimental Dive Unit's tests emphasize high flow rates at depth (see *In Depth*, August 1995). This, along with the usual competition in the market, provided the impetus for Mares to redesign its regulators. The internal diameters of components in the first and second stages (ports, orifices, hose connectors, and hoses) were increased, and the shapes of many other components were improved to reduce resistance to moving gas.

The "new" series included the Navy, followed by the Voltrex and now by the Abyss. Maximum flow rates were boosted in each of these designs without altering the second-stage design very much. The Navy retained the plastic second stage of the MR12-V, but the Voltrex and Abyss were built retro-style out of chromed brass like the III.

According to the reports that Mares USA's Mark Layton sent me, the Mares Navy passed the equivalent of the NEDU tests for Class A but was never actually tested by NEDU. The Voltrex was designed to meet NEDU's new, extended performance goal. It was tested by NEDU in September 1993 and did make it onto the "Approved for Navy Use" list.

NEDU hasn't evaluated an Abyss yet, though Mares's own Reimers-type breathing loop tests indicate that it outperforms the Voltrex.

The Abyss uses the same second stage as the Voltrex, and an entirely new first stage, the MR22. It's short, squat, and, like all other Mares regulators, has no swivel for LP hoses.

## **Field Tests in Paradise**

Four experienced divers (over 3,000 dives collectively) each used the Abyss for at least a day. One of the divers routinely dives an MR12-III; another relied on an MR12-III for many years, then swapped it out for a Micra in 1992; another has done most of his diving using a Sherwood

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Longtime *In Depth* readers have gotten used to seeing comparisons of cracking pressure in regulator reviews. Cracking pressure is the amount of initial resistance you feel when you inhale before the inlet valve opens, permitting air to flow through the hose, and vice versa for exhalation. It's what you might notice the most if you were comparing regulators in a dive-store showroom.

## ***Reviewer Cracks Under Pressure***

While cracking pressure does provide a fair index of how a light regulator might feel when you're sipping air, it doesn't tell you much about breathing effort when you're huffing and puffing. These days, nearly all regulators have low cracking pressures, and comparing them just overemphasizes the importance of the measurement. Consequently, we're dumping those familiar bar graphs.

By the way, Mares designs have never been known for extremely low cracking pressures. Mares engineers have told me that they consider stability to be much more important than initial breathing resistance, and that by maintaining higher cracking pressures they reduce the tendency for freeflow as well as the need for frequent tuneups.

D. M.

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Maximus with an underarm hose but has used many other regulators along the way; and I generally use a different regulator on every trip, since I'm usually test-diving gear for *In Depth*. Test depths ranged down to about 150 feet.

The air flow from the Abyss was smooth and linear without stuttering or flutter on gentle inhalation. It handled hard inhalation gracefully, supplying plenty of air immediately without gushing or force-feeding. It was stable and dry in all positions, even in turbulent water. I faced into and away from a current well over two knots while holding onto the anchor line, and the Abyss did not free-flow. The deeper we took

it, the easier it got to breathe. I was unable to overbreathe it at 145 feet. One of the other testers commented that he felt some resistance on hard inhalation below 130 feet, but that it was minor. The diver who routinely uses an MR12-III said that the two regulators felt almost the same, which is a tribute to the consistency of Mares designers.

### **Them Ol' Hard-Hose Blues**

However, this regulator needs a swivel or a different hose setup, in my opinion. The hose is fatter, and its intermediate pressure higher, than in other Mares regulators. As a result, it's less flexible. Despite its sweet breath-

ing, all four testers voluntarily switched from the Abyss back to other regulators for the remainder of the trip because of the stiffness of its hose.

Every time I turned my head to the right, the hose pushed the second stage out of my lips unless I clenched my teeth on the mouthpiece. I could achieve a neutral, front-and-center position by fiddling with the regulator position before a dive (rotating the regulator on the tank valve, changing the height of the tank in the BC, and rotating the tank), but the hose still restricted my head movement. I found myself turning my whole body, rather than my neck, to look to either side. Other divers may not find the hose a problem, especially for dive series that aren't as long as ours were (typically eight hours per day in the water).

### **The Bottom Line**

The Mares MR22 Abyss should exceed the breathing requirements of any recreational diver and will probably suffice for many technical, research, and commercial divers at extreme depths as well. Its air flow is stable, smooth, and responsive, and the basic design is simple, straightforward, and reliable. Mares has a reputation for integrity as a first-rate company with outstanding technical service and a solid warranty.

From a comfort standpoint, if you're thinking of buying an Abyss, I encourage you to borrow or rent one first to see if the hose bothers you, or at least spend an hour in the pool with one — a good idea before buying any piece of diving equipment.

Retail price: \$559

Street price: around \$500

Delmar Mesa

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## **Mix-and-Match Hose Puzzles**

The Abyss LP hose won't fit on any other Mares first stage, or probably any other regulator. This is becoming the case with more and more regulators. Hoses used to come in just one size, and divers were expected to look at their regulators and figure out which hole was for the HP hose (it was marked "HP") and which ones (not marked "HP") were for second stages, inflators, etc. This must have been too complicated for some people to manage (Is this the one? Yeah . . . BANG! Aaiiee!!), so manufacturers started making two sizes of ports and connectors (HP vs. LP).

Unfortunately, the manufacturers seem to have gotten their sizes backwards. LP hoses, which need to have a high flow rate to supply breathing air and inflate BCs, were assigned smaller-diameter ports. HP hoses, which don't need a significant flow rate at all, were enlarged. The two sizes then served as de facto standards for over ten years.

A few years ago, when regulator manufacturers began to redesign for higher flow rates, an aspect considered ripe for improvement was LP hose diameter. LP hoses and ports became even larger than the usual HP ports, and they're still being enlarged, but there's no industry-wide agreement on port dimensions. This process has resulted in proprietary sizes and matched first and second stages that can't be swapped among brands or even among models of the same brand. Even serial numbers on first and second stages are starting to be paired.

Of course, real regulator repairmen may tell you not to swap second stages among first stages in the field because of differences in intermediate pressure, but in practice it's done all the time. Most regulators have similar intermediate pressures (135–145 psi) and swapping second stages in a pinch doesn't usually cause any problems other than minor free-flow or slightly stiffer breathing, both of which can often be cured in a few minutes by minor readjustment. Still, if the hose threads don't match, you can't mix 'em up. You'll just have to buy two complete regulators to ensure redundancy.

D. M.