

The Secret Weapon for Longer Bottom Time

New nitrox membrane systems improve diver productivity

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IN THE COMMERCIAL DIVING INDUSTRY,

we are always racing against time. All things being equal, it's a commonly accepted fact that whichever company can get the job done the fastest, without sacrificing safety, is generally going to be the most successful. Productivity is key and when a diver is working underwater, every minute counts.

If you have two commercial diving companies working side-by-side on a diving job at air diving depths with similar equipment and similarly experienced divers, how can a company increase its ability to perform work without compromising its divers? The simple answer is to use enriched air nitrox.

Like all businesses, the diving industry has become increasingly competitive and the pressure to be more productive in the same amount of time is constant. With nitrox you can utilize each diver's



time underwater so that more time is spent working and less time is devoted to decompression.

Nitrox is simply a mixture of nitrogen and oxygen that contains more oxygen, and less nitrogen, than standard air. By reducing the amount of nitrogen in the gas mixture, we can reduce the amount of nitrogen absorbed, shrinking the diver's decompression obligation for the time spent at any given depth.

Using nitrox gives the diving company a competitive edge that is easy to obtain and becomes particularly important when working in areas where there are short weather windows. In areas where there are extreme tidal flows, nitrox can also be a real time saver, allowing the divers to make the most out of the slack tide periods.

Although recreational and scientific divers use PO₂s (partial pressure of oxygen) as high as 1.6, for use on a prolonged commercial

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diving job, where the divers are diving day after day, a PO₂ of not more than 1.4 is considered the maximum allowable exposure. Most commercial diving companies that use nitrox on extended jobs are even more conservative and prefer not to use a mixture with a PO₂ “hotter” than 1.2 to help avoid problems with oxygen toxicity.

The most significant benefits of using nitrox occur in the 60-80 FSW depth range. For example, using a mix containing 40%

oxygen with a PO₂ of 1.13 at 60 feet provides an astounding 210 minutes of dive time with no required water stops, compared to a 60-minute allowable bottom time on air. That’s more than three times the normal no-decompression limit! According to Tim Beaver, CEO of Global Diving and Salvage, “Nitrox is the biggest thing to happen to the commercial diving industry since saturation diving!”

Even at a depth of 95 FSW, using a nitrox mixture that contains 36% oxygen provides 40 minutes of bottom time, compared to 25 minutes on the U.S. Navy Tables. When you can extend your no-decompression bottom time by 60% with no decompression penalty, that’s a significant savings in time and money!

In addition, although there have been no scientific studies to confirm it, anecdotal reports by many divers suggests that divers who use nitrox suffer less fatigue following a dive than when they make a similar dive using air. Also, since the diver is breathing a mixture that contains less nitrogen, the effects of narcosis are also probably decreased, although there have been no scientific studies to confirm this either. Of course, divers, supervisors, and rack operators must be properly trained to use nitrox efficiently and with proper safety precautions.

For many years, nitrox was not routinely used for most dives in the air diving range simply because it was not practical to transport the large volumes of gas needed, or safe to mix it offshore. When mistakes were made in calculating the mixing ratios and in physically mixing the gas, crews would end up with the wrong nitrox mixtures. Fortunately, those days are long past with the new nitrox systems available today that can automatically create the mixture you need simply by dialing in the percentage of oxygen you desire. These systems are simple to use and take all of the guesswork out of using nitrox in commercial diving.

Nuvair, a nitrox system manufacturer located in Oxnard, California, uses a unique semi-permeable membrane in their compressor units that filter the nitrogen molecules out of the air, leaving a mixture that is richer in oxygen. They have designed a number of different systems including turnkey low-pressure systems, as well as turnkey high-pressure systems. These high-pressure units can be used to charge gas racks, as well as fill bail-out systems, with any nitrox mixture containing up to 40% oxygen.

With Nuvair’s systems, there is no need to mix a cylinder of gas and then wait for 24 hours to ensure that there is no stratification of the gas in the cylinder. You can have the mixture you want right now. You want continuous feed low-pressure nitrox?

MILES OFFSHORE ATOP A PLATFORM IN THE GULF OF MEXICO, THE CREW IS SUDDENLY JOLTED...

YOW! THE PLATFORM IS FALLING APART!

ALL THE PLATFORMS ARE CRUMBLING!

SOMETHING'S EATEN THEM AWAY!

BUT WHAT WAS IT? WE NEVER SAW A THING!

BENEATH THE SURFACE, SOME RUSTY RANSACKERS ARE HARD AT WORK...

HAI WE'RE PERFECTLY INVISIBLE DOWN HERE! THEY'LL NEVER NOTICE US UNTIL IT'S TOO LATE!

CRUNCH CRUNCH

THIS TUBULAR MEMBER IS ABSOLUTELY DELICIOUS!

MEANWHILE, AT THE TOP-SECRET WORLDWIDE HEADQUARTERS OF DEEPWATER CORROSION...

THIS IS A JOB FOR DEXTER DEEPWATER AND THE POLATRAK CP GUN!

YAARGH! A POLATRAK CP PROBE!

AS I SUSPECTED! IT'S THE SCALIES!

WE'RE NO LONGER INVISIBLE!

THERE'LL BE NO MORE DAMAGE FROM YOU SAVAGERS OF STEEL!

HMM... NEEDS CATHODIC PROTECTION IMMEDIATELY!

Z-ZAP!

CURSES! WE'RE POWERLESS TO ATTACK THIS STRUCTURE FOR UP TO 25 YEARS!

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You need to fill a bank of storage bottles? You want to fill a bail-out bottle with nitrox? All of these tasks are possible with Nuvair nitrox systems.


Cal Dive in Australia has been using the Nuvair Voyager system in their offshore operations for some time now. The Voyager IV is a self-contained high-pressure nitrox system that can deliver air at up to 6000 p.s.i. and nitrox up to 3600 p.s.i. The system is unique in that besides including an oxygen analyzer alarm and shutdown, it also includes both carbon monoxide (CO) and carbon dioxide (CO₂) alarms and shutdowns. Of course, it also is equipped with high-pressure, high temperature, moisture, and low oil pressure shut downs, too. Other companies who are using nitrox systems include American Marine, Titan Salvage, Parker Diving, and CanPac Divers, to name a few.

Part of the beauty of using a membrane system of this type is that there is no need for oxygen cleaning when using gas mixtures containing up to and including 50% oxygen for dive operations conducted in the USA (OSHA, the Compressed Gas Association, and the ADCI allows the use of up to 50% oxygen without oxygen cleaning, special o-rings, or lubricants, standards in other parts of the world are more demanding). The new Voyager IV commercial system provides 100% oxygen compatible air, or nitrox, for use with oxygen clean equipment as per IMCA requirements. This unique capability is possible because the Voyager IV uses a special synthetic lubricant that is compatible with pure oxygen, although as a safety precaution the system is incapable of producing 100% O₂. Harbor Offshore Services, another commercial diving firm with offices in Ventura, Spokane, Seattle and Hawaii, also uses Nuvair systems.

The Hankinson low-pressure filtration system contains four filters with a 500-hour element life. Another unique feature is the built in CO₂ scrubber, which lowers the carbon dioxide in the compressed gas to less than 400 PPM, which meets the most stringent industry standards.

The Voyager is a completely self-contained unit that is ready to go once you put it down on the deck and make the required electrical connection. From there, the only other item to be connected is

your fill hose and you are ready to start pumping nitrox. The system has a small footprint that requires about 15 square feet of deck space. The package weighs just 1550 pounds.

For more information on the Nuvair Voyager IV and other Nuvair systems, visit the Nuvair website at www.nuvair.com. Email: info@nuvair.com. Tel 805-815-4044. FAX 805-815-4196. 2949 West 5th Street, Oxnard, CA 93030, USA. 

About the author

Steven M. Barsky is a former commercial diver who worked as a saturation diver in the North Sea and Gulf of Mexico for SubSea International. Following his offshore time, he worked for Kirby Morgan and Viking America. He currently operates his consulting business, Marine Marketing & Consulting in Ventura, California. Contact Steve through his website at www.marinemkt.com.



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