Expert Views

Diving Deeper

Understanding Scuba in Underwriting

Extreme Sports

An Underwriting series

SCOR

The Art & Science of Risk

May 2022

Contents

Executive summary

Scuba diving is a very popular sport with millions of people around the world enjoying the unique experience of taking the plunge in exotic ocean destinations or even alpine lakes. Although much has been done to improve safety with required training and more advanced equipment, underwriters still consider scuba to be a hazardous activity with its own unique risks. This article offers an updated perspective on the various risks of scuba diving, as well as insights about mandatory trainings, modern equipment, accidents, injuries, and mortality associated with scuba diving.

Author's introduction

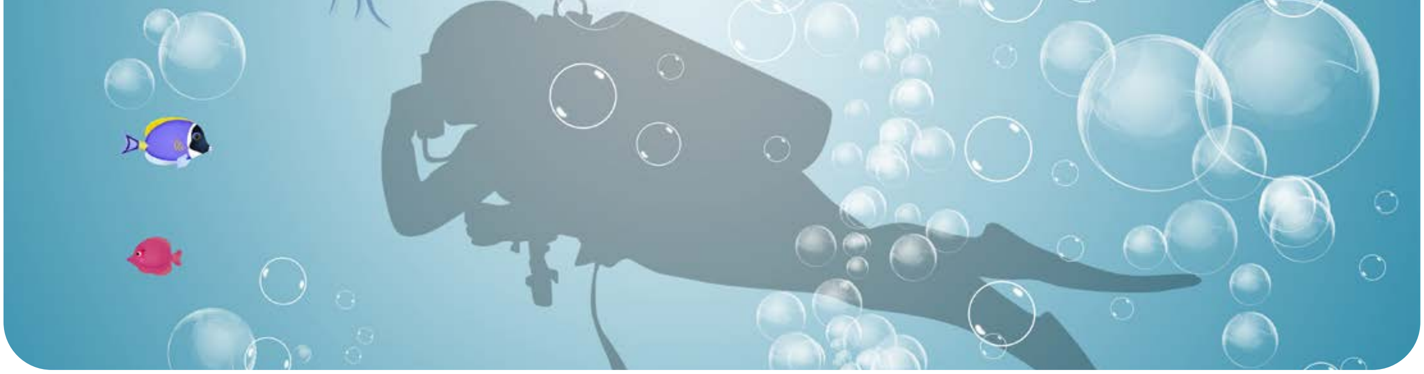
Accidents and medical emergencies can occur at any time and these incidents would certainly be complicated by being underwater. Although scuba can be considered a relatively safe sport, it is often perceived as highly risky to those who are beginners and/or those who are not knowledgeable about the intricacies of the sport. This is why we chose scuba to kick off our extreme sports series.
Since I was young, I have always loved the water and I finally had the opportunity to get my PADI (Professional Association of Diving Instructors) Open Water Certification in my mid-20s. I've been an enthusiastic diver ever since.

Call it coincidence or fate, I was learning to scuba dive at the same time I was training to become an underwriter. Because of that, I developed a keen interest in trying to align the actual versus perceived risks of scuba. While there certainly are risks for the average diver, I found many of these can be mitigated by following your dive tables conservatively, maintaining your equipment, and diving within your physical limits – and always with a buddy.

As a certified diver for 15 years and an underwriter for just as long, let me be the first to say that many underwriting manuals do not reflect the real risks of diving. For example, there should be a distinction between seasoned low-risk scuba divers and inexperienced divers who are at higher risk. There is room for improvement in underwriters' understanding of the risks associated with scuba.

I'm excited to have this chance to take you on a deep dive into underwriting scuba risks.

James Dixon
Senior Underwriter Consultant



What is scuba?

Definition, history and popularity

Humans have always been fascinated by what's just out of reach, so it's no wonder that the depths of the ocean have mesmerized us for centuries. But it wasn't until the mid-1900s that the modern form of scuba (which is the acronym for "Self-Contained Underwater Breathing Apparatus") emerged. Technological advances like the dive computer continue to revolutionize the sport and different air mixtures have been introduced, each presenting its own benefits and – in some cases – risks.

Now, according to some estimates, as many as nine million people worldwide are certified to dive by one of the top four dive associations.[1]

It should also be noted that many diving statistics are drawn from the US, which historically accounted for as many as half of the world's scuba divers, though more recent reports place this number closer to one-third. As such, many important scuba statistics come from the US market and underwriters in the US can expect to come across divers' profiles more frequently than what might be seen in other markets.

License to dive

Safe participation in scuba requires that the diver knows how to handle their equipment and react appropriately and calmly to different scenarios that might arise during a dive. To dive recreationally, you must be able to show proof that you have completed a certification course. The most common certification is offered by the US-based PADI, which accounts for approximately 70% of diver certifications in the United States and more than 50% worldwide. Other internationally recognized certification organizations include NAUI (National Association of Underwater Instructors), BSAC (British Sub Aqua Club), and CMAS (Confédération Mondiale des Activités Subaquatiques).

The most basic level of scuba certification is an **Open Water Diver Certification**, which typically allows for dives up to 18 meters (60 feet)[2] and ensures they have a solid understanding of basic dive safety skills such as:

- How to assemble, use, and interpret their dive gear (air tanks, dive computer, etc.)
- How to enter the water for a dive from a boat or shore
- How to descend safely
- How to ascend safely by making decompression or safety stops and exhaling continuously to prevent lung expansion injuries
- Basic emergencies procedures like buddy breathing and mask clearing
- Basic buoyancy control
- Basic underwater navigation

More experienced divers can go on to earn their **Advanced Open Water Diver Certification** (allowing dives to 36 meters/120 feet) and their **Master Scuba Diver Certification** (offering emergency first response training, self-rescue techniques, and more) if desired.

Risks associated with scuba

Contrary to general perception, scuba is a relatively safe sport. In fact, it is often considered a "slow" sport as it is more akin to a leisurely underwater stroll than a race.

According to data from the US, the number of recreational diving fatalities reported suggests that around two out of every 100,000 recreational divers die while scuba diving each year.[3] This number appears relatively stable over time, despite improvements in equipment utility and reliability. To put this into perspective, the CDC reports that there are 23.8 maternal deaths for every 100,000 births[4] and pneumonia and influenza cause 16.2 deaths per 100,000.[5]

In 2014, there were an estimated 13.8 million emergency room admissions in the US and US territories; 1,220 of those (0.009%) were for scuba injuries.

What contributes to these relatively low mortality and morbidity rates? Modern dive equipment helps alleviate human error when it comes to calculating surface intervals, air supplies, and other important dive criteria. Equipment is even designed to withstand underwater bouts of seasickness – you can be sick without having to remove your regulator or worry about blocking your air source.
As such, experienced divers who know how to recognize unsafe diving conditions such as weather, currents, and extremely low visibility, are familiar with their equipment, and have no preexisting medical conditions will not typically run into problems while diving.

Surprisingly, there is no direct correlation between the depth of the dives and the risk of death; in fact, most of the deaths that occur are in shallow water and result from an improper ascent or preexisting health condition.

The experience level of the diver is also directly linked to the risk of death: as a diver's certification level increases, there is a noticeable drop in the rate of fatalities, despite the presence of deeper more technical dives.[6] However, the number of years someone has been certified does not have the same protective effect – this may reflect health changes as the diver ages.

And, indeed, age is another important factor. More than 50% of diving fatalities are in individuals over age 50, which highlights the importance of maintaining physical fitness as divers age. Figure 1 shows the number of fatalities by age and gender.

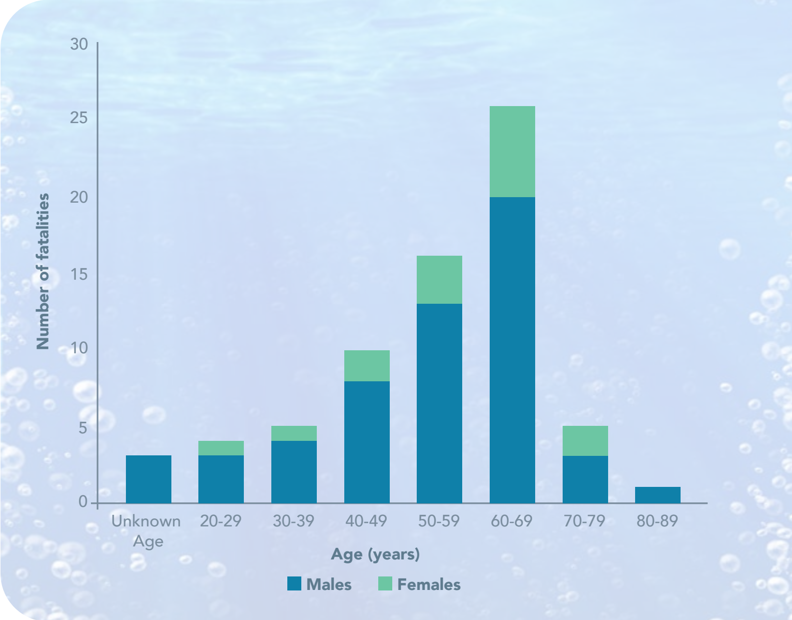


Figure 1. Number of scuba diver fatalities by age and gender. SOURCE: DAN, DAN Annual Diving Report 2019 Edition

The most common harmful events during the dives were cardiac events, accounting for 7% of scuba fatalities, and insufficient breathing gas, accounting for another 7% of scuba fatalities. The cause of death, as established by medical examiners, was drowning in most cases. However, according to expert reviewers, the data once again indicated that a leading cause of disabling injuries was an acute cardiac event, most triggered by situations where good physical fitness was needed.

High blood pressure and heart disease were the most common pre-existing health conditions known among 2014 diving fatalities, and obesity among divers who died (at 51%) was more common than found in the general living population (35%). Therefore, it may not be unreasonable to speculate that older, heavier divers with pre-existing heart or blood-pressure conditions are at elevated risk of dying while scuba diving compared with younger, healthier divers.

The following sections discuss select risks in more detail to understand how relevant they are from an underwriting perspective.

Causes of injuries and fatalities

Nitrogen narcosis

When diving, increased levels of nitrogen in the bloodstream can lead to nitrogen narcosis. Symptoms are similar to alcohol intoxication and resolve as soon as a diver ascends.

Nitrogen narcosis results from the increased solubility of gases in body tissues as a result of the elevated pressures at depth. It is not uncommon for divers breathing compressed air to experience higher levels of nitrogen in the bloodstream around 30 meters (100 feet).

Symptoms include wooziness, giddiness, euphoria, disorientation, loss of balance, loss of manual dexterity, slowing of reaction time, fixation of ideas, and impairment of complex reasoning. These effects are exacerbated by cold, stress, and a rapid rate of compression.

The effects of nitrogen narcosis typically reverse by the time the diver returns to a water depth of 18 meters (60 feet). Nitrogen narcosis has no hangover or lasting effects requiring further treatment; the main concern is of injury or making mistakes while experiencing symptoms that can cloud judgment and reasoning.

Decompression illness

Decompression illness (DCI) encompasses two diseases, decompression sickness (DCS, also called the bends or caisson disease) and arterial gas embolism (AGE).

As discussed above, during a dive, the body tissues absorb nitrogen from the breathing gas in proportion to the surrounding pressure. As long as the diver remains at pressure, the gas presents no problem. If the pressure is reduced too quickly, however, the nitrogen comes out of the solution and forms bubbles in the tissues and bloodstream (think of shaking, then quickly opening a soda bottle). It occurs in approximately 1,000 US scuba divers each year. Factors thought to increase the risk of DCI (but for which evidence is not conclusive) include obesity, dehydration, hard exercise immediately after surfacing, and pulmonary disease.

Symptoms and signs usually appear within 15 minutes to 12 hours after surfacing, but in severe cases, symptoms may appear before surfacing or immediately afterwards. Delayed occurrence of symptoms is rare, but it does occur, especially if air travel follows diving.

While DCI typically resolves with little to no long-term complications, permanent or lasting effects such as bladder dysfunction, sexual dysfunction, and muscle weakness have been reported. DCI can be prevented by using a dive table or computer conservatively and ensuring a slow ascent. To use our prior analogy, this would be akin to shaking the soda bottle and slowly twisting off the cap, allowing the bubbles to slowly come out of the solution so that they do not overflow.

Complication from the diver's choice of air
It is possible to dive with normal air – the same as you are breathing reading this report – and many dive resorts default to exactly that. However, in order to avoid nitrogen narcosis and decompression sickness, divers can choose from several different blends of air based on the planned depth and length of their dive.

To allow for deeper, longer dives and reduce the need for decompression stops and long surface intervals between dives, many recreational divers will instead opt to use "Enriched Air Nitrox" or EANx, a breathing gas blend with a higher percentage of oxygen (typically either 32% or 36%) than the usual air we breathe (21%).[7]

Depth	Air	Nitrox	
FSW (Feet Seawater)	Air (21% Oxygen) in minutes **	32% Oxygen in minutes	36% Oxygen in minutes
60	55	92	125
70	40	60	92
80	30	48	60
90	25	39	48
100	20	30	39
110	16	30	30
120	13	25	Exceeds maximum safe depth

Note: This chart is based on PADI recreational air dive[8] tables[9], and NOAA nitrox tables . It is for quick reference only and should not be used to plan or execute a dive.

**noted a safety stop: A pause in ascent at 15ft for three minutes is required for all these depths/times and times listed are the maximum time/depth for no decompression limits.

It is extremely important that divers select the type of air they use based on the dive they have planned. For example, while nitrox allows you to dive deeper than you can with regular air, it is not suitable for extremely deep dives as the increased percentage of oxygen becomes toxic if breathed at high pressure. Oxygen toxicity in the lungs (pulmonary oxygen toxicity) is like getting a bad case of the flu, but it will rarely cause permanent damage.

However, oxygen toxicity of the brain, commonly referred to as central nervous system (CNS) oxygen toxicity, is different. It can occur during a dive, so while CNS oxygen toxicity is brought on by acute exposure and is therefore typically reversible, it can lead to a dangerous situation during the dive that can have lasting consequences.

Early symptoms of CNS oxygen toxicity include flashing lights in front of the eyes, tunnel vision, loud ringing or roaring in the ear (tinnitus), confusion, lethargy, nausea or vertigo, areas of numbness or tingling, and muscular twitching, especially of the lips. The onset of oxygen-induced convulsions may occur with no preceding symptoms. During a convulsion, a diver will thrash about, perhaps bang his head into something hard or, if underwater, may lose his mouthpiece. The result can be trauma or drowning.

If all nitrox divers limited themselves to depths of no more than 33 meters (110 feet) and used the standard air tables, nitrox would be safer than diving with air, as the risk of decompression sickness and nitrogen narcosis should be lower.
To dive deeper than is safe with nitrox, professional divers (such as military, scientific, or commercial divers) can choose between heliox, a mixture of helium and oxygen that is used for dives between 60 and 90 meters (200 and 300 feet) and trimix, a mixture of oxygen, helium and nitrogen that can be used for dives up to 120 meters (400 feet).

Pulmonary barotrauma
Another potential concern for divers is lung expansion injuries, which can be the most dramatic and life-threatening emergencies in scuba diving. These injuries are usually the result of ascending too quickly or not exhaling while ascending.
The deeper the diver goes, the higher the pressure exerted by the water above them. To counterbalance this higher-than-surface level pressure, scuba regulators deliver breathing gas at the ambient pressure of the diver, delivering a

higher concentration of air per breath in order to ensure the diver's lung volume is maintained.
Boyle's law of physics outlines the relationship between the volume of a fixed quantity of gas and the external pressure. When the pressure is doubled, the volume is reduced to one-half of the original volume. Conversely, when the pressure is reduced by one-half, the volume doubles. Therefore, for a diver at 4.6 meters (15 feet), the total pressure acting on his body is 1.5 atmospheres (one atmosphere at the surface, plus an additional 0.5 atmospheres exerted by the water column). A sudden ascent to the surface would result in a 30% pressure reduction and, assuming a compliant chest wall, a volume increase of 50%.

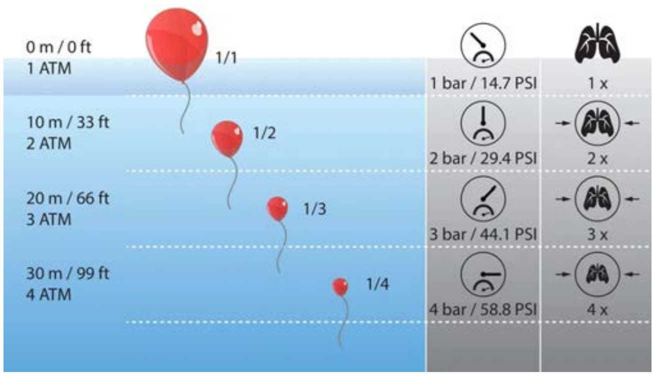


Figure 3, Boyle's law of physics demonstrated, SOURCE: Deepblu Mag[10]

That means that if you inhale and fill your lungs at 18 meters (60 feet) of depth and then hold your breath as you ascend to the surface, that air in your lungs will no longer be under the same amount of pressure and can overexpand, rupturing the lung tissue. This can lead to pulmonary barotrauma, where air leaks into the surrounding tissue, which presents a particular risk when bubbles develop in the oxygen-rich blood in the brain.[11] These bubbles, known as an arterial gas embolism (AGE), may interrupt circulation and cause permanent damage if they become lodged in small arteries.
During scuba certification courses, all divers are taught to exhale continuously and to take "safety stops" when ascending to allow their lungs a chance to adjust to the decreasing pressure and to avoid lung expansion injuries. Nonetheless, these injuries can happen with inexperienced divers or if the diver panics and swims to the surface too quickly.

This phenomenon can also occur if the diver has preexisting pathological air trapping (lung disease).

Preexisting conditions as risk factors

One of the greatest risks of diving is losing consciousness underwater, which can be caused by a number of pre-existing conditions. Conditions such as asthma and diabetes should not be overlooked when determining if an individual is fit to dive. Below are major risk factors associated with preexisting conditions.

Cardiovascular disease and other cardiac risk factors

As mentioned previously, high blood pressure and heart disease were the most common pre-existing health conditions among 2014 diving fatalities. In fact, cardiovascular events such as myocardial infarction (MI) cause 20-30% of all deaths that occur while scuba diving.[12] An individual should wait a minimum of six months – and preferably 12 months – before diving if they have had a heart attack or revascularization procedure (CABG or angioplasty). They should also be able to physically perform at a level of 13 mets (stage 4 on Bruce protocol, a standardized cardiology test that evaluates cardiac function).

Several studies have also demonstrated that the prevalence of atrial septal defects (ASD) and ventricular septal defects (VSD) in the wall separating the right and left sides of the heart was higher than expected in divers treated for decompression illness, suggesting that these divers are at greater risk than the general population. These defects place the individual at higher risk that a bubble developed during a dive will pass from the right side of the heart to the left side, where it can then be transported through the arteries, causing further complications. As such, individuals with ASD or VSD should be discouraged from scuba diving unless it is determined to be safe by a physician.

Divers with an irregular heart rate are at extra risk when scuba diving as a dysrhythmia could lead to a loss of consciousness and drowning. The occurrence of supraventricular tachycardia is unpredictable in onset but can be triggered by immersing the face in cold water. Therefore, someone who has had more than one episode of this type of dysrhythmia should not dive.

People with some dysrhythmias (e.g., certain types of Wolff-Parkinson-White Syndrome) may safely participate in diving after a thorough evaluation by a cardiologist. Also, in select cases, some people with stable atrial dysrhythmias (e.g., uncomplicated atrial fibrillation) may dive safely if a cardiologist determines that there are no other significant health problems.

Asthma as a risk factor

The physical exertion of diving combined with breathing cold, dry air can trigger an underwater asthma attack, which can easily escalate to panic and drowning.

It is important to understand that lung capacity reduces the deeper you dive. At 10 meters (33 feet) underwater, the maximum breathing capacity of a normal scuba diver is only 70% of the surface value. At 30 meters (100 feet) underwater, this reduction is approximately 50%.[13]

If a diver's breathing capacity is already reduced because of asthma, there may not be sufficient reserve to accommodate the required increase demanded by exertion. Doctors theorize that the narrowing of the airways with asthma could also trap breathing gas in the lungs, which could expand before it could be exhaled during ascents, causing lung-expansion injuries.

The Undersea and Hyperbaric Medical Society (UHMS) felt that the risk of diving is probably acceptable if the diving candidate with some asthmatic history demonstrates normal pulmonary function at rest (FVC, mid-expiratory flow, FEV1, FEF 25-75) and then again after strenuous exercise. Anyone with severe asthma, meaning they have daily, chronic symptoms, should not dive.

Diabetes mellitus as a risk factor

Diabetics represent a higher risk than average divers, because a hypoglycemic or hyperglycemic episode can easily lead to an emergency situation if it occurs during a dive. A loss of consciousness (caused by either hypoglycemia or hypoglycemia) underwater carries the ultimate risk of drowning and implies additional risks for their dive buddies. Individuals with diabetes, however well the diabetes is controlled, should not be deemed as fit to dive without restriction, especially those on insulin and sulfonylureas.

With proper precautions, individuals with diabetes can dive. DAN (Diver's Action Network) recommends that diabetics should not dive following a recent medication change, if they have had an episode of hypoglycemia or hyperglycemia requiring intervention from a third party in the last one year, or if they have a blood sugar higher than 150 mg/dL (8.3 mmol/L) the day of the dive. Diabetic divers should avoid diving deeper than 30 meters (100 feet) or longer than 60 minutes. Refer to Figure 4 on the next page for more details.

Endocrinologist and SCOR Medical Advisor Dr. Marinos Fysekidis recommends that blood sugar should be measured at least four to eight times per day during the two weeks leading up to a dive. Furthermore, individuals using a treatment requiring multiple daily injections should consult their endocrinologist to see if they should reduce the long acting (< 24 h effect) insulin dose to minimise the risk of hypoglycaemia.

A meal should be consumed at least an hour and a half, and preferably three hours, prior to the dive and a modest carbohydrate bolus of 15-30 g per 70 kg body weight (depending on glucose level), is recommended just before diving with no accompanying insulin.[14]

Individuals should be capable of managing suspected hypoglycaemia during a dive either to surface by ingesting a modest carbohydrate bolus (as gel or glucose/fructose solution) or underwater if necessary.

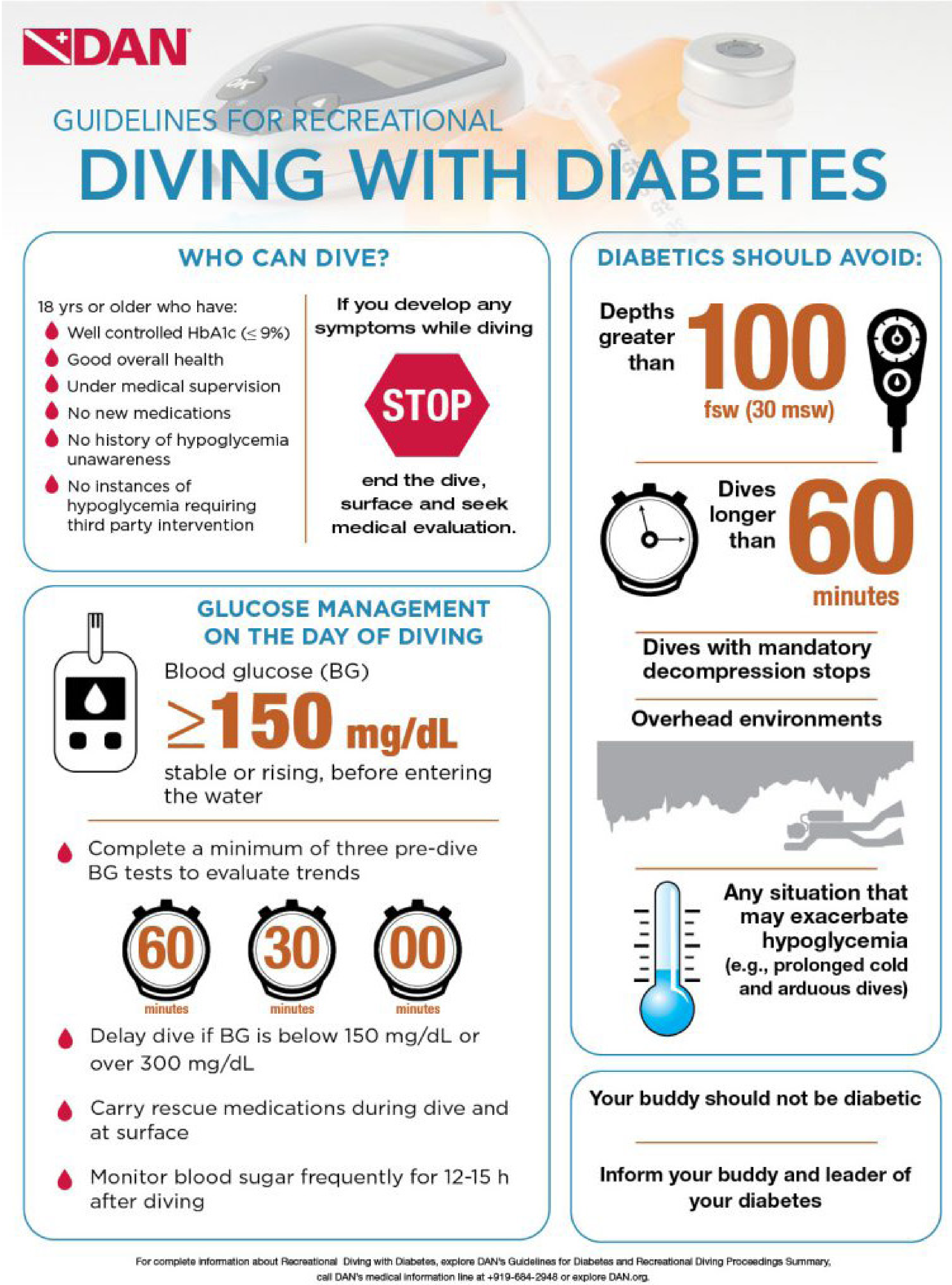


Figure 4, Diving with Diabetes, SOURCE: DAN, Guidelines for Recreational Diving with Diabetes[15]

Stroke as a risk factor
Vigorous exercise, lifting heavy weights and using the Valsalva method for ear-clearing when diving all increase arterial pressure in the head and may increase the likelihood of a recurrent hemorrhage. Therefore, these individuals should be cautioned against diving until evaluated and cleared by a certified diving medical examiner or dive physician.

A cerebral hemorrhage in a young person in whom the faulty artery has been repaired with little persisting damage may permit a return to diving, with small risk. Fitness to dive will depend on the extent of disability caused by the stroke (e.g., paralysis, vision loss).

Epilepsy as a risk factor
There is no evidence that scuba diving with compressed air to the accepted 40-meter (130-foot) limit increases the risk of epileptic seizures.[16] One is no more likely to seize while diving than while driving: the risk is the same.

However, current doctrine among diving physicians advises that individuals with epilepsy not dive. Those with childhood epilepsy, who have outgrown the condition and have been off medication for at least five years, still face a slightly increased risk of a seizure. Anti-seizure medication acts directly on the brain and may interact with high partial pressures of nitrogen. This may produce unexpected side effects.

COVID-19 as a risk factor
A history of COVID-19 should be a significant consideration when establishing if somebody is fit to dive. This is particularly true for those who had severe or "long COVID," where symptoms last from six weeks to more than a year after the initial infection. They remain vulnerable to long-term after-effects which increase morbidity and mortality risk.

It's estimated that 7-18% of people[17] infected with COVID deal with symptoms long term, and a high proportion (44-89%) of pulmonary changes has been detected by CT scan and reported in studies of patients with asymptomatic or mildly symptomatic COVID-19 lasting longer than 30 days.[18]

In addition to structural lung changes such as constrictive bronchiolitis and diffuse alveolar damage that have been observed following a COVID infection,[19] any ongoing symptoms of COVID-19 (aka, "long COVID") are likely to affect exercise capacity. In either case, these lasting consequences can make it more difficult to cope with the physical demands of scuba diving such as strong currents or an emergency.

Currently, DAN is conducting an extensive five-year study on divers who have had COVID-19 of any severity.[20] While the data from that study is pending, DAN and other diving organizations around the world have come to a consensus regarding recommendations prior to resuming diving after a COVID-19 infection[21]:

- Divers who have tested positive for Covid-19 but remained completely asymptomatic: wait at least 30 days from the first negative test before applying for fit-to-dive clearance conducted by a diving medicine specialist.
- Had symptomatic Covid-19: wait at least 30 days from the first negative test, plus an additional 30 days without symptoms (a total of two months) before applying for fit-to-dive clearance.
- Hospitalized with Covid-19 or related pulmonary problems: wait at least three months before applying for fit-to-dive clearance. The clearance should include complete pulmonary function testing, an exercise test with oxygen saturation measurement and a high-resolution CT scan of the lungs to verify a return to normal.
- Hospitalized with Covid-19 or related cardiac (heart) problems: wait at least six months before applying for fit-to-dive clearance. The clearance should include cardiac evaluation, including echocardiography and an exercise test (exercise electrocardiography) to ascertain normal cardiac function.

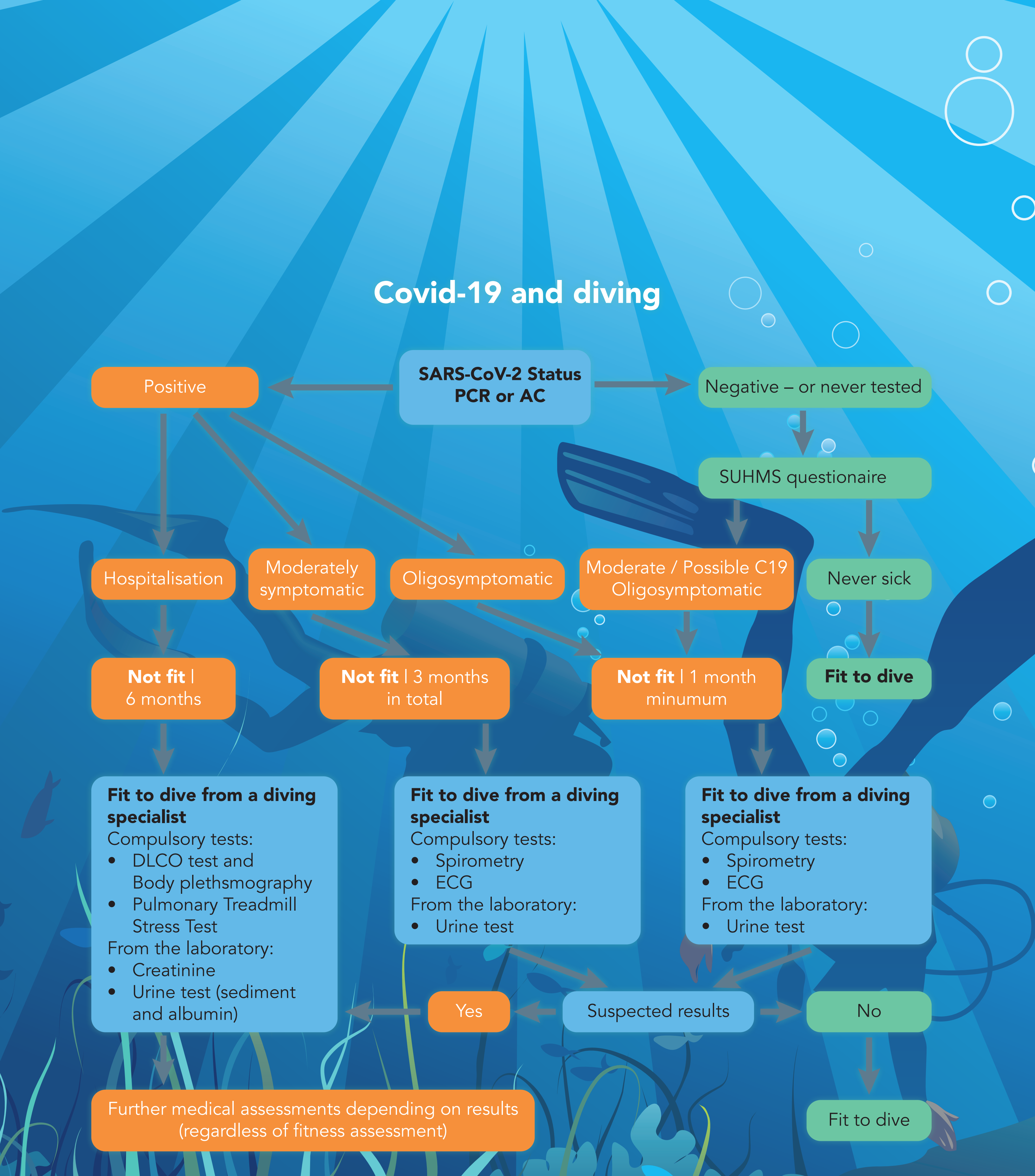


Figure 5. SOURCE: DAN, Covid-19 and diving[22]

Implications and recommendations for underwriting

Perhaps the biggest mistake that has been made in underwriting recreational scuba divers is failing to consider the whole person. We can't assume that scuba, as a sport, has standard risks that can be applied to each and every diver in the same way. As we have seen throughout this report, an individual's pre-existing health profile can have a huge impact on the risks they face diving, as can their experience, choice of air, and many other factors. When considering scuba divers, underwriters should take into account the applicant's entire profile and how different risk factors may be exacerbated by diving.

With this understanding of the risks associated with scuba, SCOR offers the following underwriting recommendations:

Ratings: Any dives that require mandatory decompression stops (that is to say, dives to or deeper than 10 meters/33 feet) have inherently more risk and will always require a rating. Any type of dive where the surface is not immediately accessible in an emergency (ice diving, cave diving, wreck penetration) will require a flat extra at a minimum.

Co-morbidities: Most conditions do not specifically exclude someone from diving if the condition is well controlled. In cases where there is poor control of diabetes, recent MI with any impact on fitness, or any condition that can lead to an unexpected loss of consciousness, the underwriter would exclude or decline.

Credits: Consider a lower rating (or credit) for healthy divers under age 40 with greater levels of experience/training. There should be no extra rating for the use of Nitrox.

SCOR is able to offer additional insights into the interconnectedness of risk factors in SOLEM, our underwriting manual, which has been updated in recent years to include comorbid conditions and offer updated ratings.

"In Japan, insurers consider medical and financial factors in underwriting, but they may not evaluate the risk of applicants' hobbies so deeply. Sport diving is not included in the list of dangerous sports that are excluded from coverage, but our underwriters would refer to SOLEM by SCOR, if we may need to evaluate sport diving."

Dr. Katsu Kubota
Chief Medical Officer, Head of Underwriting
SCOR SE Japan

"Scuba diving is hugely popular in Australia due to the year-round options available along our vast and beautiful coastline. The stunning marine life and fascinating shipwrecks entice many Australians to gain their certification, so we understand the importance of our people being well-informed on the risks to assist with our clients' diving inquiries."

Eimear Smith
Senior Technical Underwriting Consultant
SCOR SE Australia

"Sports diving remains a popular and relatively safe activity with worldwide participation, including Southeast Asia. A point to note is that the leading cause of diving accidents is related to the diver's underlying medical conditions. Thus, it is key to evaluate both medical and non-medical considerations for holistic underwriting assessment."

Kent Chong
Deputy Chief Underwriter
SCOR Southeast Asia

Conclusion

Scuba diving has come a long way in the past seven decades. While we can only guess what the future of diving might hold, ever-evolving technology is likely to continue to reshape recreational diving with more efficient and more reliable dive equipment. On the other hand, trends like climate change, over-tourism, ocean acidification, and increasingly frequent natural catastrophes might lead to the decline of coral reefs and the richness of biodiversity they host, leaving the most popular tropical dive locations lackluster. Perhaps this will mark a decline in the popularity of scuba diving and underwriters will see fewer divers' applications come across their desks. Or maybe this will lead to a geographic shift and we'll see more people starting to dive in areas where it currently isn't as common.

Whatever the future holds for scuba diving, underwriters should be prepared to take a holistic approach when it comes to understanding the risk represented by divers. We should remember that diving risks don't occur in a vacuum; instead, we need to consider risks on a case-by-case basis, taking into account an individual's medical history, preexisting health conditions, and diving experience.

For further information or underwriting guidance, reach out to your local SCOR underwriting contact.

We invite you to follow this ongoing series as we tour the world of extreme sports, tapping into SCOR's network of expert insurance professionals – and amateur athletes – whose passion and knowledge allow SCOR to break through common misconceptions and offer a better understanding of the true risks surrounding extreme sports for amateurs, professionals, and – occasionally – even spectators. We will also explore the most recent trends and the implications of new medical developments, predict how a changing climate and other evolving factors might impact these sports, and highlight the hidden links between Life and Health and Property and Casualty coverage in the world of extreme sports.

Appendix

Key dive terms

Surface interval: This is the time spent above the water in between dives. Surface intervals are important because it allows your body to "off-gas" excess nitrogen as it takes time to for the body to release the compressed nitrogen absorbed while breathing compressed air. Usually, the maximum required surface interval would be six hours between dives.

Decompression stop: Also known as a "safety stop," these stops are built-in pauses in the diver's ascent that allow the body to dispel gases dissolved in the blood. Without these stops, gases would expand, turning into bubbles and causing decompression sickness. Decompression stops are recommended for any dive deeper than 10 meters (33 feet).

Dive gear definitions

Dive computer: A dive computer takes depth and time information and applies it to a decompression model to track the dissolved nitrogen in your body during a dive. Your computer combines a depth gauge, timer and sometimes a submersible pressure gauge (SPG) into a single, useful instrument that calculates how much dive time you safely have remaining. The majority of divers have a computer because it makes diving easier.
Buoyancy Control Device (BCD): A BCD does exactly what its name describes – it gives you buoyancy control in the water. Sometimes you want to float on the surface comfortably or drift along effortlessly mid-water, observing the scenery. A BCD that fits you well, along with a weight system, allows you to do this by fine-tuning your buoyancy.

Regulator: The regulator is a device that delivers air to the diver and lets the diver breathe underwater. Regulators deliver air to the diver by using two separate "stages" to reduce the high pressure of the air from the tank. Both stages working together make it possible for the diver to get air delivered at a pressure that is comfortable for breathing. The air moves first through a regulator's first stage which is attached to the scuba tank, into the regulator's second stage, which is the part through which the diver breathes. The second stage has a comfortable mouthpiece attached, allowing the diver to breathe from it easily.

Octopus/emergency regulator: All divers carry a backup second stage, also known as an "octopus regulator" or a "safe second stage." This regulator acts as a backup in the event that another diver needs additional air to get back to the surface, or more rarely in the event of a problem with the diver's own second stage. The backup can either be a second mouthpiece attached via its own hose to the first stage or incorporated into the hose that you use to inflate and deflate your buoyancy compensator.

Endnotes

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