

SDM SPECIAL SERIES ON REGULATORS



U.S. DIVERS Conshelf 30

TEXT AND PHOTOGRAPHY BY GEORGE COZENS

The U.S. Divers Conshelf 30 is the most recent addition to a very long line of Conshelf regulators: A series which dates back to the mid-1960s in name and back to the mid-1950s in design. The high model number is indicative of the many changes this series has undergone. The biggest difference between the Conshelf 30 and its closest cousin, the Conshelf XIV, is the first stage. Except for some cosmetic differences, the Conshelf 30 uses, essentially, a Royal Aqu-Lung first stage.

This first stage is based on a balanced diaphragm design—a design that USD believes is less susceptible to friction, wear and the environmental effects of salt, sand and other contaminants, than a piston design. The flexible, fiber reinforced, rubber diaphragm serves as a barrier, keeping saltwater and other matter away from the critical parts of the stage. Under most diving conditions, this design, generally, provides enough protection for the first stage. But for extreme

conditions, such as diving in very cold water, an environmentally protected version, called the Supreme, is available. (Its ambient pressure cavity is filled with silicone oil.) The body of the first stage is quite compact, but heavy. It is machined from solid brass and given a satin chrome finish. Its unique shape allows for reduced size and a 45 degree angling of the high and low pressure ports, which results in less hose kinking and strain at the first stage connections and a straighter path for the air as it flows through the stage. This straighter path, as the air flows through the stage and into the second stage hose, means less resistance and more flow capacity: A capacity USD says exceeds 1,850 liters per minute.

If the high capacity of the first stage is restricted by the low pressure hose and/or connections, the net gain at the second stage is nothing. So, USD provided this first stage with four, gigantic, half inch diameter low pressure ports (compared to three-eighths inch diameter ports

found on typical first stages). Complementing these larger ports is a low pressure hose that has about twice the internal area of other LP hoses: It can handle about twice the flow of air of others. In addition, the greater internal volume of this second stage hose serves as a reservoir, holding about twice the normal amount of intermediate pressure air immediately available to the second stage, without having to turn on the first stage. This results in a lower initial inhalation effort. For attaching low pressure accessories with the more common $\frac{3}{8}$ inch fittings, the Conshelf 30 comes with two one-half to three-eighths inch hose adapters. The single high pressure port is $\frac{7}{16}$ inch in diameter, to prevent anyone from attaching a low pressure hose to it.

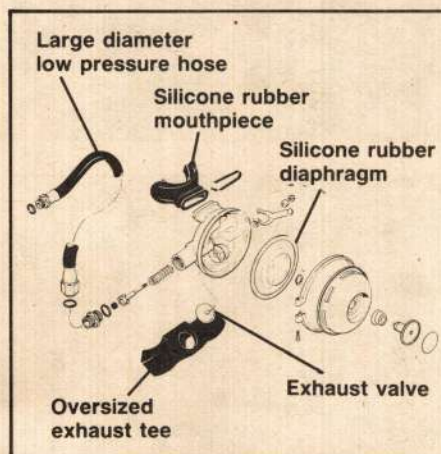
A standard feature on the first stage is the forged brass, satin chrome plated, swivel yoke, rated at 3,000 psi. It is fitted with a large plastic-knobbed yoke screw and an O-ring sealed dust cap.

Except for a few modifications, the sec-

ond stages of the Conshelf 30 and XIV are identical. Both utilize a venturi assisted, downstream demand valve design. The venturi effect created by the flow of air through the second stage helps to reduce the inhalation resistance, and therefore, improve performance. The downstream demand valve, which opens in the direction of flow, and upon demand (i.e., inhalation), acts as a safety valve, venting off any overpressure in the low pressure hose caused by a malfunction in the first

tor after diving, preferably by soaking in warm water with the first stage still attached to a scuba cylinder and with the air turned on. If this method is too difficult, or not possible, a warm water soak is still recommended, but with the dust cap firmly sealed against the HP inlet port. In the latter case, care should be taken not to depress the purge button, as water will likely enter the regulator and cause internal problems. Annual professional service by an authorized Aqua-Lung service

were the inhalations, from slight to normal volumes. At gross inhalations the resistance of the Conshelf 30 increased somewhat: But, it still provided all the air I could use (I couldn't out-breathe it), although it took a little more effort. Returning to the anchor line, I hung off at ten feet for a few minutes. Decompression wasn't required, but it provided additional safety and gave me a chance to experience the Conshelf's performance at shallow depth—still no problems were encoun-



From left: Diagram of Conshelf 30 second stage; first stage; second stage, assembled. The first stage has one 7/16 inch diameter high pressure port and four 1/2 inch diameter low pressure ports. All ports are angled down 45 degrees. The second stage has an oversized exhaust valve and tee, silicone rubber mouthpiece and diaphragm, and a brass case with a polyester powder coat on the front.

stage. The back of the case, called the box bottom, is formed of brass, with a satin chrome plating. The front of the case, called the box top, functions as the diaphragm cover, and is also formed in brass, but with a black polyester powder coat. A clamping ring, of satin chrome plated brass, holds the box bottom and top together and is secured with a stainless steel screw. For improved sensitivity and performance, increased resistance to ozone and chlorine deterioration and greater longevity, silicone rubber is used in the diaphragm, exhaust valve and mouthpiece. The exhaust port and the natural rubber exhaust tee are oversized to reduce exhalation effort. In the center of the box top is the plastic, spring-loaded, flush-mounted purge button. It is of reasonable size and can be easily depressed even while wearing thick gloves.

With its conventional design and corrosion resistant materials, the Conshelf 30 requires no special maintenance. U.S. Divers does suggest cleaning the regula-

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dealer is not just recommended, but required to keep the original owner, limited lifetime warranty valid. The cost of this service might run a little over \$20 for replacement parts in a standard overhaul, with, perhaps, a like amount for labor. With my first breath from this new Conshelf 30 I felt this was going to be a pleasant dive. Descending to the bottom, at about 70 feet, I made a quick comparison with the reference regulator. This regulator (one of the same types that made the high performance group in the U.S. Navy Experimental Diving Unit test of scuba regulators in 1979) and the Conshelf 30 were attached to the same cylinder by means of a Y valve. The Conshelf 30 still performed quite well. I then followed a compass course out to sea, until I reached a depth of about 105 feet. Here I made additional evaluations, this time varying my inhalations and exhalations from very slight to much exaggerated. Throughout the range, the exhalations of both were pretty closely matched. So

tered. During two other dives, at depths from 10 to 40 feet, the Conshelf was checked in all of my usual, contorted orientations. It performed well; free of any problems and idiosyncrasies. And, it did not leak any water. Freeflowing was not unusual: If it started, simply tilting the mouthpiece down stopped it. The longish exhaust tee did a good job of directing the exhaust bubbles away from view. A few bubbles did rise within the field of vision, but these disappeared when I looked down slightly. At first, the high ridge on the exhaust tee seemed to tangle with my lower lip. I found, however, that by taking the mouthpiece more deeply into my mouth, the mouthpiece and the tee fit much more comfortably.

All in all, the Conshelf 30 performed very well. This fine performance, in addition to its strong, basic design, solid construction, easy maintenance and reasonable retail price of \$275, should draw the U.S. Divers Conshelf 30 to the attention of many prospective buyers. >