Scuba Guide

Guiding Divers

Problem Solving

Legal Climate

SCUBA Courses & Publications
Scuba Guide
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**Introduction**

Scuba Guide is the first professional level in recreational diving. Scuba Guides provide services to certified recreational divers. Divers seek such services to take benefit from the knowledge and skills of the Scuba Guide. In part such benefits are related to safety, but mostly divers seek benefit of logistics and local knowledge in order to enjoy a comfortable and exiting dive.

Scuba Guides must have excellent knowledge of diving equipment, compressors and Nitrox in order to recognise problems and to solve such problems on-site. They must be good divers with excellent navigation skills and experience with deep diving to avoid long swims and to be able to return a diver, who wandered off, to the group. For reasons of safety, they must have completed both the Oxygen First Aid and Safety & First Aid courses. To make dives interesting and enjoyable, detailed knowledge of the underwater environment (both general and specific to the site of the dive) is required.

The aspects mentioned in the previous paragraph are not the subject of this book. The training to become Scuba Guide requires participation in courses in which the above aspects are covered. This book covers how Scuba Guides work, how they handle problems and what they can do to avoid legal problems.
Guiding Divers

This first section of this booklet covers the work of a Scuba Guide, assuming that all goes as planned. Problems and a possible need for intervention are addressed in later chapters.
The Role of a Scuba Guide

The job of a Scuba Guide is to create comfortable, enjoyable and safe diving experiences for recreational divers. This can either be done as a commercial activity, or simply as outdoor activity amongst family and friends. Although a Scuba Guide does have a role during the actual dive, most of the work is done before and after.

The comfort of a dive is increased by providing services. The level of provided services can vary greatly. It can be limited to you being the one who brings the buoy and emergency oxygen to the site. It can also go to the extent that everything is prepared on site. Scuba units set-up and ready to be donned, towels, food and drinks for after the dive and all else that is needed so that the divers only have to put their suit on, grab their gear and go in the water.

Enjoyment of a pleasant and exiting dive requires you to know the site. Your navigation skills must allow you to guide the group to the best spots and your knowledge of the underwater environment must be sufficient to explain what has been seen. As a Scuba Guide you are an expert on local diving and the local environment. The remuneration you can ask for your services largely depends on the number of return visits you generate. That in turn mostly depends on the level to which the divers feel that your presence is enriching. Your expertise is what makes people like diving with you.
If you dive with Scuba Divers, you are responsible for all aspects concerning the safety of a dive. That is not the case when you organise dives for autonomous divers. Being an autonomous diver means that they are trained to take responsibility for their diving activities. Within the limits of their training and experience, they can take decisions pertaining to the dive themselves. For Open Water Scuba Divers that means a maximum depth of 20 metres on sites that provide a physical depth restriction. Basic Advanced Scuba Divers can dive to the same depth, but on sites that are not limited by the depth of the bottom, while Advanced Scuba Divers can dive up to 30 metres depth. All of them are limited to diving conditions that they are already acquainted with.

Your role with respect to safety when it concerns autonomous divers is based on your duty of care. You are hired to do a job. That job is assuring comfortable, enjoyable and safe dives. That raises the question who is responsible for what aspect of “safety”. There is no clear answer, but your part pertains to the fact that you are providing a service and to the probability that your level of knowledge and skills is superior to that of the participating divers.

The fact that you are providing a service requires you to take the same measures and precautions that another Scuba Guide would have taken in the same circumstances. Bringing first-aid and oxygen equipment to the site can (most probably) be seen as a “standard” measure, just like obtaining a weather report. Securing the site with buoys, lines or other measures is expected when circumstances warrant such precautions.
Your superior level of knowledge and skills relates to identifying local dangers (current, underwater life, or other) and informing participants on the required procedures to prevent problems. Reminders for safe diving practices (such as making a safety stop) also fall in this category. Lastly it addresses your physical ability and skill level to help divers should they require that.

**Attitude, Knowledge and Skills**

As a Scuba Guide, you get to spend a lot of time in the water. However, you must always keep in mind that diving is not your primary role. For you, diving is not the same as for an Open Water Scuba Diver, Master Scuba Diver or even a commercial diver. You do not dive for your personal pleasure or to do a job, but to assure the pleasure of others. Being a Scuba Guide therefore means that you must take pleasure from fulfilling the desires of others.

As a provider of comfort, enjoyment and safety, you must find a balance between the different aspects of your job. Although it may be tempting to see safety as your first priority (that point of view can make you feel more important), you must always remember that all three aspects of your activity have equal priority.

Of course you must require or interdict some sort of action when safety warrants such a measure. And, of course you must cancel a dive if the conditions are too harsh for the skill level of participating divers. That does not mean that “safety” can be used as an excuse to manoeuvre yourself in a position that makes you feel to be an authority. Unnecessary or exaggerated safety measures will undermine you authority, rather than support it. Divers will simply not enjoy diving with you.
Divers have been trained at different locations and by different instructors. They are likely to do some things different from the way you do it. That is not a problem. In diving there are “multiple truths”. It does not matter if you push the top of the mask when clearing it of water, or to lift the bottom of the mask. It does not matter if you go back on the boat with your fins on (like many French divers do) or if you take of your fins before climbing the ladder (as most German divers do). It is probably “safest” when divers do tasks and skills in the way they were trained and have experience with.

It is not the role of a Scuba Guide to teach people better. Keep an open mind. The way you have learned to do things is only one of many ways. Even if you are convinced that the way you do something is far better, do not get tempted to “become a teacher”. Teach only when asked to do so. That is obviously the case when people sign-up for a course. For you as a Scuba Guide, interest to learn is expressed by signing up for a dive in different circumstances or by asking specific questions. Explaining how to best get in the water at a specific location is part of the “comfort aspect of the job”. Answering questions as good as you can, belong to the “enjoyment part of the job”.

Creating a desire to listen to your advice or to ask you questions depends on your expertise. People see how you do things and remember how clearly and accurately you were able to answer previous questions. To establish your role as an authority and to bring divers to appreciate your services requires excellent knowledge and skills.

Your training as a Scuba Guide requires that you complete courses on different subjects. The foundation of this training lies in the general diving skills that are part of the Scuba Diver, Open Water Scuba Diver, Advanced Scuba Diver and Scuba Safety & First Aid courses. You should be able to perform the skills learned in those courses in an exemplary manner.

Specialised skills and knowledge, which are useful for providing comfort, enjoyment, and safety, are learned in the additional programmes that a Scu-
ba Guide must complete. This module about guiding divers only covers the techniques that are used by Scuba Guides to organise and conduct dives. Those skills are part of your expertise, but not sufficient to satisfactorily fulfil your role.

Training in equipment, compressors and Nitrox installations is needed to help divers with any problems they experience with their dive gear and to evaluate if the equipment used by divers is suitable for the prevailing conditions. Training as a Nitrox diver is needed for similar reasons. Additional oxygen requires precautions and dive planning must be altered. As a Scuba Guide you must be able to verify if this is done properly.

Training as a deep diver and underwater navigator improves your skill level in the water. It can always happen that you have to return a diver to the group who has descended deeper than planned. This means that the Scuba Guide must be trained for these greater depths. Navigation skills allow you to make a dive more comfortable by avoiding long swims at the beginning or at the end of a dive.

Naturalist training is essential for your role to provide enjoyment. Divers want to know about the things they have seen underwater. It is important that you as a Scuba Guide are a rich and reliable source of information. The training you receive is of a general nature. It is your personal responsibility to add local knowledge to your know-how.
Finally your training must include first aid with oxygen training. That training is purely meant for your role in safety. The course does however relate a lot of information on physiology, which strengthens your knowledge of diving theory.

The level of Scuba Guide does not require abstract knowledge (as would be the case for Assistant Instructors and Instructors). The work of a Scuba Guide is “in context”, which means that it is rather applied knowledge that is needed. Abstract theory does make it easier to respond to questions, but as long as you don’t desire a role in teaching, such knowledge is optional.

Preparation – Making a Map

Preparation for all aspects of your task (comfort, pleasure and safety) requires knowledge of the dive site. It may be necessary to visit a site multiple times before you can add it to your list of diving opportunities. You must find out where the best spots are, assure you can navigate the site, make yourself acquainted with the environment, and so on. The level of knowledge you require cannot be obtained by simply interviewing a third party who has local knowledge.

Your preparation is done best by making a map of the site. If the site is for a shore dive, the map should include infrastructure on land (parking, where to get changed, where to enter the water). If it is for a boat dive, the starting point should be the mooring, or the location where to throw anchor. Making a map serves to explore the site for the best features, to prepare for navigation, to become aware of interesting environmental details, to identify any dangers and to be ready for briefings when you use the site for autonomous divers.

A map must be simple and without much detail. It should be possible to draw a copy of the map on a sheet of paper or a whiteboard in a matter of minutes. You will probably make an electronic version of the map (maybe
even for divers to charge them on their dive computer) and a waterproof hardcopy to use during your briefings. Also consider uploading your map on the internet so that divers can include it in the logging of the dive. That it should be possible to copy the drawing in a few minutes does not mean that you draw it again at the beginning of every dive.

For Scuba Divers, the map is just used to inform them (before the dive) of what they can expect. For autonomous divers, the map is important to prepare their individual dive plan and navigation. For that purpose, the map should indicate the depth of different locations (depth lines work well for that), the most interesting spots and landmarks that can serve for navigation. The location for entering the water (or location of the anchor) is one such landmark.

Although a map of a dive site should be simple (as it can be drawn in a few minutes), for many it will still be too complex to serve for navigation. In the Advanced Scuba Diver course, divers learn how to project a simple shape (rectangular or triangle) on a map to simplify navigation. Keep this in mind when you suggest a route for the dive. As feature of the map, you can provide a suggested pattern. To allow the use of a compass for navigation, the map must have compass references, such as an arrow pointing north.

**Preparation – Emergency Plan**

Although most of the safety aspects of organising dives relate to prevention, you must always assume that accidents can happen. If there is an emergency, many decisions must be taken in only little time. To improve your ability to act swiftly in case of a problem, you must prepare yourself. This is done by taking a closer look at the site and collecting relevant information.
You will want to know where and how a diver in distress can be brought out of the water. There must also be a plan to recall the divers when needed. Evacuation routes are the next point. If the dive is done from a boat, what is the nearest mooring opportunity to meet emergency medical services? If you dive from land, can emergency services easily find the site, or is a rendezvous location needed. What are the emergency numbers (or frequencies) to be used? Also identify locations that should be avoided during evacuation because of surf, strong current or rocks.

Some exits require special equipment, such as ropes or a stretcher. You will want to know if such equipment is on-site, or if you need to bring it. Only include “permanent” information in an emergency plan. Every time you visit the site, you observe again and take not of temporary limitations and possibilities, such as weather conditions and the skill level of other divers on the site. Take a look at possible resources (human, equipment and materials). An emergency plan is not a step-by-step protocol, but a collection of useful information that can be useful in an emergency.

**Preparation – Materials**

Your familiarity with the site is also needed to establish what materials you need to bring for a dive. Lines, buoys, dive flag, emergency oxygen, first-aid kit, material for diver recall, spare equipment and so on.

In addition to diving related materials, also consider the comfort of the diver. Food, drinks and shelter may be needed at remote locations. Verify the telephone service and bring other communication equipment if needed. Do you need side-scan radar to locate the exact site or will GPS coordinates or a cross-bearing do?

The amount of material needed depends on the extent to which you can rely on on-site services. Lakes, rivers and the coast are often the location where people go fishing, jogging, walking or other. If a location is frequented a lot, there is
normally infrastructure to buy food and drink. If there is a dive operation close-by, you should not have problems getting cylinders filled and can maybe make use of permanent installations, such as ladders to enter and exit, diver-down flags and other. The further you move away from companies that can provide services, the more self-reliant you must become. That could go to the extent that you need to bring a compressor to the site.

Do not only concentrate on logistics to simply allow dives to take place and keep divers hydrated. Also consider if the site becomes more attractive with gadgets. Dive lights or magnifying glasses can increase the enjoyment of a dive. If people are interested in fauna, maybe you could bring some fish ID books.

Planning Dives

The planning of a guided dive for Scuba Divers largely follows the steps that are explained in the Open Water Scuba Diver manual. As Scuba Guide, you take the role of autonomous diver. The Scuba Diver is accompanying you on the dive. Your special skills as Scuba Guide do not so much play a role during planning, but more during the actual dive. Since Scuba Divers have not yet learned all the necessary skills to be self-reliant, they rely on you to take care of many tasks for both of you. Their dependence on others for several aspects of the dive is the reason why they are only allowed to dive with a professional.

If you do a guided dive, for planning you take the same approach as for a dive with Scuba Divers, regardless of the certification level of participants. The parameters of the dive can be different. For deciding on the parameters, you take the diver with the lowest certification as reference. The number of divers you take on a guided dive should be low. It must be possible for you to oversee and to control the entire group.

Dives you organise for autonomous divers are not always guided dives. If divers will go in buddy-teams, the planning of a dive is different. In such cases you provide a “box” within which each team can do the more detailed planning for their own dive. You establish limits with respect to the duration and depth of the dive. With help of your map, you provide input on in-
teresting features and suggested routes. In that process you remind divers of general safety rules, such as safety stops and respecting personal depth limits, and give information on things like a recall signal. The “box” and the additional information you give are all aimed at assuring a comfortable, enjoyable and safe dive.

The buddy teams completely rely on the accuracy of your information. If you mix up east and west, or if you give wrong information on the starting point of the dive, the individual planning will be completely off. Not only must your knowledge of the site be adequate to provide information on the site, but you must also express yourself clearly.

Logistical considerations are an important part of your planning. Assure that the location and time to meet are clear for all. Give advice relating to clothing based on the weather report and the dive conditions. Also provide information on available service on site (filling cylinders, food, drink, shelter). Do not limit your planning to the dive itself, but also consider all aspects before and after the dive.

Assigning buddy teams can be seen as a part of the planning. For safety, it may be tempting to team-up an inexperienced diver with a highly qualified diver, but again you may not forget to consider comfort and enjoyment. Experienced divers tend to consume far less air than new divers. It can be frustrating for them to end a dive when they still
have plenty of air. It can also be that some divers have already planned to dive together and assume that this is okay.

The more data you have on the divers, the better you can assign teams. If there are novices, consider to team-up with them yourself. Consider personal preference (ask who wants to dive with who) and then team-up whoever is left by best matching the individual divers. For matching teams, look at apparent affinity during preparations and transport, consider certification level, experience and (if visible) activity. Photographers for example are not always very popular buddies, because they tend to be pre-occupied throughout the dive.

**Briefings**

Once your map, the emergency plan, the list of required materials and the planning are done, you are ready to prepare your briefing. There is no standard sequence for your elaboration. Prepare your briefing according to the main concepts that have been mentioned several times (comfort, enjoyment and safety). For the purpose of communication, dive sites need a name. If such a name is not yet available, then it is up to you to invent one. Mention the name during the briefing, so that dives can include it in their logbook.

Describe the dive site (using your map) and give advice for navigating the site (if autonomous divers will navigate as a buddy team). You may already have provided information on logistical considerations, but if not, you may include them in the description. Tell the divers what underwater life is to be expected, or emphasise other special features of the site. Another aspect of this part of the briefing is the diving conditions. Provide information on
temperature, waves, current, visibility and other factors that can affect the diver.

If there are any techniques that differ from the “standard” way to dive a site, the briefing is the moment to explain these. This can relate to entries and exits (techniques and locations) or to the dive itself. The same applies to specific emergency procedures and the way you will recall the divers if that becomes necessary. A reminder of standard safety practices, such as doing a safety stop can also be included, but take the level of experience of the participants into account for such aspects.

You must also clarify your role. Make it clear what divers can expect from you and what you expect from them. Especially if you do not guide the whole group, but provide a “box” within which the divers have their own responsibility for the detailed planning. Also tell them where you will be and (if you are with them underwater), how you can be recognized. In your explanation of what you expect from the divers, you can also include expectations pertaining to behaviour with respect to the diving environment.

Managing a Dive

At the beginning of the dive, note who dives with who, what the air supply is and the expected dive time. If the group dives in individual buddy teams, you can consider noting information on the intended route. Check the equipment before divers enter the water and make sure each team does a buddy check. Pay attention to last minute cancelations because of malfunctioning equipment or other reasons.

Entering the water is often one of the most challenging parts of a dive. You may be able to increase comfort for individual divers by assisting them. Take note of the time that individual teams descend.

If you stay on land, chose a vantage point from where you can oversee the entire site. If you dive with a group of autonomous divers, there is no “standard” positioning or procedure. The idea is to have an overview of what all divers are doing and to be able to point out interesting features of the site. If navigation is complicated, you can ask teams to follow you to a
starting point from where on they can continue on their own. Depending on your intentions, you can either stay in front, behind, above or besides the group. Position yourself in such a way that you can provide maximum enjoyment and safety.

If you do a guided dive, you should limit the number of divers. As the guide, you probably swim in front; turning around in short intervals to assure the group is still following you. Since you are guiding, you do the navigation and point out interesting features. As the group is planned to stay together, you must assure that the parameters of the dive respect the diver with the lowest certification level. When guiding, you must also check the air supply of the divers in the group. The group ends the dive together and that should be done before the first diver needs to use the reserve.

When diving with Scuba Divers, you not only fulfil the role of buddy, but are also the one who needs to control the dive and must act in case of a problem. Scuba Divers gain experience with every dive they make. It may thus be justified to increase group size with time. If the Scuba Divers you are guiding have just been certified, you must be very conservative when it comes to ratios.

Managing dives can be hard, because there is no standard protocol that can be followed. There are too many factors to be taken into account. The level of the participants, the diving conditions, the site, surface support and many others, all have an influence that must be reflected in your decisions. Learning how to do this cannot be done from a book or by listening to lectures. Dealing with context can only be learned in context. This is why most of the “Guiding Divers Module” is practical.
Problem Solving

Not all dives go as planned. You must expect to come across problems with divers having stress, equipment and divers not having the skills or physical level that you would have expected. Since the comfort, pleasure and safety of the divers is your concern, a Scuba Guide must have skills in problem solving. That is the subject of this chapter. The chapter is completed with a reminder on emergency management.
Dealing with Stress in Divers

The subjects of recognizing stress and what to do about it are covered in detail in the Scuba Safety & First Aid manual. As is explained in that book, improving the ability to cope with stressors is not really something that can be done in the duration of a single dive. There are exceptions. If stress is related to fear of the unknown, a coping strategy can be to provide the diver with more detailed information on what can be expected during the dive.

In most cases, helping divers to deal with stress will be an evasive strategy. If the dive will be made in a group, an evasive strategy is likely to affect the dive plan for all the divers involved. You may need to dive at shallower depth than planned, to avoid swims against the current or other measures that could affect the enjoyment of the other divers in the group. That again may lead to peer-pressure. The diver may feel that he should continue as if nothing is wrong, to avoid affecting the dive for the others.

Stress must be dealt with. Recognition is the first step. During preparation you need to stay attentive to all the divers in your group. When you have recognised abnormally high stress in an individual diver, you must consider that diver, as well as the comfort, enjoyment and safety of the rest of the group. For you as a Scuba Guide, an overly stressed diver is a tricky situation. If the dive is planned to be in buddy teams, you can just team up with the affected diver and see how it goes. If the dive is done as a group, you must avoid a situation in which you have to split the group.

Sending a diver back to the boat or the beach after the dive has already started is not an option. Stressed divers are not fit to be in the water on their own, even if it is just for a 20 metres swim. Bringing an overly stressed diver on a dive that you are guiding on your own may thus mean that you have to
abort the dive for the entire group. When confronted with a stressed diver, you should carefully consider your options. Not allowing the diver to enter the water is one such option.

**Problem Management - Equipment**

Most equipment related problems are small and can be taken care of on-site. Make it a habit to carry a spare mask, straps for masks and fins, tie raps, O-rings, mouthpieces and other items that can easily be replaced. Also add tools such as spanners, side cutter and allen keys. For dives in a remote area or from a boat, consider bringing a complete set of equipment as spare. As a Scuba Guide it should be your objective to assure that all divers present can enter the water. Solving equipment related problems is a necessary step in achieving that goal.

Sometimes a diver has doubts if an equipment item is functioning properly. For most equipment, this is easy to establish. You can inflate and deflate a BCD, check mask and fin straps and so on. Determining if a regulator is still in order and safe for diving is harder, but can be done with a small test. This test can be applied to regulators of all makes, even if the diver does not have data available such as the exact intermediate pressure for the specific regulator. The test can only be used on “correct” regulators, meaning that the second stage and the octopus are of the same brand, or at least compatible with respect to the intermediate pressure.

There are 5 steps to be completed, and before you get started you need a full cylinder and a bucket of water.

- Connect the regulator to a closed cylinder and check air integrity.
- Open the cylinder and check condition of O-rings, intermediate pressure valves and high pressure valve.
- Check the condition of the second stage.
- Check the intermediate pressure.
- Check the flow.

In **step 1** the regulator is connected to the cylinder valve. The valve should not be opened. Now try to breathe gently from the second stage (this has to be done gently, otherwise you risk air passing through the exhalation valve,
which would interfere with a correct diagnosis). If the regulator is equipped with an alternate air source, the same procedure should be repeated on that mouthpiece.

If no air comes out of the mouthpiece(s), the first step is completed. If you draw air, you need to find the location of the leak. The first thing to keep in mind is that the air coming out of the mouthpiece can come from a leak at many different locations. It does not necessarily come from a leak in the second stage you are trying to inhale from. A technician thinks of a regulator in terms of: high pressure chamber, intermediate pressure chamber and ambient pressure chamber. Theoretically seen, the air coming out of the second stage mouthpiece can come from a leak in any of these areas.

It is unlikely that a primary second stage and the alternate air source both get a leak on the same day. If you can draw air from the primary second stage, but not from the alternate air source, it is likely that the leak is located in the ambient pressure chamber (the housing of the second stage) of the primary second stage. If you can draw air from both mouthpieces, it is then likely that the leak is located in either the intermediate pressure or high pressure chamber.

The high pressure chamber (as a definition for the use in this test) is the area form the location where the high pressure gas from the cylinder is entering the first stage, up to the high pressure seat. It also
includes everything that is connected to that area (such as an SPG). With a closed cylinder, the passage between the high pressure chamber and the intermediate pressure chamber is open, due to the lack of cylinder pressure.Leaks in the high pressure chamber are normally very small. Too small to be detected in step 1, but this is not a problem, because step 2 will reveal any leak in that area.

The intermediate pressure chamber is the area between the high pressure seat and the intermediate pressure seat in the second stage(s) and all that is connected to that. This means that the intermediate pressure chamber has a part in the first stage and consists of all intermediate pressure hoses (including inflator hoses) and the connection(s) to the second stage(s). Leaks in the intermediate pressure chamber can be found by listening along all intermediate pressure hoses while inhaling from a mouthpiece, especially the connection of the intermediate pressure hoses at the first stage and at the second stage. Give the inflator hose special attention, because this is frequently the cause of a leak in the intermediate pressure chamber.

The ambient pressure chamber is the area from the intermediate pressure seat in the second stage, up to the mouthpiece. A leak can be located in the membrane, can be a worn mouthpiece, and can be a damaged housing or a broken or stuck exhalation valve. Any leak found in step 1 should be repaired before progressing to step 2.

**Step 2** involves opening the cylinder and looking for leaks. As you are dealing with a regulator that is thought to have a problem, you should keep all the hoses firmly in the hand when opening the cylinder. A leaking intermediate pressure hose can cause injury. Keeping them firmly in the hand prevents them from whipping around.

When defining the leak, you have to distinguish between passive O-rings and active O-rings. A passive O-ring is one that is not in contact with a moving part of the regulator (such as a piston). These O-rings are not subject to wear due to friction. Passive O-rings degrade with time. They can get cracks or deform. An active O-ring has the same problems, but in addition they have the problem of wear caused by movement in the regulator.
A leaking passive O-ring will let air escape at the location of that O-ring. This can be the O-ring between the cylinder valve and the regulator, the O-ring between an intermediate pressure hose and the first or second stage, an O-ring sealing a plug in the first stage, etc. To clearly identify the location of the leak, you can simply hold the regulator underwater.

![Diagram of regulator components]

A leak of an active O-ring takes some consideration. An active O-ring is in most cases the seal between the high pressure chamber and the intermediate pressure chamber, the high pressure chamber and the ambient pressure chamber or the intermediate pressure chamber and the ambient pressure chamber. This means that the air leaks into another chamber and not directly into the environment. The location where the air is leaking out of the regulator is not the location of the leaking O-ring.

This requires you to really understand the construction of the regulator in order to be able to identify the real location of the leak. The same problem applies to a leak at the high pressure valve or the intermediate pressure valve. In any case, a leak at an active O-ring cannot be fixed on site as the regulator must be completely opened. This must be done by a technician.

Air flowing from the mouthpiece can originate from either the first stage or the second stage. This means that it is necessary to define the source of the problem before doing a repair. To do this, technicians close the cylinder again and depressurize the regulator. When opening the cylinder valve again, they listen. If the free-flow starts immediately when the regulator is pressurized, the leak is located in the second stage. If there is a delay (even only half a second) the leak is located in the first stage.

- Second stage explanation: before opening the cylinder, the first stage is “open” allowing an immediate flow of air to the second stage and an immediate flow to the mouthpiece when the intermediate pressure seat is open (broken or wrongly adjusted). If you are not sure you hear a leak, you can hold the equipment under water and look for bubbles.
• First stage explanation: before opening the cylinder, the first stage is “open” allowing an immediate flow of air into the intermediate pressure chamber and to the second stage. If the second stage is adjusted correctly and not broken, the flow will be stopped at the intermediate pressure seat. As soon as the pressure in the intermediate pressure chamber of the first stage reaches the pressure needed to close against the spring and the ambient pressure, the flow will stop. The regulator stabilizes in closed position. A small leak at the high pressure seat will now allow additional air to leak into the intermediate pressure chamber, increasing the intermediate pressure. At some point the pressure in the intermediate pressure chamber will exceed the force of the spring and ambient pressure in the second stage and a free-flow will start. Depending on the size of the leak, the delay can be a fraction of a second or several minutes, but there will be a delay.

**Step 3.** If step 1 and 2 did not show any leaks in the second stage, all the functions for inhalation and exhalation are already verified. This only leaves the verification of the adjustment of the regulator (and later in step 5 the flow). If a regulator is not free-flowing, the lever is not too high. The only wrong adjustment could involve a lever which is too low. To verify this, you gently shake the regulator. This allows you to estimate the play the lever has (the distance from the membrane). If the lever is too far from the membrane, the regulator is not safe and must be adjusted before diving with it. For the purpose of this test, adjust before progressing to step 4.

After the verification of the second stage it is time to do **step 4** for verifying the intermediate pressure. Normally this is done with an intermediate pressure gauge. In the field you most probably do not have such a gauge, or even the manufacturer specifications for the correct intermediate pressure.

Each brand of equipment has a specific intermediate pressure which is used in all current models. This means that the springs in the second stages of that manufacturer are adapted to the intermediate pressure the first stages of that brand are to be set for.

We make use of that fact to verify the intermediate pressure the first stage is delivering by using the second stage of the same brand as an intermediate pressure gauge. Considering that the correct cracking pressure for most regulators is around 3 to 5 centimetres of water pressure, we can slowly descend a second stage (no water inside) upside down in a bucket of water.
The water will exert pressure on the membrane and will activate the regulator when the pressure exerted on the membrane is equal (or higher than) the cracking pressure of the regulator. If the regulator has to descend 3 to 5 centimetres deeper than the deepest point of the membrane, the cracking pressure of the regulator is appropriate. An alternate air source of the same brand should give the same result. If the cracking pressure is off, the first stage (not the second stage) is not correctly adjusted.

The last thing to verify in step 5 is the flow of the regulator. All divers have heard a free-flowing regulator when a regulator is dropped in the water upside-down. We are used to the sound and the regulator we are testing should be able to provide a flow which sounds similar to the flow we have been hearing before. To make a regulator free-flow, we have several options, but the purge button is not one of them. Modern purge buttons allow us to depress the membrane only a few millimetres. You can immerse the second stage upside down in the bucket of water, you can make a violent move with the second stage, which is instantly stopped against your other hand or you can inhale sharply from the second stage while pulling the mouthpiece away from your mouth.

If there is not enough flow, there is a restriction between the cylinder and the mouthpiece. The regulator should not be used. Do make sure that the cylinder has enough pressure. If the cylinder pressure is only 5 or 8 bars, the first stage will not be able to create the needed intermediate pressure (around 10 bars) and the flow will be very mild. The cylinder valve should be completely opened. If the cylinder is only opened half a turn, all other steps will work, but the cylinder cannot supply the first stage with enough air for adequate flow.
If all steps from 1 to 5 work well, you can be assured that the regulator is in good condition. This test works as a confirmation that there are no technical objections against the functioning of the regulator and at the same time allows a technician to identify the problem in case the regulator fails in one of the steps.

The more you understand of the functioning of regulators and other equipment items, the better you will be able to recognise and solve problems. This is why the completion of an equipment course is a requirement for Scuba Guide certification. You should also consider attending training programmes conducted by manufacturers. Often such programmes are accessible via the dive centre you are working with.

**Problem Management – Skills and Ability**

It can happen that you are confronted with divers who are (physically or for skill level) simply not up to the challenges of the planned dive. There are only few restrictions that would exclude people from becoming a diver. The medical that is required does in most cases not take physical fitness into account. People with physical challenges (such as amputations) are encouraged to take up diving. There are instructors with marginal attitude who issue certifications before the course participant has achieved the level of skill that is required for the course. Skills that were once learned can degrade over time. All of these can cause problem for the planning and conduct of dives.

As with stress, it is not easy to address problems with skill or ability. Divers may be offended by the suggestion that they may not be up to the challenges of a dive, or feel embarrassed. Admitting that they will not be able to handle
the conditions may feel to them as admitting incompetence. The way you deal with a lack of skill or insufficient ability can therefore be compared to the way you do an assist for a diver. You approach any solution as a mutual effort. Rather than you helping, you fight the challenges together.

Divers with inadequate skill or ability place you in the same situation as divers with stress. Preventing emergencies requires handling issues relating to equipment, the ability of the diver to cope with the circumstances (stress) and the level of skill and ability. All of these, in turn, stand in relation to the conditions in which the dive takes place. You would expect divers to only sign up for dives that are within their personal limits, but you cannot count on that.

Since it is not possible to improve physical condition or skill level just before the start of a dive, your only options are to provide assistance, to alter the dive plan in order to reduce the influence of the conditions, or to refuse taking the diver into the water. Just as with stress, your decision could not only affect the dive for the diver in question, but for the entire group.

Your first step must be to inform the diver of what is to be expected during the dive and which demands this will have for skills and physical fitness. You can then explain how much assistance can be provided. If the diver is unknown to you, you cannot yet be sure that your estimation of the level of skills and fitness is correct. After you have informed the diver (unless in cases where it is obvious that there is a real problem), the diver must decide to participate or not. If you know the diver and are aware that the conditions are too harsh, you must refuse participation.

If your observations of a diver during a dive, or a need for assistance, confirm your estimation, then you need to address the issue after completion of the dive. Talk to the diver and point out lack of skill or physical condition. For the safety of the diver in future dives, your input is important to be better informed of personal limits. The diver must be made aware that a certification does not imply an authorization to dive within certain parameters. Certification level must be taken into consideration, as must physical condition, experience, health, lapsed time since the last dive, experience with local conditions, and so on.
Problem Management – Handling Emergencies

Emergency management has been covered in detail in the scuba Safety & First Aid manual. The procedures and the thinking process you follow as a Scuba Guide do not differ from a diver at the level of Scuba Safety & First Aid. There is a difference in the level of preparation that is expected from you. You are expected to have an emergency plan, to be fit to act in an emergency, to have the required equipment (lines, oxygen, first aid material and so on) and to act swift and adequate when it comes to an emergency.

All divers have some level of “duty of care” toward other divers. The fact that you offer diving activities implies a promise to do your best to assure comfort, enjoyment and safety. Even if you do not say that you are there for the safety of the divers, it is expected. In the diving community it is considered “normal” that a Scuba Guide is prepared to act in case of an emergency. If an emergency arises and if it appears that you were not prepared, you are not considered a “reasonably prudent Scuba Guide”, which can lead to an accusation of negligence.
Legal Climate

The fact that you offer services to divers (regardless if you are paid for that or not) has consequences for your duty of care. As a professional you are expected to do what other reasonably prudent professionals would have done in that same situation. What a reasonably prudent professional does is not defined in national law. It is embedded in the understanding the diving community has of the role of a Scuba Guide. If your actions (or inaction) fall short of expectations, you can be accused of negligence. You must be aware of that possibility and know how you should conduct yourself to fulfil expectations.
Liability, Intention and Negligence

Every person is responsible for his own behaviour and decisions. The responsibility of a Scuba Guide requires additional attention, because of the higher responsibility that comes with a promise to look after the wellbeing of other divers.

If your behaviour and/or decisions do not meet the expected level, there can be legal consequences. Another person, a company or the state can claim that you did not fulfil your responsibility and initiate a legal procedure. If it is a person or company, it is mostly done with the objective to be compensated for damages. If it is the state, it will mostly seek punishment in the form of time in jail or a fine.

In the role of a Scuba Guide, you are expected to take a proactive approach and to anticipate possible problems. Actively doing something wrong speaks for itself. Not doing something that could have reasonably been expected from you carries the same consequences. The worse situation obviously arises when it becomes clear that your action (or non-action) was intentional. You have done or not done something in the full awareness of possible consequences.

Negligence is more relevant for guiding dives. It means that you have done (or not done) something, which resulted in damage, but that you were in a position to recognise the situation and could have acted appropriately. What you intended to do is not relevant, only what you have done. For example: if you initially cancelled a dive, but then allowed the divers to persuade you to take the group anyway, your initial cancelation is not relevant anymore - to the contrary. Your initial cancelation shows that you were aware of the bad (or even unacceptable) conditions.
To be found negligent, five questions must be answered affirmative:

- Were there damages?
- Did the person have a duty of care?
- Was the duty of care not fulfilled although the person could have recognised the situation?
- Was not fulfilling the duty of care the direct cause of the damages?
- Could the damages have been avoided?

You do not fulfil your duty of care when you do not act as could have been expected of a reasonably prudent Scuba Guide in the same situation. For some professions this expectation is rather clear, as it is formulated in the law (with various levels of detail). For a trucker it is clear how often to take a rest, how many millimetres profile a tire needs, how fast to drive where and when, if alcohol is allowed, and so on. This allows us to tell beforehand what is right and what is wrong.

In most countries, diving is hardly regulated. This eliminates the notion of right and wrong. Judgement is based on expert opinion, which is formulated in hindsight. The expert is aware of what you have done and what the circumstances were. The content of the expertise can vary substantially, based on the background of the expert that was selected. The expert is asked to respond to specific questions that are asked by the court. The answers from the expert have substantial influence on the judgement in the case.

To make the situation in diving clearer, diver training organisations have taken the initiative to formulate an “industry standard”. Such standards are published in EN and ISO norms. Diver training organisations (such as SCUBA C&P) then base their standards and training system on these norms. Unfortunately, most of these norms relate to diving equipment, training and dive centres. Although the training of Scuba Guides is subject to a norm, there is no clear standard for the work a Scuba Guide is doing.

Pay attention to the formulation of the sentence that stands at the basis of your duty of care: “As a professional you are expected to do what other reasonably prudent professionals would have done in that same situation”. This means that context (that same situation) is taken into account. Taking context into account excludes diver training organisations and the dive centre for which you work from responsibility toward your clients (they have a
responsibility toward you and must be able to justify that they have given you authorization. They are not on-site and thus unaware of the situation.

Let’s say a training organisation would allow you to guide 8 divers, and your boss would say you should take only 4. On-site you are confronted with bad visibility (only 2 metres). In your opinion, you should not take more than two divers in such circumstances. Based on standards and the instructions from your boss, you now decide to go in with four divers. If this leads to an emergency, it is (from a legal point of view) of no concern to your boss or the training organisation. They would just have to say: if I would have known the visibility was that bad, I would not have gone diving at all, let be with four divers. As only you are on-site, only your decisions have legal relevance. Standards and instructions can be used to guide your activities, but they cannot serve as an excuse for a bad decision.

As a Scuba Guide, there is no “right and wrong”, only “appropriate or inappropriate”. Because context must be taken into account whenever you take a decision, right and wrong does not make sense. Such an approach would lead to sentences such as: “that is right, but . . .”, or “that would be the wrong way, unless . . .” When words like “but”, “unless”, “under the condition that” and similar formulations become necessary, right and wrong as concept ceases to exist. This requires you to act in the way reasonably prudent professionals would have done. Efforts toward acting “appropriate” in this sense are called defensive guiding.

You should be aware that this explanation of legal systems is “general”. Laws differ from country to country. It is your responsibility as a citizen and as a diving professional to know the laws that govern the activity in the country where you work.

**Defensive Guiding**

As a Scuba Guide you have the same duty of care as your colleagues. It would not be reasonable to accuse all Scuba Guides in the world of not being prudent. If it is common to bring oxygen equipment, to make an emergency plan and to conduct a briefing, then you should do what your colleagues do as well.
Following a “standard way of organising dives” cannot exclude you from all legal risk, but it does help to build a strong defence. Context is a key factor that cannot be standardised. A Scuba Guide is supposed to do what the reasonably prudent professional would have done in the same context.

How is context taken into account? As Scuba Guide, you are part of the context. Make sure you keep yourself fit and are able to show that you are fit for diving by taking regular medical examinations. It should not be possible to accuse you of any substance use that could impair your judgement or ability to act.

The divers are part of context. Make sure that you take their age, physical abilities and other factors into account when deciding on locations, ratios and other factors. Local habits are part of context as well. If there is a common way to organize dives in the local environment, then there is probably good reason for that. Follow local practices if there are no pressing (and valid) reasons not to do so.

Your preparations can alter context to increase your ability to act if that becomes necessary. Surface floats, ascend and descend lines, emergency and spare equipment and other precautions can improve the safety of a dive site.

Obtain a weather report before going diving and share the information with participating divers. Also verify dive conditions. Participating divers must be aware of the conditions and must decide themselves if they want to (and feel up to) participate in the dive. Avoid situations in which divers feel forced to enter circumstances they would rather avoid or to end up in unexpected circumstances.

Which documents can help in defence against unjustified claims? In a legal dispute, it is important to have documents available that provide proof of acting reasonably prudent. The absence of such documentation in itself can be taken as an indication of not taking your role seriously.

Your personal logbook provides proof of regular diving activities and shows that you keep your diving skills up-to-date. Documentation of courses or seminars visited shows that you put effort in staying up-to-date with current practices in recreational diving.
Diver statements provide proof that a diver is aware that diving is not a risk-free activity and that he chooses freely to participate anyway. Dive rosters show all participants in various activities, which can provide witnesses.

**Insurance**

Scuba Guides and instructors are required to have professional liability insurance. Such insurance is available from different companies. Defensive guiding helps to prevent accidents and it helps as defence against unjustified claims. Fewer accidents and fewer convictions help to maintain the availability of insurance at reasonable price.

Liability insurance covers mistakes or unintended negligence. If you end up at 35 meters with divers who are not supposed to dive deeper than 30 meters by mistake and an accident happens, you are still insured. If you announce in a briefing to the same divers that it is the intent to visit a wreck at 35 metres, you may lose insurance coverage, because you bring the diver intentionally in higher than acceptable risk. Be aware that your insurance company may withhold benefits if it can be proven that you intended to dive outside the parameters for which participating divers are certified.
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