EDDY CURRENT TESTING

Are you aware your tanks contain 1 million pounds of kinetic energy? Did you also know that “accidents” occur each year where tanks explode due to improper, or lack of visual inspections and hidden cracks that are invisible to the human eye?

Striving to create a safer diving industry, TL Sea Diving is one of only a handful of operators in Washington State, who carry the Visual Plus® System testing unit.

The Visual Plus® System is an eddy current testing unit for aluminum cylinders. This unit detects if a tank is at risk of explosion, based on hair-line cracks and other flaws you can’t see in the threaded neck area of your aluminum cylinder. We use this system any time we conduct a visual inspection of any tank not made of the 6061 alloy or over a specific age. In addition, we are PSI certified, which also makes us safer. Having untrained personnel conduct visual inspections is just asking for trouble and potential injury. We want more people to scuba dive, but to do it safely and responsibly.

There is no additional charge for this added testing, as we are determined to provide you with the most reliable cylinder inspection possible. This will keep us ahead of all DOT, OSHA and PSI standards and we hope others in the industry will follow our lead.

THE 6351 ALLOY CONTROVERSY

You may have encountered the local dive-shop saying they can’t fill your tanks and that you must purchase new ones….from them! This may not be entirely true! Fear and lack of training have forced divers to unnecessarily spend their money on new tanks when their old cylinders were just fine!

The following article explains why some dive-shops feel compelled to condemn your tanks, even though there’s no reason for it. Many divers complain they feel “ripped-off” by this practice. We agree! Should this happen to you, come to TL Sea before you spend your money unnecessarily and we will ensure your tank is safe. Just by a couple of tests performed in our Dive Center by our PSI Certified Technicians, we can determine whether or not your tank is safe. Maybe we can save you some money and give you peace of mind.
There have been a lot of horror stories about aluminum cylinders and a condition called “Sustained Load Cracking” or “SLC”. The rumors imply that SLC is a major problem with aluminum scuba cylinders and that it makes them dangerous to use. All high-pressure cylinders used in scuba, both steel and aluminum, can become dangerous if they are physically abused (i.e. dropped, dented or subjected to high heat as in a house fire). They can also become unsafe if they are overfilled to a working pressure above the manufacturer’s rating for that cylinder, or if they are improperly inspected at routine intervals required for both visual and hydrostatic tests. Some tanks aren’t even inspected at all! As both steel and aluminum cylinders have ruptured over the years, this is cause for concern.

When a cylinder ruptures, the investigation conducted by the Department of Transportation usually finds that one of the above abuses has occurred. Only 8 aluminum cylinders have ruptured world-wide since their introduction. This represents 0.3% of all cylinders made. The current stories deal with a particular aluminum cylinder made of an alloy known as 6351.

Alloy 6351 was used in making scuba cylinders & other types of pressure vessels as well as in the aerospace industry until 1988. The particular allow can, under certain conditions, develop slow growing cracks known as Sustained Load Cracking - “SLC”. It is not a manufacturing defect, but is characteristic of the metal. Physical abuse or routine overfilling of the cylinder can encourage the development of SLC.

Since the cracks require about 6 years to grow to the point where they can be dangerous, they can easily be detected by proper routine visual inspections and by routine “eddy current” testing, before they are a problem.

Eddy current tests (such as the Visual Plus® System) can “see” cracks in metals before the human eye can see them. The aerospace industry has been using this technique for years and continues to use it to make certain that the airplanes you fly on are safe.

Beginning in 1989, all new aluminum cylinders were made from a new alloy called 6061. Alloy 6061 replaced the older 6351 alloy and is not prone to SLC. You may have heard that new cylinders were developing SLC and were being replaced, too. Actually, as “eddy current” testing was being introduced, inexperienced technicians were mistakenly rejecting cylinders based on the test based on their improper evaluation of the cylinder’s test results. Manufacturers replaced a limited number of these tanks so they could perform tests to determine why they were being returned. The tests show absolutely no SLC in the
6061 tanks. This prompted the industry to provide better training to eddy current test technicians to make their tests more accurate.

SAFETY GUIDELINES

To ensure your confidence in the safety of your scuba cylinders, steel or aluminum, simply follow these guidelines:

- Have your scuba cylinders **visually and hydrostatically tested** at the required intervals, 1 year and 5 year respectively.

- Make sure that the person who visually inspects your cylinder is **properly trained**. Currently, the Professional Scuba Inspector (PSI) Visual Inspection Protocol is the recognized industry standard. Ask to see the Inspector's certificate of training and ask for your copy of the inspection report when you pick up your inspected cylinder.

- Make sure that the inspector does an **“eddy current” test** on the cylinder (aluminum only - steel does not require them) each time a visual inspection is performed.

- **Do not abuse your cylinders**. Do not drop them and do not expose them to high heat. Do not use them if you suspect that they have been physically damaged and have a trained professional inspect the tanks and conduct any required testing.

- **Do not overfill your cylinders** or allow anyone else to overfill them expecting them to "cool down" to the working pressure. **Proper slow filling** of the cylinder between 300 - 600 psi per minute will minimize the heating of the cylinder and the change in pressure as the cylinder cools. The pressure change on cooling is normal and should be expected. Please don't ask the Dive Center operator to overfill the cylinder to compensate and please be patient while they take time to fill your tank properly and safely.

Your safety while enjoying diving is our primary concern. We hope this information answers your questions about the stories you may have heard. If you have any further questions, please feel free to contact us at the Dive Center. We will do our best to keep you informed!