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Critical Thinking in Selecting a Dry Suit System

by
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As divers in today's world, it's not enough to say, "I have a dry suit and a helmet. I'm prepared to dive in any environment." There are too many variables and unknowns to simply grab your gear and jump into the water. Even under the best of circumstances, there may be hidden dangers lurking below the surface of the water.

In many underwater environments today it's no longer a question of whether there are contaminants present or not, but what contaminants lie in wait for the unsuspecting diver and what concentrations of those contaminants are there. If you dive in harbors, rivers, lakes, streams, drainage canals, or ship channels, you must assume that the water is contaminated with either biological or chemical pollutants, or both. If you dive anywhere along the coastal waters of the U.S., there is also a very strong chance that you may be exposed to unseen pollutants, especially any time after a heavy rain or when creeks or rivers are flowing into the sea nearby.

Some of the contaminants you may be exposed to if you are not wearing the proper protection may present a hazard only to yourself. However, there are a substantial number of chemicals and bio-hazards that can be transmitted to your tender or anyone that handles your equipment. There are also bio-hazards that are communicable that you can carry with you, exposing your family and friends.

In order to decide how to protect yourself properly you must evaluate all aspects of your diving system to ensure that they are compatible with the expected hazards. To get yourself in the proper frame of mind it's important to think in terms of a system, because any weak link in the system is a possible point of exposure for contaminants. It's not enough to have a dry suit

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that is made of a specific material that will withstand a particular chemical if the zipper, gloves, seams, or latex seals will fail during the course of a dive.

For diving in contaminated water it's not enough to merely don a set of gloves that will provide mechanical protection for your hands. You must isolate your hands from the environment, just as you do the rest of your body.

To connect a pair of gloves to a dry suit, the most practical method is to use a ring system that allows the glove to be easily replaced when it begins to show signs of wear. While there are many different types of ring systems on the market, be sure to carefully evaluate any systems you are considering. Although many systems will work well in the clean environment of a dive store or trade show, not all will perform when you're getting down and dirty in the mud and sand found at the bottom of most harbors, or when you're jetting down a pipeline.

The most reliable cuff ring systems are the simplest and require no more than an inner and outer ring. The inner ring fits inside the sleeve and provides rigidity, while the outer ring locks the sleeve against the inner ring and seals the cuff. From there it's a matter of selecting the glove with the chemical compatibility and mechanical durability to meet the needs of your dive.

There are a variety of chemically protective gloves that are available that will help to protect your hands from a many different substances and can be mated to the cuff rings that are available for Viking's suits. For example, gloves made from "solid" neoprene (not foam neoprene as used in wetsuits), will withstand 57 minutes of exposure to Hexane before "breakthrough" occurs, i.e., when the chemical can be detected at the molecular level inside the glove. Conversely, a glove made of butyl rubber will only withstand 4 minutes of exposure to Hexane prior to breakthrough.

When you evaluate a dry suit you must also consider the material that the suit is made from, the seam construction materials, and any exposed latex that is found in the suit. Each one of these components may have a different level of chemical resistance, depending on who manufactured the suit, the manufacturing techniques, and the materials used in the construction of the suit. Chemical resistance must be further defined in terms of the length of exposure and the concentration of the chemical.

Suppose you were called upon to assist with the salvage of an airplane that was leaking JP4 (jet fuel). While a Viking suit will suffer only a "minor effect" when exposed to jet fuel, the seams of the suit will suffer a "moderate effect." The breakthrough time for JP4 is 45 minutes for divers using a heavy-duty suit, but there is no test data for latex parts. Should you accept the risk this dive might present?

As biological agents become a greater concern for everyone, you'll want to ensure that your dry suit has been properly tested to ensure resistance to biological agents. If you're diving in waters that may contain viruses such as hepatitis, proper protection is essential.

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It's also important to keep in mind that it is relatively easy to decontaminate a vulcanized rubber dry suit, but that suits with an exterior nylon coating may harbor contaminants for days after the dive. Tests by NOAA and the EPA have shown that even after proper decontamination, a dry suit with a nylon exterior will usually still test positive for contaminants despite the use of recommended decon procedures.

Always keep in mind that when manufacturers test their suits the tests are always conducted on brand new products that have never been exposed to sunlight, abrasion, or any other chemicals. Suits that have prior exposure to these elements may fail unexpectedly without warning.

Trelleborg-Viking has prepared the latest revision of their chemical database which contains complete information on the chemical and biological compatibility of their suits and accessories. It's available for free on CD-ROM, and is entitled, "*Diving in Contaminated Water, 3rd Edition: Chemical and Biological Tests of Viking Dry Suits and Accessories.*" The CD is available at no charge from any Viking dry suit dealer, or contact Viking directly at 800-344-4458 or via email at tvi.usa@trelleborg.com.

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Photo Captions



Photo #1: Divers must be properly equipped for diving in polluted water. (© Steven M. Barsky. All rights reserved.)

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Photo #2: Coastal waters may be highly polluted, especially after heavy rains. (© Steven M. Barsky. All rights reserved.)



Photo #3: Decontaminating vulcanized rubber dry suits is relatively easy, compared to suits with a nylon exterior. (© Steven M. Barsky. All rights reserved.)



Photo #4: Cuff rings for attaching dry gloves must be simple but reliable. Courtesy of Trelleborg-Viking.