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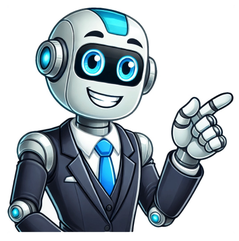

Dive tank hydrostatic test

Only those of us who own a scuba tank know how emotionally attached we can get to this piece of equipment over time. But is the superficial attachment enough? Not really. The best way to prove your affection and respect for your metallic dive buddy is to take good care of it. Proper maintenance and inspection of your scuba cylinder are essential to it continue to reciprocate your love by providing safety and assurance underwater. In this article, I have crafted the perfect guide on how often you need your scuba tanks inspected and provide some bonus tips on scuba tank maintenance. Periodic inspection of scuba tanks is of utmost importance to ensure they are safe for use. Over time, scuba cylinders can develop cracks, rust, material thinning, or other defects that can compromise their integrity. Neglecting your scuba tank means putting yourself in danger. You don’t want your dive tank to fail on you while you’re underwater. In addition, periodic inspections are required by law in most countries and by certification agencies such as PADI and NAUI. Take for example, in the United States, an annual visual inspection is not required by the USA DOT, though they do require a hydrostatic test every five years while in the EU, countries require a visual inspection is required every 2.5 years, and a hydrostatic test every five years. This should give you an idea about the importance of scuba tank inspection. Dive tank inspection is classified into two main categories: visual inspection(VIP) and hydrostatic testing/pressurized testing. They both serve slightly different purposes but are ultimately essential to keeping your scuba tank safe and sound. Visual cylinder inspection (VCI) involves a qualified technician examining the cylinder for cracks, corrosion, and other defects. The technicians also check the valve of your tank during visual inspection. During Valve testing, the valve is removed from the tank, inspected for any signs of wear or damage, and tested to ensure that it opens and closes properly and does not leak. If the cylinder passes the visual inspection, it will be stamped with the current year and month to indicate it is safe for use. The frequency of inspection varies depending on the country and certification agency, but the general recommendation is to have a visual inspection of your dive tank conducted at least once a year or more frequently if you’re a regular saltwater diver. For instance, PADI requires that your cylinders undergo a visual inspection at least once every year. If your cylinder has been subjected to unusual stress or structural damage caused by dropping, corrosion or incorrectly painting your tank get it visually inspected ASAP, regardless of the last inspection date. The cost of a scuba cylinder visual inspection varies depending on the location and the technician performing the inspection. On average, you can expect to pay between $20 and $40 for a visual inspection. Some dive shops or certification agencies may offer discounted rates for multiple inspections or bundle visual inspections with other services, such as valve or hydrostatic testing. If you wish to dig deeper regarding VCI check out our Visual Inspection Checklist for tank inspectors and divers. Hydrostatic testing is a more in-depth inspection that involves pressurizing the cylinder to test its structural integrity. The rule of thumb is, that you must get your scuba tanks hydrostatically tested every five years at the very minimum. This applies to most aluminum tanks, which are commonly used for recreational diving. After the cylinder passes the hydrostatic test, it gets stamped with the current year and month indicating it is safe for use for the next few years. The cost of a hydrostatic inspection for a scuba tank can vary depending on your location, and the service provider as well as any additional services, such as valve maintenance or cleaning. On average, you can expect to pay between $50 and $70 for a hydrostatic test. Scuba cylinders should be tested at their maximum working pressure. For most scuba cylinders, this pressure is between 3000-3500 PSI. During the hydrostatic test, the cylinder will be pressurized to a minimum of 5/3 of its maximum working pressure, or approximately 5000 PSI, to ensure it is structurally sound and can take a beating beyond its capacity if necessary. Scuba cylinder inspections and tests should only be performed by qualified professionals. Most dive shops generally have certified technicians who can perform visual inspections. If you’re from the USA, my suggestion would be to find the closest DOT (Department of Transportation) approved hydrostatic testing facility. You can use the official Retester Location Portal of DOT for this purpose. You can also find certified cylinder inspectors through organizations such as the Professional Association of Diving Instructors (PADI) or the National Association of Underwater Instructors (NAUI). Get your goddamn rusty tanks tumbled – you’ve probably heard this before if you own a bulky steel tank. Tumbling is technically part of your steel scuba tank maintenance process where the inside of the cylinder is cleaned and polished to remove any rust or debris. It is effective in maintaining the lifespan and structural integrity of your dive tank. Tumbling can be done as part of routine maintenance or before a visual inspection to remove any corrosive spots inside the tank that can compromise its structural integrity. Or you can do tank tumbling all by yourself using a whip or any abrasive medium. Our detailed guide on tumbling your scuba tanks at home might be useful if you want to take your tumbling game to the next level. Tumbling is not required frequently but if you wish to make your scuba tanks last longer getting your tanks soft-tumbled at least once every year is the least you can do. While it is essential to have your scuba cylinder inspected and tested by a professional, there are some things you can do to help maintain the cylinder by yourself between inspections to keep your tank in tip-top shape: Salt and metal never go hand in hand. So make sure to always rinse your scuba tank with fresh water after every dive to remove any salt or other debris that may have accumulated on the outside of the cylinder. You can be less strict with post-dive maintenance if you’re a freshwater diver. It is also important to dry the tank thoroughly before storing it. You can use a clean, dry towel or air compressor to remove any moisture inside the tank. You should also store your cylinder in a dry, cool place away from direct sunlight, which can help prevent rust and other forms of corrosion. The next thing is to check the neck of your tank, valve, and regulator (both first stage and second stage) periodically to ensure they are functioning properly. If you notice any signs of damage or wear, such as a crack in the neck or hissing air, have them repaired or replaced immediately. Since the valve controls your airflow from the cylinder to your lungs, you would do well to keep the thread clean and properly maintained between dives. You should be mindful of never exceeding the maximum fill pressure of your scuba cylinder. Needless to say, overfilling it can cause your scuba tank to explode (although very unlikely), and it won’t be a pleasant sight. Use only a certified scuba tank refill station that has properly calibrated equipment. Always check the tank’s pressure gauge before and after filling to ensure that it is not over-pressurized. Despite all the care and inspection, like everything else in life, your scuba tank too will eventually reach its retirement age. If your scuba tank fails any of the inspection tests, it’s a tell-tale sign that it’s time for you to bid farewell to your beloved tank for the sake of your safety. Don’t get disheartened. Your scuba tank still isn’t finished. There’s a wide variety of uses for your old scuba tanks as discussed in our guide. It’s your tank; the better you take care of it the longer it will be of reliable service to you. A lot of divers try to avoid proper inspection of their cylinders to save a few bucks but they don’t understand the life risk they’re undertaking by not doing so. A failing scuba tank while underwater can be detrimental. Regular visual inspections and hydrostatic tests can help detect any defects or issues before they become a problem. Additionally, following basic maintenance tips and guidelines can help prolong the life of your cylinder and keep you safe while diving. Scuba tanks require an annual Visual Inspection, which encompasses a thorough check, air fill, and O-Ring replacement. Our certified tank technicians inspect your tank to ensure it meets Technical Diving International (TDI), Pressure Systems International (PSI), Compressed Gas Association (CGA), and Occupational Safety and Health Administration (OSHA) standards. Bolt Kit Delrin Speed Nuts Skip to content Although cylinder failures are rare, the effects can be catastrophic. Photo by Stephen Frink After cylinders first enter service, an annual visual inspection and a five-year hydrostatic test are required. These requirements include cylinders used for diving and other life-support applications and cover breathing air, nitrox, heliox, trimix, oxygen for decompression and argon for drysuit inflation. How are these standards mandated and enforced? What are good and safe practices? Regular inspection and paying close attention to your cylinder can help identify issues before they become a danger. Visual inspection, internal and external: The Compressed Gas Association (CGA) publication P-5, Care of High-Pressure Cylinders for Underwater Breathing, lists the annual visual inspection requirement. While federal regulations do not enforce visual inspection, it is the best practice because diving exposes scuba cylinders to a corrosive environment and frequent handling. Cylinder manufacturers may require this inspection, and filling stations may require it before filling a cylinder. Five-year hydrostatic pressure testing: The U.S. Code of Federal Regulations (CFR), specifically 49 CFR 180.209 Table 1, requires a five-year requalification period for all scuba cylinders, including visual inspection and hydrostatic testing or ultrasonic examination. This regulation is federally enforced for business owners, so a filling station must require recertification before filling a cylinder. This CFR applies to all requalification, maintenance and use of cylinders. While the law doesn’t apply to privately owned cylinders, any person taking a cylinder into a public place, transporting it on a public highway or attempting to fill or rent cylinders for profit must comply. For private owners and users, requalification is still critical for safety. 6351-T6 aluminum alloy cylinders: 49 CFR 209 provides additional recertification requirements for cylinders made of this material. Visual inspection and eddy current examination (VE) are required every five years to determine the presence of any sustained-load cracks. The visual inspection should be in accordance with CGA C-6.1. Marking: 49 CFR 180.213 requires that the five-year recertification shall be durably and legibly marked with the retester identification number (RIN) and the year. The inspector may apply additional markings. Suspicion of any issues between inspections: If you have any reason to doubt your cylinder’s integrity, such as leaking at the valve, deformation or mechanical damage, immediately have your cylinder examined by a formally trained and certified inspector. They will visually inspect the cylinder and take further actions as needed. Oxygen cleaning: All cylinders used for breathing gases containing more than 23.5 percent oxygen (nitrox, decompression gases or pure oxygen) must be oxygen-cleaned according to CGA G-4.1 requirements. If you suspect that the breathing gas contains any oil, hydrocarbon or aromatic substances, the cylinder must be cleaned again for oxygen. Operators who fill with oxygen-enriched gases should require cylinders to be oxygen-clean. Rejected cylinders: According to 49 CFR 180.205, any cylinder that the test station has permanently rejected must be stamped as condemned or with a series of X’s over the code specification and marked pressure. Alternatively, with the owner’s permission, the tester can render it incapable of being filled. Records: Retain all inspection, testing and recertification records while you own the cylinder, and give them to the new owner if you sell your cylinder. A cylinder filling station can reject a cylinder and require further evaluation. They may choose to err on the side of caution to protect the safety of their staff, divers and the general public. © Alert Diver — Q3/Q4 2021 ADVERTISEMENT If it has been five years since your last thorough inspection, federal law now requires you to have your air tank tested. In the US, the Department of Transportation regulates this, while other countries have their own rules for pressurized vessel maintenance, use, and transportation. Due to the risks associated with pressurized air cylinders, regulations are similar across the board. A hydrostatic test is used to address these risks and locate any flaws that could put a diver in danger.How to check for Hydro:It is important for any diver to be able to read the stamping on any tank. Even if you are renting, always check the stamping as a safety precaution. Around the top of every tank, you can find vital specifications stamped. Keep in mind that the location and arrangement may differ depending on the manufacturer. Through practice, you'll be able to identify important specifications and understand their meaning.To ensure safety, every cylinder is required to undergo a hydrostatic test once every five years. When a cylinder passes inspection, the test date is permanently stamped on it. In the given example, the test was conducted in March of 2023. An added "+" symbol after the test date indicates that the cylinder can be filled up to 10% higher than its maximum service pressure. As this test is conducted every five years, the cylinder may have multiple hydro dates stamped on it.During a hydrostatic test, a technician looks for leaks in the tank, filling it with water and submerging it into a sealed chamber. The tank is pressurized to 5/3 of its normal pressure, causing it to inflate and displace water from the chamber into a burette. The amount of water displaced during pressurization is recorded, and the tank is held at this pressure for 30 seconds. The water is then returned to the chamber, but not all of it, as the tank has stretched slightly even though the pressure has been released. The amount the tank has stretched is called permanent expansion, and the difference between total and permanent expansion is elastic expansion. If the elastic expansion exceeds the limits set for your cylinder, it will be marked as condemned or with Xs over the DOT specifications. If the tank passes the hydrostatic testing, it will be stamped with the date and ID number of the shop that carried out the testing.Public safety is the reason hydrostatic testing is mandated and regulated on such a high level. While Scuba tanks are made of durable metals, there are inherent dangers in dealing with highly pressurized gasses within a metal container. Compromised tanks can cause trouble underwater or injury if dropped or torn, causing the gas to propel the tank around a room. These tests not only keep people safe, but they keep people alive.We are a scuba tank drop off point for Hydro and Tumble. We do visual inspections in-house.If you have any questions call us at (310) 398-5759 one of our pros will be happy to help you out. SCUBA diving opens up a fascinating underwater world, but it comes with its own set of safety challenges. One of the most critical aspects of maintaining safety for divers is ensuring that their SCUBA tanks are in top condition. This is where hydrostatic testing comes into play. At Serviced Fire Equipment, Inc., we specialize in water jacket hydrostatic testing to ensure your SCUBA tanks are safe for use. Let’s dive into the importance of this process, when additional procedures like eddy current testing and internal bead blasting are required, and how often these tests must be conducted. Understanding Hydrostatic Testing Hydrostatic testing is a method used to inspect the integrity and safety of pressurized vessels, including SCUBA tanks. The process involves filling the tank with water and pressurizing it to a level higher than its normal operating pressure. The tank is then placed in a water jacket, a chamber filled with water, and the pressure is increased. Any expansion of the tank is measured by the amount of water displaced from the water jacket. This test helps identify any weaknesses or flaws in the tank that could lead to catastrophic failure during a dive. It’s a critical safety measure that ensures the tank can withstand the pressures it will face underwater. Why Hydrostatic Testing is Crucial Safety Assurance: The primary reason for hydrostatic testing is to ensure the safety of the diver. A failed SCUBA tank can lead to drowning or serious injury. Regular testing minimizes the risk of tank rupture. Compliance with Regulations: Various regulatory bodies, including the Department of Transportation (DOT) in the United States, mandate regular hydrostatic testing for SCUBA tanks. Compliance with these regulations is necessary for legal and insurance purposes. Tank Longevity: Regular testing and maintenance can extend the life of a SCUBA tank. Identifying and addressing issues early prevents more severe damage that could render the tank unusable. Performance Reliability: A well-maintained tank ensures that divers can rely on their equipment to perform as expected, providing peace of mind during dives. When is Eddy Current Testing Needed? Eddy current testing is a non-destructive method used to detect surface and sub-surface flaws in metal objects. For SCUBA tanks, it is particularly useful for identifying cracks and other defects that are not visible to the naked eye. Eddy current testing is often required in the following scenarios: Aluminum Tanks: Aluminum SCUBA tanks are more prone to developing cracks, especially around the neck and threads. Eddy current testing is used to detect these issues. Post-Hydrostatic Testing: If a hydrostatic test indicates potential weaknesses or irregularities, eddy current testing can provide a more detailed analysis of the tank’s condition. Older Tanks: Tanks that have been in use for many years or have unknown histories may benefit from the additional scrutiny provided by eddy current testing. When is Internal Bead Blasting Needed? Internal bead blasting is a process used to clean the interior surfaces of SCUBA tanks. This procedure is necessary when there is significant corrosion, rust, or other contaminants inside the tank that could compromise its integrity or contaminate the air supply. Bead blasting involves projecting small glass or ceramic beads at high velocity against the internal surfaces of the tank, effectively removing debris and leaving a clean, smooth surface. This process is typically needed: After Long Periods of Disuse: Tanks that have been stored for long periods may develop internal corrosion or contamination. Following Hydrostatic Testing: If hydrostatic testing reveals significant internal corrosion, bead blasting is used to clean the tank before it is returned to service. During Refurbishment: Tanks undergoing complete refurbishment often require internal bead blasting to ensure they are in the best possible condition. How Often Must SCUBA Tanks be Tested? The frequency of hydrostatic testing for SCUBA tanks depends on the material of the tank and regulatory requirements. In the United States, the DOT mandates the following: Aluminum Tanks: These tanks must be hydrostatically tested every five years. However, some aluminum tanks made with certain alloys may require more frequent testing. Steel Tanks: Steel SCUBA tanks also require hydrostatic testing every five years. Steel is generally more durable than aluminum, but it is still susceptible to corrosion and other forms of wear and tear. In addition to hydrostatic testing, visual inspections are recommended annually to check for any obvious signs of damage or wear. These inspections can help identify issues early and ensure that tanks remain safe between hydrostatic test intervals. Hydrostatic Testing at Serviced Fire Equipment, Inc. At Serviced Fire Equipment, Inc., we are dedicated to ensuring the safety and reliability of your SCUBA tanks through our expert hydrostatic testing services. Our water jacket hydrostatic testing process is thorough and precise, providing you with the confidence that your tanks are in optimal condition. Here’s what sets our testing services apart: State-of-the-Art Equipment: We use the latest technology to conduct hydrostatic tests, ensuring accurate and reliable results. Experienced Technicians: Our team of skilled technicians has extensive experience in SCUBA tank testing and maintenance, allowing us to provide the highest level of service. Comprehensive Testing: In addition to hydrostatic testing, we offer eddy current testing and internal bead blasting to address all aspects of tank safety and maintenance. Regulatory Compliance: We ensure that all testing is conducted in accordance with DOT regulations and industry standards, so you can be assured of compliance and safety. Conclusion Hydrostatic testing is a vital process for maintaining the safety and reliability of SCUBA tanks. Regular testing, combined with additional procedures like eddy current testing and internal bead blasting when necessary, ensures that tanks remain in top condition and safe for use. At Serviced Fire Equipment, Inc., we are committed to providing the highest quality testing services to keep divers safe and equipment performing at its best. Whether you’re a professional diver or an enthusiast, trust us with your SCUBA tank maintenance needs and dive with confidence. Maybe you are a new technician who wants to learn how to test a scuba tank, or just a scuba enthusiast curious about the methods used to verify the safety of your scuba tank. Either way, the process to test a scuba tank starts with a visual inspection and ends with a hydrostatic test. The way that an accredited technician tests a scuba tank can be broken down to 14 steps: Recording all the specifications Inspecting the outside of the tank Emptying the tank Removing the valve Inspecting the valve and O-ring Examining the neck of the tank Inspecting the inside of the tank Checking the threads on the inside Putting the O-ring back onto the valve Starting the hydrostatic test by filling up the tank with water Checking the O-ring around the hydrostatic test chamber Placing the cylinder in the hydrostatic test chamber Testing the tank Removing the tank and finishing up The steps above are the simplified version of how scuba shops test their tanks. The process is quite detailed and requires a full understanding before someone attempts it. Below are the 14 steps on how to test a scuba tank with more details provided. After that, you may want to know why you should test a scuba tank, how often to test it, and the most common reasons for scuba tank failure. Or you may decide, like me, that renting tanks is the better option. But it doesn’t hurt to know if the rental shop is doing the right things with their tanks. Before starting any testing, you must first record all the necessary information. Then, you can move onto an exterior inspection and interior inspection. Lastly, you will do a hydrostatic test. Below are the 14 steps to test a scuba tank. The first step before starting any visual inspection or hydrostatic testing is to write down all the specifications on the tank. These include manufacturer, serial number, size of the cylinder, working pressure, test pressure, water capacity, weight, capacity, design specifications, and date of manufacturer. The scuba tank should also have a sticker with the last visual inspection date and last hydrostatic test date. Record those as well. Check the bottom and sides of the exterior of the tank. Check for any deep scratches, loose coating, corrosion, dents, cracks, bulges, cuts, excessive wear, heat damages, electric arc or torch burns, and any other indications of abuse or harm. Also, check for illegible, inaccurate, or unauthorized permanent stamp marking on the exterior of the tank. If the tank exceeds the rejection criteria for the exterior inspection, condemn it as permanently unusable. Lastly, check for any other materials on the surface of the tank. Any foreign substances should be removed by either brushing the tank, water-jet cleaning, controlled shot-blasting, chemical cleaning, or any other non-destructive method. Do not remove a significant amount of tank material. Once the exterior inspection is done, and the scuba tank has passed, you can move onto the internal review, which requires you to remove the valve. Before you can remove the valve, you need to make sure that the tank is empty. Further details will continue in the steps below. Understanding the external markings Before removing the valve, depressurize the tank to empty it. You will not always need to do this, but a lot of the times, the tanks do come in full. You should slowly release the air and record if any leaks are detected. The release of the air should take longer than 10 minutes. As for breathing gases with a high oxygen fraction (oxygen-enriched air), they need special precautions. High oxygen fraction breathing gases should not be released in an enclosed space because that can lead to a fire. Once you have emptied the tank, remove the valve. You should be able to twist it off with your hand because the valves are usually only hand tight. If the valve is hard to remove, stop immediately. Check to see if the valve is working correctly by adding a small amount of air to the scuba tank. Doing so will prove whether air goes in and out of the valve. It might be necessary to release the pressure by removing the burst disc. You can also choose to drill into the valve body below the valve seat. After the valve check, if the valve is working, you can then proceed to remove the valve. If the valve still is not working correctly, contact the manufacturer. Inspect the valve to make sure the knob is working, that it is not deformed. Also, make sure the safety valve is not leaking. Then, remove the O-ring and check for flat spots and fraying. Although you do not necessarily need to replace it if it is still in good condition, it is recommended that you do anyways. Additionally, remove and replace the valve neck O-ring as well. Lastly, carefully clean the threads of the valve since they will be going back into the tank. Make sure the neck area and threads around it are clean and without imperfections so that when you put the valve back in, it will go in smoothly. Problems with the threads include metal loss, galling, corrosion, cracking, and abuse. Abuse would include deep nicks, cross threads, broken threads, stripped threads, and threads without well-defined and sharp peaks. If the neck area and threads are not clean, clean them of debris and lubricant before continuing. Put your tank inspection light inside the cylinder to inspect the inside. You should also use a dental mirror to see better. The tank inspection light is very bright, and while it is suitable for illuminating the tank, it can also be so bright that it does not cast shadows. This can make it hard to see little imperfections, so if you turn it to the side, you can throw shadows around the inside of the tank to pick up those imperfections. Make sure to inspect all around the bottom and all around up and down the sides. The dental mirror can help to see around the corners of the neck better. You are looking for cracks, corrosion, and any other imperfections. If any of these imperfections exceed the test limits, you must condemn the cylinder. Inspect the threads on the inside of the cylinder well because they are critical for holding the valve in place. Use a non-destructive testing device, such as Visual Plus, so you can better check the threads. Make sure they are sharp and clean. Place the O-ring carefully back onto the valve without rolling or twisting it. Then, put a little bit of grease on the bottom of the valve threads. Do not put oil on the O-ring. The oil can cause the ring to slip out. Once the tank has passed both the exterior and interior inspection, you can move onto the hydrostatic test. You start the hydrostatic test by first filling up the tank with water. After filling the scuba cylinder with water, you will put a hydro test adaptor on top of the tank. The reason for filling the tank with water is to avoid the tank expanding and exploding if it does not pass the hydrostatic test. Because there are no air spaces, and the tank is placed in the hydrostatic test chamber that is also filled with water, the tank cannot expand and explode. Before putting the tank into the test chamber, remove the test chamber O-ring, clean it, and make sure there is no film, dirt, or rust on it. Check for flat spots or fraying as well. Once you have inspected it and you have determined that the O-ring is up to par, put it back onto the test chamber. Use the hydrostatic testing equipment crane to pick up the tank and put it in the hydrostatic test chamber. The hydrostatic test chamber should also be filled with water. The water in the tank and inside the chamber should all be the same temperature, which should be room temperature. Then, place the O-ring covering on top of the chamber to close the chamber. Use a hydraulic clamp to keep it tightly in place. For those of you who have the appropriate software, you can test the tank by simply clicking “test” on your computer screen using the software. The software will tell you the percentage expansion number. Depending on the tank, the percentage you will be looking at as the limit will change. It is usually 10% for aluminum and steel tanks and 5% for fiber wrapped tanks. For those who do not have software to test the tank, you will manually need to pressurize the tank. You need to do this to squeeze out some of the air. Pressurize the tank to 5/3 of its normal pressure. You can find the normal pressure on the cylinder. Remember, you should have recorded this at the beginning before doing any testing. Make sure to connect the burette (a type of measuring cylinder) to the sealed chamber to record the water displaced during the pressurization. Pressurize the tank for 30 seconds. The tank will inflate and displace water from the chamber into the burette. Record the total expansion shown by the amount spilled. Then, release the pressure and let the water return to the chamber from the burette. Even though releasing the pressure from the tank will cause deflation, the cylinder will still have stretched a bit. Thus, not all the water from the burette will return to the chamber. In this case, the amount the tank has stretched after deflation would be considered the permanent expansion. Subtract the permanent expansion from the total expansion to get the elastic expansion. If this value exceeds the limits set for your cylinder, then the tank has failed the test and should be discarded.. Once you have completed the test, remove the tank from the chamber. After removing the tank, clean it and then dry it immediately. The interior should have no trace of free water or other contaminants. If the cylinder needs to be repainted or coated, do not heat steel cylinders above 300 degrees Celsius. Aluminum tanks have even more restrictions on permitted temperatures, so check the specifications given by the manufacturer. Make sure to put the correct valve back on. Putting the wrong valve on a scuba tank can result in an explosion. If the tank fails, mark with “X’s” over the DOT specifications. If the tank passes, stamp the tank with the date and ID number for the shop that carried out the testing. The hydrostatic test step by step Now that you know how to test a scuba tank, you may be wondering why you need to test the scuba tank in the first place. Other than it being the law, you need to test a scuba tank for safety reasons. Testing scuba tanks started when aluminum cylinders had begun receiving a lot of attention in the United States due to an explosion in Riviera Beach, Florida, in February of 1998. Before that event, the dive industry generally ignored the occasional explosion of aluminum or steel cylinders. With that said, visual inspections are done to make sure there has not been so much corrosion that the tank walls become weakened enough to explode. The hydrostatic test is to check the elasticity of the metal. Every time you fill up a scuba tank, it expands. Once the air is released, it contracts. Over time the metal slowly becomes less elastic. It becomes more brittle and susceptible to cracks and breaks. The elasticity begins to break down. Therefore, the purpose of getting the tank tested is so that you don’t fill your tank one day, and it ends up expanding and exploding due to substantially reduced elasticity. There are federal licensing requirements for hydrostatic testers in Canada and the United States. Test procedures are established by law and enforced by the Department of Transportation in the U.S. or Transport Canada in Canada. Tank testers must legally take training every three years and examined by federal enforcement personnel every five years to keep their license. However, enforcement is lacking, and many inadequately trained technicians will certify improperly evaluated cylinders. Because there is no legal mandate stating that inspectors need training on visual inspections, many of them do not know what the visual inspection of the hydrostatic test entails. Keep in mind, though, that untrained inspectors are at legal risk if a cylinder that they inspected ends up exploding. They have no legal defense in this case, so most dive industry entities such as PADI, NAUI, Luxfer, Catalina, Compair/Mako, and most dive stores accept the PSI training protocol as the industry standard. The cost of an inspection will depend on the dive shop that conducts it. For the annual visual examinations, the fees usually range from $15 to $25. Hydrostatic testing can range from $20 to $70, depending on what kind of cylinder it is. How often you need to test a tank depends on your location. In the United States you are legally mandated to have your scuba tank(s) tested every five years. For some special tanks, you need to test every three years. As for the visual inspections, you need to do so once every year. In the European Union, you need to do a hydrostatic test every five years, and a visual inspection every 2.5 years. In Norway, a hydrostatic test with visual inspection is needed three years after the tank production date and then every two years after that. Tanks are required to be hydrostatically tested yearly in Australia. As for those in South Africa, you need to do a visual inspection every year and a hydrostatic test every four years. Check the regulations regarding when you need to get your tank-tested for your country if they were not mentioned above. A common issue is weak valve threads. Also, a visual inspection is more likely to fail than a hydrostatic one. According to Luxfer gas cylinders, over 90% of scuba tanks fail the visual inspection before even getting to the pressure test. In a hydrostatic test, corrosion on the inside is typically the reason for failure. In terms of corrosion, steel tanks are more likely to damage due to rust. Aluminum tanks are less likely to corrode. Yet, when they do, it is usually due to excessive corrosion in the thread area or beneath the boot, or from cracks found during the visual inspection. Corrosion damage is typically the fault of the fill station or cylinder owner. Water of any kind, but especially salt water, can cause the metal to corrode. It isn’t uncommon for there to be several drops of water left in the valve after last use or rinsing by the owner. To avoid this, always open the valve and blow out the valve aperture before filling the tank. As for the fill stations, poorly maintained filters and water separators can pump water into the cylinder during fills. Make sure to go to a fill station that upkeeps its filters and water separators well. Also, ask that the fill station operator blow out the fill whip before attaching it to your cylinder to avoid dirt, dust, or any other foreign matter getting inside. You cannot use a scuba tank if it fails. Due to DOT regulations, a tank that fails hydrostatic testing is not allowed to be filled again and will not be given a test stamp. Without a hydrostatic test stamp, no reputable dive shop will fill it. To ensure this happens, the tank serial number is stamped out with an “X,” and the cylinder threads scored. The need for testing is to ensure that scuba tanks don’t explode. It may come as a surprise to some, but most scuba tank explosions occur during the filling process due to the power of the compressed air. Thus, the safest way to fill up the tank is to make sure there is a separation between the operator and the cylinder. Separation can be accomplished by either creating a barrier or creating distance. Fill stations should only accept cylinders that have been inspected by a trained visual inspector and are within the retest period. Read more in my full step by step scuba tank fill guide. Scuba tank maintenance is necessary to ensure the highest scuba diver safety. There are many tips for maintaining your scuba tank to ensure your safety: Ensure water never enters or forms inside of your tank. Keep the threads and cylinder interior dry and free from contamination of any sort. Before using any scuba tank, make sure it is within the retest period. Do not store tanks full of air for more than three months. Clean, dry aluminum cylinders may retain their quality slightly longer. For storing tanks for more than three months, the tank should have just enough pressure (200 psi) to keep moisture out. Some say it should be less than or equal to 3 bars (50 psi). Regardless, the higher the tank pressure, the greater chance for internal corrosion. Take your scuba tank for a visual inspection once a year. Have it inspected every three to six months if you use your tank frequently. The University of Rhode Island conducted a test in 1971 where they found that a small amount of saltwater inside a steel cylinder can damage it in 100 days to the point of imminent explosion. Getting a visual inspection is a top priority from a maintenance and safety perspective. Make sure to have a reputable hydro testing facility hydrostatic test your scuba tank. Reliable facilities will entirely service your tank, including testing, cleaning, drying, zinc coating, and painting. Before putting your tank away, always give it a fresh water rinse. Make sure the tank valve is closed when rinsing it. To avoid putting unnecessary stress on the metal of the tank, do not fill the tank past stamped ratings. Doing so would be considered overfilling it and can weaken the tank over time. Avoid rough handling of the tank that can cause corrosion to the metal or weaken the cylinder. Secure the cylinder during transport, so it does not move around and potentially get damaged. Always store your scuba tank in a vertical position unless a visual inspector recommends otherwise. To check for corrosion or contamination, see if you can see or smell anything coming outside of the tank valve. If you tap on the side of the tank and hear any rattling on the inside, get it visually inspected. Something is wrong. If you find water on the inside of your tank, but no corrosion has occurred, rinse the tank with freshwater or steam clean it. Then, dry it with warm air. Check with a qualified inspector to determine the extent of any hints of corrosion. Never leave a cylinder standing unattended. When cylinders are out of reach, always lay them down to prevent them from falling or being knocked over. Avoid exposing cylinders to extreme heat, so keep them in the shade during the summer. The ambient temperature should technically be less than 140 degrees Fahrenheit (60 degrees Celsius). Also, avoid storing them near heat sources such as hot lights, heaters, furnaces, freezers, electrical or combustion motors. Whether you are a scuba diver or technician, each scuba tank must be tested regularly and accurately to maintain the safety of the divers and the sport, in general. If you are a technician, make sure you fully understand the procedures for testing the scuba tank because it is you who is legally at risk if the tank explodes. Divers: make sure to test your scuba tank according to the regulations of your country, at the very least. It also doesn’t hurt to get it checked more regularly if you are using the tank frequently. After all, it’s your life that is at stake.