ESA®

Diveleader

Diveleader Manual

Product n° M0007

Editor: ESA Worldwide

Formative project, development, consulting and revision:
Mauro Bertolini, Mario Romor, Maria Laura Careddu, Egidio Trainito

Text: Mario Romor

Illustrations: Stefano Trainito, Jacopo Pasqualotto

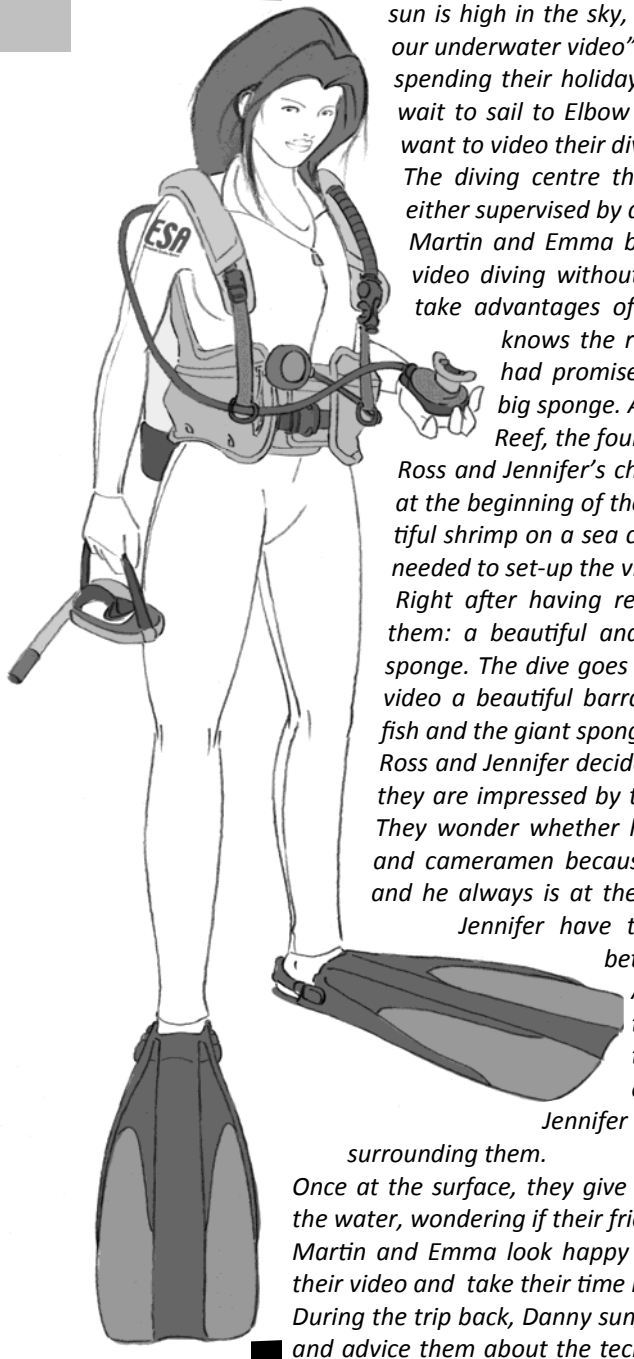
English translation by: Renzo Rossetti, Zahra Samir

The formative aids ESAs in subject of prevention and management of the emergencies are conforming to the lines approved by IRC.

Index

1

An important role



"It is a beautiful day: the sea is calm, the air is clear and, as soon as the sun is high in the sky, we will have the luminosity we need for our underwater video". It is the statement of one of four friends spending their holidays at the Keys Island, Florida. They can't wait to sail to Elbow Reef, a very important site, where they want to video their dive.

The diving centre they have chosen usually let people dive either supervised by an expert Diveleader, or on their own.

Martin and Emma believe they will be freer to record their video diving without the guide. Ross and Jennifer prefer to take advantages of the support Danny, a Diveleader who knows the reef perfectly, can give them. Indeed, he had promised them to show them an exceptionally big sponge. As soon as the boat reaches Elbow Reef, the four friends get ready and the dive can start.

Ross and Jennifer's choice appears to be the best one already at the beginning of the dive: Danny calls them to show a beautiful shrimp on a sea cucumber. Great! He gives them the time needed to set-up the video-camera and film it.

Right after having recorded the shrimp the Diveleader calls them: a beautiful and colourful nude Brach is grazing on a sponge. The dive goes on like this all time and they are able to video a beautiful barracuda, a colourful moray, nice sights of fish and the giant sponge Danny was talking about.

Ross and Jennifer decide to video Danny too, and while doing it, they are impressed by the elegant and accurate way he moves. They wonder whether he has collaborated with photographers and cameramen because he seems to understand their needs, and he always is at the right place in the right time. Ross and Jennifer have to admit that they couldn't have had better.

At the end of the dive, Danny shows them the bar for the safety stop, check the computers and asks if everything is ok. While the three-minute stop goes on, Jennifer keeps on recording the Ray's Breams surrounding them.

Once at the surface, they give the cameras to the crew and get out of the water, wondering if their friend enjoyed their dive.

Martin and Emma look happy too: they could admire the reef, record their video and take their time in choosing the best scenes.

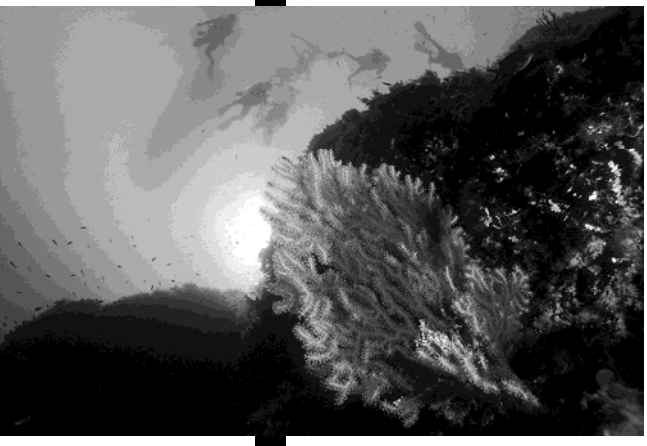
During the trip back, Danny summarises all the creatures they have seen and advice them about the techniques to improve shootings and diving skills.

Using a manual, he shows them all creatures they sow during the dive and helps Martin and Emma to identify those they don't know.
It really was a great dive, planned in a perfect way. They will be able to connect their cameras to the TV sets at the diving centre to check their film.
Until a few years ago, scuba diving was practised only by a few people who could afford the needed training and able to arrange their own dives.
Nowadays, thanks to evolution of diving equipment and new training aids, the number of people who practise scuba diving is high and is increasing more and more.
One of the main reasons for the increased interest in this sport is the possibility to dive without worrying to much of the organization of the dive itself. When people want to dive, all they need to do is to contact a diving centre.
This makes divers to enjoy relaxing dives and take advantage of the experience of professional divers.
We have just spoken about professional divers; actually, this is one of the key words you will hear during this course that establishes the limit between recreational and professional divers.
The four friends of the above story enjoyed their dives thanks to the assistance and services offered by a very smart professional diver: Danny. Diving with him was really advantageous because of its qualification and deep knowledge of the submarine environment. You will have noticed how he managed the dive in such a way to satisfy the divers needs, but this is just one of the features of a Diveleader. Your training during this course is the fundament on which you will base your job and important role as a Diveleader.
You will improve your diving and aquatic skills, will learn to manage diving activities and to assist Instructors and divers during their courses. To do this with the highest professionalism you need to get accustomed to several subjects, such as refilling cylinders, maintaining equipment, using IT system, driving and managing a boat, and so on. You will have to work hard, but you will achieve a very important goal that will satisfy you and let you enjoy really exciting moments.
When your Instructor will entrust a diver who can't empty its mask to you, you will be satisfied by your capability when such diver succeed in making it.
You will be really pleased when divers will continuously ask you to dive with you because you grant them both amusing dives and safety.
Furthermore, when you will move to a specific place to work during winter time, you can be sure the same place location to dive with you.

A moray confidant is one of many meetings of a beautiful dive.

1

You have already acquired many of the information necessary to play the role of the ESA Diveleader during your previous courses, and many of the things you will learn during this course will help you in becoming an ESA Instructor and continue your professional growth.
The ESA Diveleader course can only be led by ESA Diveleader Instructors or higher level ESA Instructor; this can make you better understand the value of training and responsibilities of a Diveleader.
Becoming a Diveleader can be really hard, but it will surely improve the quality of your life: wouldn't you like to have a job that you love?
You could stay in contact with water and nature instead of working in an office. You could enjoy nice weather and sun, meet many people, dive everyday, help other divers, sail, take part to important events, play a role full of responsibilities and satisfactions.
These is just a sample of the benefits you may enjoy becoming a Diveleader. Therefore, what are you waiting for?



Who would not want to work doing what they like?

ESA

If you have already attended other ESA courses, you know what ESA means. Otherwise, you may need to know something more about it. In any case, you will find useful to read this paragraph, as it gives you some information you will need when you become a Diveleader.

The mission of ESA – THE WATER-WORLD CREW – is the education and training of scuba divers from the first level up to the highest professional ones and the promotion of all activities related to scuba diving. The operative standard applied by ESA are the most updated ones in order to make the students to be trained in the safest environment. The training process developed by ESA takes into account the integration of information provided by the Instructor and the tools released to the students for each course, such as this manual.

The initial training starts with the development of scuba diving skills in a swimming pool or delimited water, and a subsequent review and improvement of the same skills diving in open water. A student participating to any ESA program or course shall prove his knowledge completing a test that will be corrected by the Instructor. Copy of such test shall be kept by the Instructor.

Thanks to ESA, the divers can start from the base of their training process such as the Open Water Diver course and continue to the highest levels such as Diveleader, Instructors and more. They can specialise in other branches of scuba diving activities, such as biology, photography, archaeology, etc…

Of course, a diver shall prove the possession of the needed pre-requisites to participate to the courses for professional divers.
The ESA highest standard for the training of scuba divers are applied to the courses for professional divers too, starting from the ESA Diveleader course.
The ESA Instructor are trained by the ESA IC Directors. The latter have specifically learned and are qualified to teach the future Instructors all needed teaching techniques.
The training of an Instructor is the most complete. It includes but is not limited to information about scuba diving principles and theory, ESA procedures, principles of psychology and marketing, management of single divers and group of divers, solution of problems, protection of environment.
The licenses released by each Instructor are validated by the headquarter of ESA and/or by formally authorised ESA offices.
The ESA Training Department deals with training, and keep the ESA affiliates informed about changes in existing procedure and/or introduction of new ones.
Qualified commercial firms operating in the field of scuba diving such as clubs, stores and diving centres, can affiliate to ESA, becoming ESA Points. Those firms able to market, organise and hold courses for the training of new Instructors are called ESA IC Points.
ESA is also specifically involved in the spread of information related to the environment, in order to improve the quality of each dive and train divers aware of the importance of the underwater life. Indeed, information and concepts about the environments and its protection are integral part of the training of all ESA professionals. This makes sure that the protection of the environment is duly taken into account in all the steps of the overall ESA training process.

ESA wants to develop a special effort to make as much as possible the knowledge about the environment during the diver's course formation.

How to use this manual
This manual will be very useful for both this course and your career as a professional diver. It will be your reference as a Diveleader, but also during your ESA Instructor Course.
It is written in a very simple way and is arranged in order to make you study easily.
Every chapter is divided into paragraphs. Each one contains an introduction to the most important information (What will you learn?), explanation and checks (Minitests) with related answers. At the end of every chapter you will find a summary of all topics (Congratulations) and a questionnaire (What have you learned?) that will strengthen your knowledge of the chapter.
Answer the questions carefully and, if you are not able to provide one or more answers, you can read the explanation again. Remember you will have to review your answers with your Instructor during the next training session.

Should you have any doubts, take notes and ask him to clarify what you need to.
Start to study now! You will be able to use your time efficiently, stay less time in the classroom and develop your skills supporting your Instructor while teaching.
In Charter 6 "Details" you will find the information you need to improve your knowledge of scuba diving principles. You may find useful to start this manual from Chapter 6; this will enable you to better participate at the other session of the course and study in depth those subjects for which you may need to concentrate a bit more together with Instructor and staff.
Due to the nature and purpose of this course, it is recommended that you work in team as, thanks to the possibility of exchanging ideas, opinions and experiences, it contributes to the achievement of better results. Anyhow, you may decide to study on your own or with you friend. Have a nice course and remember: ask questions!

The manual is a buddy during this course, but will be useful throughout all your careers

Pre-requisites
To start the ESA Diveleader course you must comply with the following requirements:

- be 18 year old at least
- prove possession of ESA Advance Diver licence (or equivalent)
- ESA Prevention & Rescue Diver licence (or equivalent)
- valid ESA First Aid licence (or equivalent
- prove to have at least 60 registered and signed dives in your log book
- provide a valid and original medic certificate

Should you have any doubts on the validity of what you have, don't hesitate to ask for information either to an ESA Point, or to an ESA Diveleader Instructor, or to ESA directly. You can contact ESA via e-mail using the address you can find on ESA internet site: www.esaweb.net

Certification
The "Diveleader" is the first level of ESA training process that allows a diver to became affiliated to ESA as an ESA Professional.
The Diveleader certification is **EN 1415/3** and **ISO 24801/3** certified, to confirm the international validity of ESA Courses.
The fact that you get the licence implies that you have completed your training experience as a recreational diver and that have subsequently gained an adequate qualification to act as a diving guide for qualified divers and **be part of the team that operates during ESA training sessions under the direct control of ESA Instructors.**

To carry out the above activities and assume all responsibilities thereof, you shall prove that you have and shall maintain an appropriate insurance coverage.
By renewing the yearly ESA membership you will have the right to enjoy all benefits deriving from the ESA Professional qualification, including:

- getting specific incoming mail from the ESA Training Department, about updates/changes in the teaching methodology
- getting specific incoming mail from the ESA Industry Relations & Legislative Department related to the diving industry and diving about laws and/or decrees/regulations that may influence it
- getting specific incoming mail from ESA Sales Department relating to new products and to diving related general business
- participating to seminars/upgrade meetings arranged by ESA

Furthermore your ESA Diveleader licence enables you to participate to another important step of your training path: the ESA Instructor Course (ESA IC).

The Diveleader certification is the first level of ESAs professional training.

Structure of the course
Working as a Diveleader, you will often have to answer many questions divers will ask you about the arrangement of the dive they are going to do with you: they want to know about the site, what they can see, depth and time limits, what to do before and after the dive, etc. People want to get as many information as they can about the activity they are about to be involved in.
You too are stepping in a very important and unforgettable adventure: you will be still telling people about what you experienced during your course such as playing the part of a diving guide or assistant in years.
Furthermore, the target you want to reach is very important and, therefore, you want to have all information about your course.
The course is arranged in a very flexible way. It takes into account logistics, and accommodates your and your Instructors needs. You will plan all steps with the ESA Diveleader Instructor who will be happy to answer all your questions and to clarify any doubts you may have.
The course is divided in Four Training Units: (1) acquisition of information, principles and rules by mean of the Theory Units, (2) evaluation of scuba diving skills and familiarity with water that will be held in some stages of the course, (3) underwater training that will be held during Delimited and Open Water dives (4) subsidiary training workshops.

(1) acquisition of information, principles and rules

The information you will receive are needed for your growth as a recreational professional diver. Some of them are needed before any practical test, some will improve your and the other divers' safety, others will be useful during your whole training process, even when you will decide to become an ESA Instructor.

The evaluation of information, principles and rules is broke down in 6 Theory Units.

The Diveleader certification implies to assume responsibility to third parties and therefore needs an insurance cover.

(2) evaluation of scuba diving skills and familiarity with water

This evaluation will be held in delimited water to have a comfortable and safe environment that enables you to be more efficient and let you repeat your exercises, if needed, without having too negative impacts on the logistic arrangement of all activities.

You shall demonstrate that you can perform all fundamental exercises of the ESA Open Water course, carry out rescue techniques in the most effective way, to be sufficiently familiar with water and able to face a possible difficult situation or to accomplish any eventual task.

Familiarity with water include 3 exercises: a four hundred-metre swim on the surface, fifteen-minute buoyancy and three free dives. Another exercise will help you to verify your ability to plan a dive and solve problems when diving: you shall plan a dive with your dive mate and, sharing the same regulator, you shall exchange with him weight belt and mask, ascend and, once reached the surface, inflate the BCD (the diver using his mate air shall inflate it blowing into it).

(3) Underwater training

This activity will contribute to further improve your diving skills and will enable you to learn techniques needed to accomplish your professional role as an ESA Diveleader. You will learn many things just by watching your Instructor and his staff.

You will have to register at least 12 open water dives during the course, and you will have to act both as a Diveleader and as a demanding diver. It includes 2 night dives. The latter will enable you to plan a type of dive that is considered to be one of the most exciting dives in the field of recreational dives.

The experience gained during these dives will help you in improving your professional capability. So concentrate yourself in taking the most of them instead of concentrating on the fact that they are exams!

You Instructor and his staff will help you to improve step by step, until you have demonstrated that you have acquired all the needed fundaments to operate as a Diveleader. The Instructor may decide to increase the number of dives to further improve your ability and techniques.

(4) Subsidiary training

During the Training Workshop, the ESA Diveleader Instructor and his staff will show you how and will ask you to accomplish those tasks that may

not be directly linked to diving. You will get to know hot to welcome customers, to register bookings and participants to activities, to knot the most important knots, how to market SCUBA diving, to fix a suit or a regulator, etc

Even though these duties are not accomplished when diving, they are of paramount importance and are needed to offer customers complete and professional services that will make you to become their preferred Diveleader.

What you need to do to have the licence

To get the licence you have to complete all sections of the course, demonstrate that you have adequate competence in all specific areas and reach the established targets.

Furthermore, you shall demonstrate you have the following licences: ESA Oxygen First Aid (or equivalent), furthermore you must held the **ESA Ecodiver, ESA Deep Diver** and the **ESA Orienteering Diver** certification.

The concepts you will learn during the course Diveleader will come in handy when you decide to become Instructor

You shall demonstrate your knowledge of diving theory by way of a written exam. To answer correctly to questions you can study using all ESA tools, such as manuals for the following courses: Open Water Diver, Advanced Diver, Prevention & Rescue Diver, Ecodiver, Orienteering Diver and Deep Diver.

The way the course is arranged lets you to satisfy the requirements and meet the targets taking your time; all you need to do is to agree how to proceed with your ESA Diveleader Instructor.

You may even start your course in a place with an Diveleader Instructor and complete it somewhere else with another ESA Diveleader Instructor, without having to start from scratch again. Either way, all you need to do is to complete all sections of the course. Should you not be able to participate to one of the open water dives of the course, you will have to wait for your licence until you have successfully completed such dive. Thereafter, the Instructor that leads the last session of the course will give you your licence.

You have to bear in mind that some parts of the course are introductory to others, therefore not participating to a session may prevent you to access the next one. Your Instructor will be a good coach and will help you in successfully achieving all established targets and obtaining your licence.

You will receive your licence directly from your Instructor but, before operating as an ESA Diveleader, you shall get the validation sticker to stick on your licence.

To operate as an ESA Diveleader you shall have a suitable insurance coverage and be affiliated to ESA.

1

As stated in the ESA Instructor Manual, ESA memberships are divided in two categories: (1) ESA Professional and (2) ESA Point

(1) ESA Professional are those who have any of the following licences: ESA Diveleader, ESA Instructor (for the various possible levels) ed ESA IC Director.

When you get any of such licences you become automatically affiliated to ESA as an ESA Professional for the current year. To maintain the active status of your membership, you will have to comply with the provisions of the ESA Professional Membership Agreement.

All ESA Professionals have a direct relationship with ESA Training Department

(2) ESA Points include Diving Clubs, Diving Centres and Diving Stores that, having the adequate credentials, can be affiliated, in accordance with the specified requirements, to one of the three categories mentioned above. To maintain their active status the years subsequent to that of their first registration to ESA, all ESA Points must comply with the provisions of the ESA Point Membership Agreement.

All ESA Points have a direct relationship with the ESA Sales Department.

N.B. *all ESA memberships expire on the 31st of December of each year.*

If you have any questions, do not hesitate to contact the ESAs offices.
Our staff will be glad and able to offer all possible assistance

For the Diveleader to held the ESA Oxygen First Aid certification is very important

Chapter One
Planning and guiding dives

What will you learn?

It is a great August day and David, a new Diveleader, is diving with two frequent customers of the diving centre he works for. He is quite excited because the diving site is very interesting and he has been entrusted to lead the dive on his own. He wants to do its best.

Antonio, one of the divers, indicates there's something wrong while they are diving: some water is leaking into his mask. David remembers that during its ESA Diveleader course its Instructor gave his mask to a diver who were experiencing similar problems.

Without waiting any longer, David decides to exchange his mask with Antonio's, who accepts it. As soon as the exchange is completed and David empties the mask, he realises that his choice is not as good as he thought. Indeed, Antonio's mask is equipped with optical lenses, and David is not able to see clearly anymore.

David tries to have his mask back, but Antonio decided to keep it until the dive ends. Luckily, David's Instructor, who had decided to supervise the dive from a distance, helps David and takes control of the dive.

Thanks to the Instructor's common sense and experience everything goes well and, at the end, everybody can laugh about the episode. This anecdote shows how it is important to be prepared, use common sense and treasure your experience.

In this chapter we will answer questions such as: what will I do to be properly prepared? How shall I make my role as a Diveleader clear to everybody? How can I plan all activities in the best way possible? How can I provide all necessary information efficiently? How can I make my customers enjoy diving making sure safety is granted at the same time? What can I do to offer a better service after diving? How important is the role of those who assist to a dive without getting into the water? Which tools can help me in carrying out my job in the best way possible? The answers to these questions we will start to build the foundation of your knowledge as a Diveleader, that is, a diver's leader, who shall be an example to divers, and who supervises and lead people entrusted to him.

Diveleader readiness and efficiency indicate a big professionalism

This is just the beginning: the tangible experience you will enjoy both during this course and with some more experienced colleagues will contribute in developing your ESA Diveleader capability.

Qualification (know-how and experience)

Knowledge has a key role in your training. Everything you will learn during this course will be useful when working as a Diveleader, able to plan and lead dives.

During the course enthusiasm and application will help you to get the most from your candidates

During your ESA Prevention & Rescue Diver (or equivalent) course, you have understood that repeating all exercises many times increases your knowledge of rules to respect, in order to prevent problems.

An adequate training enables you to manage any possible emergency that may occur promptly and efficiently, and to plan the best dives for your customers, balancing recreation and safety, taking into account environmental conditions (drift, visibility, etc…) and previous experiences of the divers.

David surely had the necessary knowledge, but he was not experienced enough to react safely and make the right choice.

Work enthusiastically and try to learn as much as possible during your course, then start your career working with more expert colleagues until you gain the necessary experience. Never be too self-confident, remember that you will always learn something new, treasure every new experience, use common sense and avoid extreme conditions.

Your qualification will be based both on this course and on other ESA training programs you will attend.

Surely, you will have to plan and/or lead dives at a depth that is close to the recreational dives' limits; for this reason, to get your Diveleader licence, you must have got the ESA Deep Diver licence before. The same applies for orienteering techniques: you must have the ESA Orienteering Diver licence to plan and lead dives following the established patterns.

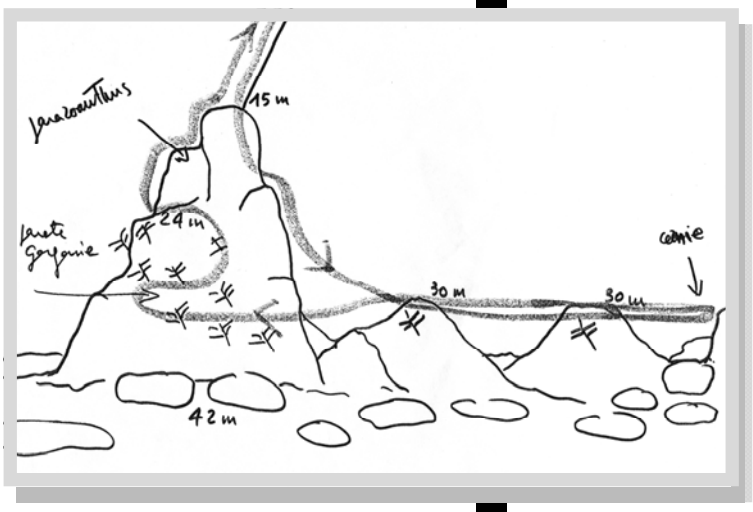
A good education takes into account the environment. **This gives you many advantages, such as ability to renounce to a frequently requested dive site, should it be affected by adverse weather conditions, and choose an apparently less interesting one without disappointing your customers, but making them enjoy it anyway**. How can you be able make such choices? Thanks to the ESA Eco diver course you will learn about all most important characteristics of underwater environment.

This training program represents a mandatory step of your training as a Diveleader.

ESA decision to give you such a broad range of information is based on the fact that, when you work as a Diveleader, you will be responsible of supervising other divers and making them to respect your decisions: only showing you have the necessary knowledge, experience, capability, common sense and attitude you will be able to make people to listen to you, most demanding divers included.
The familiarity with the place where you work will make you more efficient and confident, therefore, I strongly suggest that you dive as much as possible studying the characteristics of the dive sites. To know them very well, you may trace maps of each dive sites; taking bearings of the dive sites you will know them better. Your maps will also be useful during the pre-dive briefing.

A nice day

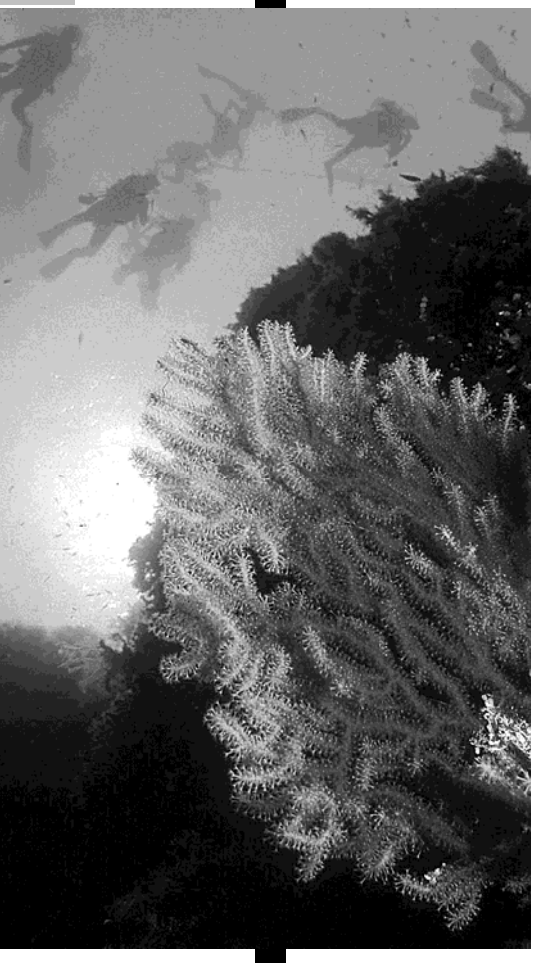
Jane arrives at the diving centre at 7 o'clock and, after having prepared her diving equipment quickly and carefully, she starts to check the boarding list for the dinghy that will take the divers, Sara and Scarlet included, to the dive site.
The dinghy is full of people today, this makes the staff happy: eight divers will be equally shared in two groups. Scarlet will remain on the dinghy today while Sara, who knows the sites better, is going to lead the more demanding divers. Jane shall use her experience and enthusiasm to make two couple of newly licensed divers enjoy one of their first dives.
Based upon the above considerations about roles and level of knowledge and experience of divers, the three Diveleader choose the diving site. It is necessary to find the best compromise taking into account the divers' licence and experience, environmental conditions and that some of the divers may already have been diving in this area before.



A dive map, simple but clear, is a good working tool

It is a beautiful day. There's not a ripple in the sea and the weather forecast is good for the duration of the whole excursion. Therefore, the three colleagues can choose any place that let Jane's group to dive at 15/16 metres and Sara's to reach 27/28 metres instead. The Lobsters' Shoal is the right place. None of the customers has already dived there because it is usually exposed it to the wind. But today it is the right day.

The team start to work and makes cylinders and necessary equipment ready, tools and a spare diving equipment. They also bring with them a first aid kit that includes an oxygen cylinder, and that they have checked to be compliant with the current regulations.
The dinghy is also equipped with the safety stop station that includes spare weights and spare cylinder or spare regulators that supply air directly from the surface. These tools will allow the divers to complete a possible emergency decompression stop even if the cylinder is almost empty.

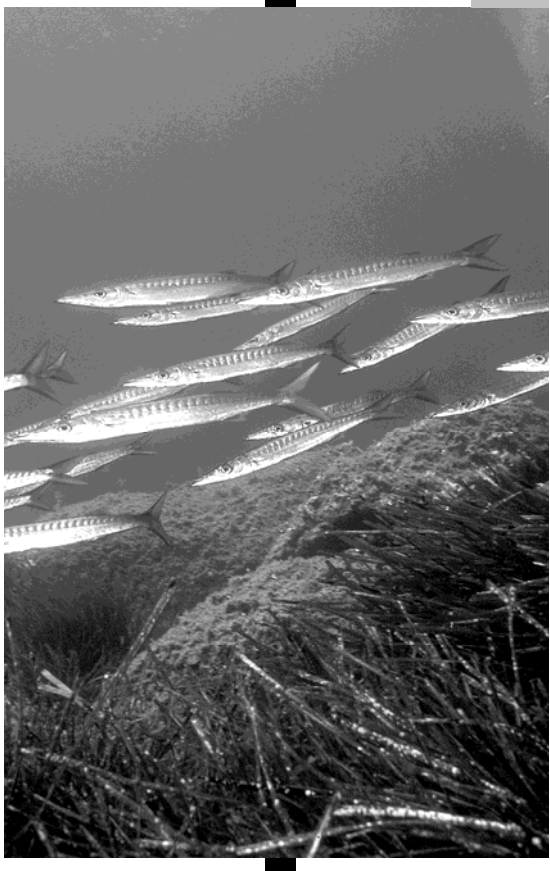


A group of divers descends slowly on a sandbar in the clear water

While Sara asks all customers to complete the preparation of their diving equipment, **Jane is waiting for the divers by the dinghy, in order to check the names of those who are getting on the boat**. Scarlet makes sure she has all that is needed on the boat: licence, radio, telephone, binoculars, echo sounder, GPS, hat, sunglasses and drinkable water.
Once the boarding operations are completed, the happy party leaves the berth and head towards the diving point. The sea is so calm that Scarlet can let the dinghy go fast, at a speed that allows Sara and Jane to complete their pre-dive briefings.
Observing the coast, Scarlet realises it is the right moment to turn the GPS on. The **GPS (Global Positioning System)** is an instrument that, thanks to impulses received from satellites, lets you know your exact position on the surface and where is your destination.
As they get close to the diving site, they see the buoy to be used as a mooring point for the dinghy. The three components of the staff understand each other very well and the mooring operation is concluded in a really short time. This makes the customers to congratulate a lot for the efficiency of the operation.
The great conditions let the divers to choose their preferred entry into water. Some of them prefer to jump into the water fully equipped, others prefer to wear their equipment in the water. The staff helps the customers promptly. They know that if the preparation is not a cause of stress, the customers can really relax and enjoy the dive, and the events that may generate problems are low.
When everybody is ready, Sara and Jane check that the equipment is fine and, after having exchanged the “OK” sign, they start to dive. Jane’s group descend following the rope, while Sara and the experienced divers descend surrounded by the blue water only.

Lucia indicates she can't equalise. Promptly, Sara invites her to get a bit shallower and to go close to the rope. This way she will be able to better control her descent. Thanks to Sara's advice, Lucia is able to equalise and join her mates that are waiting for her, under the supervision of the Diveleader.

After some days of bad weather, the sea is finally calm. This gives the divers the chance to see a lot of fish: they are surrounded by a nice group of Mediterranean barracudas before reaching the seabed, there is a huge number of big Black tails swimming right in front of them. Looking at each other, Sara e Jane decide their strategy for the dive: with such a great day they will surely succeed in showing all divers the big grouper that usually stays close to the old corvinas' lair. They make the two groups to reach the point from two different directions. The big grouper is right there, waiting for them and let the divers to stare at it for some minutes. Sara cheers Jane end with the for experienced divers, she starts to go toward the deeper side of the shoal, where she will show the divers a big branched sponge and some Gastropods.



A group of barracuda swimming between rocks and sea grass

Jane remains shallower and quite close to the dinghy, in order to grant the divers the maximum safety. Notwithstanding such an easy dive, the newly licensed divers are enthusiast for the animals they meet. Looking at the anfractuous rocks Jane show them some beautiful red scorpion fish and many big lobsters.

At the end of the dive both groups complete the safety stop completely surrounded by the Ray's breams, continuously disturbed by curious barracudas that get close to understand what the bubbles breathed out by the divers are. Scarlet remained on the boat during the dive. She could enjoy the sight of the sea and was on the alert to catch any sign of problems to react promptly.

She deserves a smile to the divers and treat them professionally in order to speed up the boarding operations. With such a great and calm sea the staff shall be back to the diving centre and get ready for the next excursion without wasting time.

When everybody is on board, Scarlet heads the bow toward the harbour while her colleagues are commenting the great dive with the customers, using the ESA "Seas of The World" manual. Once at the pear, the mooring operations show how skilled the team is again. Everything is completed quickly and the customers are happy and satisfied. This job is usually more a pleasure than a hard work for the three colleagues.

At the end all divers are at the diving centre to register the dive on the log book and have the Diveleader's signature to validate it.
The Diveleader participate to the completion of the dive registration suggesting the name of the underwater creatures observed.

Planning

You can understand how planning a dive important is.
Planning thoroughly a dive will enable you to manage it accurately. Even if, thanks to the experience and understanding of the staff, the dive is planned quickly, you can base it on some key.
Use always the following scheme, both during this course and when you are a licensed Diveleader:

- Features of the divers
- Experience
- Licence
- Date of the last dive
- Last dive related data
- Place of the last dive
- Psychological and physical conditions
- Information you can get from colleagues or dive mates
- Diving site characteristics
- Depth
- Waves
- Drifts
- Temperature
- Visibility
- Composition of the bottom
- Potential dangers
- Environment related features
- Other interesting features
- General sea conditions
- Logistics
- Available vehicles and tools
- Available staff

This is the list of information you need to get before you start to plan a dive.
Processing this data you will be able to decide the site, the time, the depth and duration of the dive, necessary vehicle and human resources.
Sometimes less experienced Diveleader may not choose the best solution. Most of the times it is due to the fact that they want to lead a great dive, they want appear to be the most capable guide in the world, or the simply want the other divers to enjoy the dive as much as they can.

Minitest

1) *With a good preparation and experience can be possible to find the right balance between:*
a. *depth and time*
b. *gain and fun*
c. *safety and fun*

2) *To obtain the ESA Diveleader certification, you must have to demonstrate to held which ESA Speciality:*
a. *ESA Eco Diver*
b. *ESA Orienteering Diver and ESA Deep Diver*
c. *a) and b) are correct*

3) *To indicate the location, GPS uses:*
a. *the aims ground*
b. *the signals from satellites*
c. *magnetic north*

Answers: 1c - 2c - 3b

Although the most experienced Diveleader's have better management and supervising capabilities, they consider comfort and safety of divers as a top priority. **The attractiveness and the creatures that can be when diving are the last of their problems.**

Indeed, a good quality dive is based more on the fact that it takes place in a relaxed atmosphere than on what can be seen in a specific site.

For this reason, we suggest to you to plan every dive considering the less trained and less capable diver, taking into account what can be done during the dive and what shall be avoided.

Remember that if everything goes well, all customers will say you are great, but if something simple goes wrong, specially if it is linked to safety, it will be easy for the other divers to blame you. Safety is considered to be your responsibility (see Chapter Four for further details).

For instance, if you are going to lead a drift dive with three divers, two of which are expert, capable and on which you can rely upon, you may decide to let the third one to dive even if he is not as good. In this case, you must consider the limits of his licence and make sure the conditions are particularly favourable (not strong drift, calm sea and shallow dive).

The quality of the dive does not solely depend from the meetings or by the scenarios, but very often by the created atmosphere.

In the opposite case (one more than expert diver and two not as good) you should choose a different diving site that will make the expert diver enjoy it and make the other two feel safe at the same time.

Remember that, as a Diveleader, you are responsible to choose to dive or not to dive. Therefore, you shall be extremely careful and not hesitate to cancel the dive or change the site. Specifically, avoid conditions that could stress the divers, such as rough sea, insufficient visibility, darkness, lack of direct contact with the surface (caves or wrecks), strong current, etc.…

Sometimes it is care of details that makes a successful dive. Think about the place you are going to dive and evaluate how different it would be diving early in the morning, or at noon or in the afternoon. This enable you to choose the best time of the day for a specific diving site and improve the quality of the dive itself. You can discuss your choice with the Instructor and your colleagues.

Briefing

Try to imagine that you are on a boat for divers. The person in charge of the diving centre has already planned the dive and asks the staff to meet him inside a cabin of the boat to inform everybody about such plan. He assigns four divers to each Diveleader and asks everybody to start to work with them to get ready for the dive. I suggest you to introduce yourself to them, gather them all together and brief them about what they need to do and the dive. The soonest you do it, the better.

Usually people are eager to know what they are supposed to do, who is going to be their guide, where they are diving. Start immediately to talk to them and give them all the information they want. This will help you in establishing a good relationship with the customers and let them not to be anxious.

To better deal with the customers, try to remember how curious you were before the open water dives of your courses and wanted the Instructor to inform you about what to do.

What is a briefing?

A briefing is a brief discussion you must have with your customers before starting to get ready for the dive. It is useful to inform them about any general rules to be respected on the boat and diving, what they could expect to see during the dive, what they will have to do. A briefing gives the customers the chance to express their needs and decide together with you the best for them. Furthermore, it help you in knowing the divers and vice versa, and to strengthen your position as a Diveleader.

To dive indoors or in dark can cause stress to some divers

You shall consider the briefing to be an important tool. A satisfactory dive depends on it. Some guides does not brief divers or do it not correctly. These guides are those who usually face unpleasant events during and/or after the dive. You can't expect that divers don't touch fish if you haven't told them beforehand; if you haven't explained them what sign you will use to indicate them that it is time for the safety stop, don't them angry with them if they don't understand you.

A good briefing is based on a good familiarity with the diving site. To get such familiarity you may have to visit a specific dive site many times. Anyhow, this is not always possible. Indeed, you may move to a specific town or country and start to work without knowing the diving sites or knowing the overall environment. Should it happen, the best thing to do is to introduce yourself to the divers, give them some indications about the preparation of the diving equipment and wait for the briefing until you have attended the briefing of a more expert Diveleader. Otherwise, you may decide to join your group with the group of such more expert Diveleader while he is briefing.

A briefing must include all necessary information but need to be short. As people could be on holiday and willing to enjoy themselves, you may not be able to focus their attention on you for more than a few minutes. Once their level of attentions starts to decrease not all of the things you say during the briefing will be understood or taken into due consideration. Therefore, you have to make your plan your briefings in order to be as effective as possible. The following guidelines gives you some will be useful when preparing your briefings.

• a briefing should start by introducing everybody and catches the attention of divers, giving some information that makes the dive worth it. During the preliminary phase of the briefing you don't need to give all details about the dive. You should mainly concentrated in getting information about the divers and giving the needed instructions

- inform divers about the name of the diving site and explain the reason for such name
- make you aware on the level of experience of the divers and on when they had the last dive. You may discover that you are dealing with a no homogeneous group of divers (all experienced but one included in such group by mistake) or that a diver had already dived with another centre two hours ago.
- provide clear information about your role and where you will be during the dive: will you show them the site and all creatures or you will take care about safety only? Will you lead the group or will you follow it, supervising it and react when needed?
- explain how to enter into water, where and how to gather all together in the surface, how to descend and what to do in case of problems during this phase
- explain the communication means you will use and the meaning of the signs, with specific reference to those for air consumption
- give recommendations and rules to respect in order to minimise the impact of each diver on the underwater environment.
- give advise about the safety stop, how and where to emerge, how to get out of the water and on the boat or what to do afterwards
- at this stage, you can tell people about the dive giving detailed information and highlighting its interesting features. Do it in order to make your group enthusiast about the dive and to stimulate their curiosity
- a map could help you in describing the diving site. Show it to the divers
- to add value to your briefing, tell them about the specific things or creatures you will show them during the dive, such as a crab that lives in a anemone. This will be appreciated and they will better understand what you are showing them
- emphasize everything that can make the dive more interesting, such as name and story of a wreck, archaeology related infor-

A good briefing also serves to strengthen the Diveleader role.

mation, naturalistic or geologic information

- if you are going to dive in a place you don't know very well, you can take into account the general features of the area, such as the Mediterranean Sea. You can surely mention the species you can usually see when diving in this sea.
- be pleasant and enthusiast. Make everybody understand that you are available to listen to them and know their needs, doubts or anything they are worried about.

A briefing sample

This example will be useful to prepare your first briefing for the Water Experience you will attend during the course. **Both Instructor and experience will help you in improving your capability to brief.** This shall take into account the kind of dive, site and divers.

The briefing must turn on the curiosity of divers

"Hi, I am Susan, an ESA Diveleader, and I am going to diver with you today. What are your names? When was your last dive? What license do you have? May take a look at your log books? Congratulations! You dive frequently, good!

We are diving at the Angel wall today. It is called so because of a watchtower called "Angel's Tower" that shows the place where we will stop the boat and start our dive. The watchtower was build during the Spanish domination and is one of the many towers you can se all around the coast. They were used to control the sea and give alert of potential attacks from enemies. These watchtower used fire during night to signal threads from one tower to the other up to the headquarter.

Furthermore, the tower shows the one of the two ends of the Zinger's natural reserve.

We will be there in 25 minutes, so you can start to assemble and check your equipment right after the briefing. Should you need anything, don't hesitate to ask me. You can wear your suit and, if you are hot, you can use the shower you can find in the stern.

Valentine and Jack, you two will be diving partners, as well as Luke and John. I will ask you to wear your equipment and get ready for the dive so that we will jump into the water as soon as the boat stops. We will jump from the boat with a scissor dive from the opening on the left side of the boat, unless anybody wants to jump differently. I will wait for you by the mooring buoy you will find a few meters away from the bow, at the front of the boat.

We will start to dive when we are all ready.

We will use the rope that links the buoy to the bottom of the sea. Should anybody stop for any reason, let's stop and weight all together, so that we will have almost the same air consumption and will absorb the same amount of nitrogen. **I will stay in front of you during all time and will show the all the most interesting things.** I will call you flashing my torch. This sign is to ask you how much air is left in your bottle and you will answer using these signs. This sign is to indicate that you have 100 bars and this for 50 bars. This information is useful to plan the best tour in order to see as much as we can and be back under the boat for the safety stop with enough air in the bottle. **Check your computer frequently and show me the display when 5 minutes only are left from the non decompression limit.** Please don't go deeper than me, it will be easier to enjoy the dive.
As you can see from this map, the bottom of the sea under the buoy is a slope and at a depth of about 10 metres there is a wall that goes beyond 40 metres. Control carefully your buoyancy in order not to exceed 35 metres, that is the maximum depth we will reach. The wall is full of little caves and lairs of lobsters, morays and octopuses.
We will go directly to 35 metres, were some of the little caves are full of shrimps. We will not enter those caves, they are really small, but you can look inside with the torch to see them.

This is the sign to make you understand when we have reached such caves. **Another reason not to enter the caves is that our bubbles would concentrate on the vault and this is fatal for the organism that lives there** (sponges and Madre pores). The surface of the wall is full of red and gorgonians and we will continuously be surrounded by altheas. Keeping the wall on our left side we will start to go shallower and at a depth of about 25 metres the wall starts to become a slope again. Here we will find some rocks were it is possible to see some big corvine, black tails and a couple of groupers. While getting close to the rocks we will proceed altogether: Valentine and Jack will be on my right, Luke and John on my left. I will make this sign to ask you to stop at a certain distance from the groupers. They are quite afraid and if we get any closer they will go hid among the rocks and it will not be easy to find them.
At this point you should have about 100 bars in your bottle. We will check it and will start to go back to the boat. During our way back, I will show some clear signs on the rocks that shows that the surface of the sea was much lower than it is today. We will be back on the cliff of the wall at 10 metres and head toward the bottom of the rope of the buoy.

Minitest 1

1) Which of the following factors must be considered in planning:
a. *characteristics of the Dive site*
b. *characteristics of divers*
c. *a) and b) are correct*

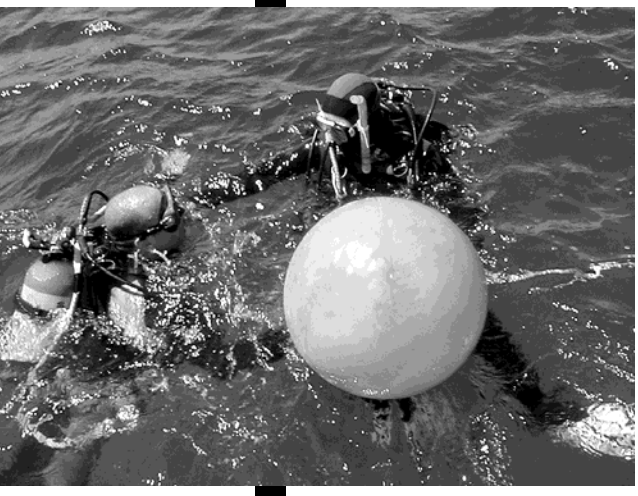
2) *Working with a mixed group, it is preferable to plan a dive based on:*
a. *most inexperienced*
b. *most unruly*
c. *more experienced*

3) *In the briefing is important establish:*
a. *the Diveleader role*
b. *the limits of depth and time*
c. *a) and b) are correct*

4) *Which of these is the most important thing to identify?*
a. *date, time, depth and time of last dive*
b. *observations last dive*
c. *last name of the dive guide*

Answers: 1 c - 2a - 3 c - 4 a

We will be on the slope at about 5 metres. Here we will perform our safety stop for three minutes. In the meanwhile you could look at some holes where the small Ray's breams live during their early stages of their lives. They are completely different from the adult ones. Their colour is electric blue; you can see that the back of the bigger ones is already starting to turn brown. We will restart our ascent when the three minutes have expired and will emerge by the buoy. You can get on the boat with your equipment. All you need to do is to give your fins to Laura who will help us. Please go up the ladder one by one, and avoid to stay close to the ladder while one of you is already climbing, as it could be possible to slip and fall back to the water. Today the weather conditions are great, but should we find some current when we emerge, we can hold on to the rope that is tied to the stern. In this case, remember to take off your fins only when you have at lest one foot on the ladder.



The Diveleader makes reaching the mooring preventing difficult situation

Should anybody need some help to get on the boat with the equipment, please ask the staff. Any questions? Ok, enjoy your dive!"

Leading a dive

A dive can be compared to a flight: the most critical moments are take-off and landing; it is quite unlikely that something wrong happens during the cruise. Just like a pilot, you must control closely the divers at the beginning of the dive and, later on, while ascending to the surface. Nevertheless, pilots control the aeroplane during the whole flight to check that everything is ok and to manage and solve any issue promptly. In the same way, you shall continue to supervise the divers during the whole dive, as a problem could happen in any moment. Furthermore, divers can get to admire you thanks to your professionalism and ability to show them interesting things that make the dive worth it.

Try to imagine what problems could happen, when it could happen, and who would suffer of it: this will help you to decide the best approach to the dive and how you will supervise it.

To better plan the exchange of information between you and the other divers, a dive can be divided into three principal moments: 1) initial phase, 2) underwater tour and 3) ascent and getting out of the water.

1) Initial phase

Sara, observed carefully the four divers she is supervising today. The observation during boarding, preparation for the equipment and briefing made her understand that Anthony could have some problems. He looks too anxious and worried. A look at his log book confirms her

thoughts about him: only few dives, all from the shore. This is enough to make her decide that Anthony needs to be closely observed, and start to help him from the preparation of the equipment. Then she asks Joy (the Diveleader who will remain on the boat during the dive) to help him to jump from the boat. She is already in the water when Anthony jumps, so that she can take care of him promptly.

Indeed, as soon as Anthony is in the water, he starts to flounder and says he doesn't want to dive. **Sara's professionalism and experience makes the difference: she helps him to grab to the mooring line, and, while the other divers are getting ready, she talks to him.** She tells him to trust her, that she will be with him all time during the dive, and suggests to take a look at the fish surrounding them. They are a lot. Sara's words and the nice sight of the fish make Anthony to relax and enjoy the dive. Actually, his entry into water was the only critical moment of the whole dive. Everything went well and Anthony is a frequent diver and an ESA Prevention & Rescue Diver already.

Experience and understanding of behaviours of divers help in managing a difficult situation that could become too complex to manage or even dangerous.

If Sara had got ready for the dive after that Anthony jumped from the boat, he would have definitively decided not to dive. He could have even decided not to dive anymore, or to put him self in danger.

The causes of problems during the initial phase of the dive could be: pre-dive stress, stress generated by dive mates, difficult compensation, lack of control of buoyancy and descend speed, confusion induced by poor visibility or too clear water, effects of weather and sea conditions. Another cause could be a malfunction of the diving equipment due to a wrong assembly procedure and missed pre -dive check.

If you are planning o dive from the shore, make sure you choose an easy access point to the water that enable you to get out of the water easily even if the conditions of the sea should change.

Waves, currents, tides, visibility and consistency of the bottom of the sea are all factors to be duly taken into account. Should you have any doubt on the environmental conditions, don't dive or choose a different place; remember that rough sea and unclear water must be avoided.

In some places it is impossible to avoid waves. Therefore, should you want start a dive from the shore, make sure the divers can do it and choose the best moment to let divers get into the water.

Minitest

1) *Which of the following factors can contribute the onset of stress during the initial dive's phase?*
a. *anxiety induced by buddies*
b. *the environmental conditions*
c. *a) and b) are correct*

2) *With the rough sea, you should:*
a. *give up diving or find a suitable place*
b. *try to enter, bringing out those who are not able to do it*
c. *a) and b) are correct*

3) *To conduct a dive in the presence of current is important:*
a. *make sure you know intensity and direction of the current*
b. *make the first experiences alongside a colleague with more experienced*
c. *a) and b) are correct*

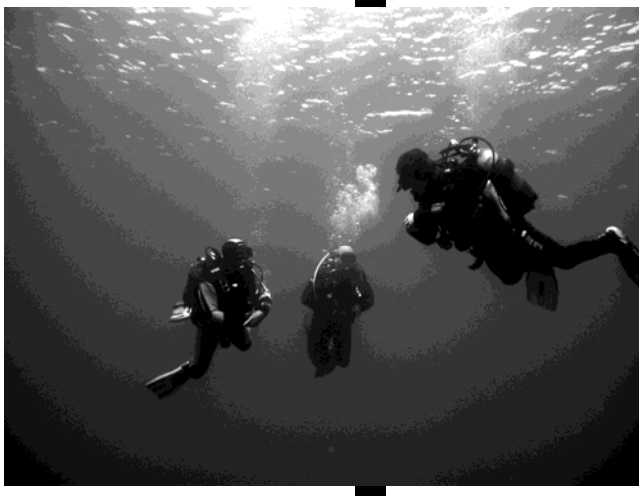
Answers: 1 c - 2a –3c

Ask them to use the regulator straight away from the beginning and to swim as soon as they can.
Other places are characterised by constant currents. In these places you must strictly take care about entry into water and make sure the divers have been specifically trained to do it. **Make sure you know how strong the current is and its direction; ask your more expert colleagues to help you until you are experienced enough.** Before entering into water check that all divers are ready, that they all have their ballast on and that they have opened the bottle. Explain clearly all procedure to follow during the briefing and avoid strong current. Should some of the divers have photo or video cameras, torches and other bulky pieces of equipment that need to be handled with care, be sure you know how to deal with them in order to support the divers professionally. Ask the divers if they need an hand and give them tips on how to handle such components without causing any damage.

The control of the air supply must be done frequently

2) Underwater tour
Every time you supervise a dive, you have to decide your position in the group of divers (in front, at the back, or on the side) and what your task is.
The best way to take such decision is to consider that some of the issues (even the minor ones) that happen in the initial phase of a dive are a cause of stress. Such stress that can be increased by other little problems that may happen during the and, thus, generate dangerous conditions for the completion of a safe and pleasant dive.
If you swim slowly, leaving the slowest diver to take his time, and monitor continuously the whole group you are supervising, you will be able to prevent unexpected fast ascends, runs out of air and breathlessness. You will be able to keep the divers all together and not loose anyone, and will be able to find the way back to the entry point.
The first times you will supervise a dive, you may be so involved in showing interesting things that it could happen that you may not recognise signs or minor issues. Should it happen, you may have to face a real problem. During your ESA Prevention & Rescue Diver course, you have already learned that the later a problem is discovered, the bigger it becomes, the hardest to react and find a solution is.
It is usually preferred to adapt the path on the base of what happen while diving. Reduce your speed or make the needed changes to meet the divers need.

Try to imagine this:
Manuel, a Diveleader, was supervising a dive on rocky slope full of lairs and ravines. He had decided to reach the lair of a big moray located in the outer point of the reef. One of the divers, James, showed him the air gauge: 70 bars only left. Manuel decided to continue the dive the same in order to make it a successful one, and so that all divers would have been happy and liked him as a Diveleader. Manuel thought the air was enough and the outer point of the reef not that far. James was worried instead. His stress caused him a more frequent breath and a higher air consumption. When Manuel turned back to the group to show them the moray, was surprised to see that James had 20 bars left only. Such a low pressure would have not been enough to go back to the entry point. Manuel decided to hurry up, but all the other divers, pleased by the moray, did not understand the need to hurry. Notwithstanding the shallow water they were diving in, the air pressure in James bottle continued to drastically reduce because of his increasing anxiety. Indeed, James was indicating the need to emerge. Manuel calmed him down giving him his emergency regulator and started to go back with the whole group. During the way back, Manuel was hoping not to face any additional issue: he would have not been able to react as needed. Furthermore, the waved surface of the sea would have caused a hard time to the divers in case they emerged far from the boat.



Keep the group, increases the prevention of problems

Thinking over this episode after everybody was back on the boat, Manuel learned a good lesson and focused his attention on many things that will surely help you too. Take some notes of your thoughts about this episode and discuss them with your Instructor.

It is important to establish a good relationship with the divers you are supervising and try to meet their needs and expectations without affecting safety.

The first times you will find hard to manage some experienced divers who want to dive their own way. Unfortunately there are no general rules to apply in this case, and all you can do is to base your decisions on you experience. If you understand that some of the divers are not going to follow the rules and go too deep, you can plan to dive in a place were the sea bed can't let them do it. Otherwise you can remind them about existing laws and rules, and that, according to ESA's standards, they must respect their licence's limits.

To avoid misunderstandings, it is useful to make everything clear during the briefing.

Anyhow, you could realise that some of the divers are not going to follow the rules only when you and the whole group are already diving.
For instance, let's assume a diver is going deeper than agreed. What can you do? You can call him and remind to respect the limit. What if he doesn't pay attention to you? **You may decide to continue the dive staying close to the respectful divers and keeping an eye on the deeper one.** This way, you and the other divers will not be exposed to risks, you can observe what happen and save air that could be useful later on. Finally, after the dive, such disrespectful divers will be rebuked by the others.
What do you think? Do you have other suggestions?

A safety stop station and an air tank with the regulator group mounted, increase the safety during ascent.

You may be able to better control the divers if you know the dive sites and the naturalistic aspects well. Acting as a real guide and showing them even the smallest things (such as a nude branch) you will interest the group and motivate it in staying close to you. This is way ESA has included the ESA Eco-diver course in your training path. Should you decide to bring the cards for the identification of the species and indicate the creatures you are showing to the divers, you can be sure you will be continuously surrounded by them.
Be interested in what they show you, even if it is something ordinary for you. Congratulate with them, remember what they showed to you and talk to them about it after the dive. Never act as if they are showing something not important. Let them decide if what they see while diving is interesting or not; everything seen underwater can be so. Make them notice the different sceneries too. For instance, if you are diving under a cliff, ask them to look upward to see that it continues over the surface.
If a couple of divers stops to take some photographs, don't get nervous and, instead of calling them with the shaker, get closer to them with all the other divers to see what they are looking at. Sometimes the divers show nice things to the guides.
In short, highlight all beautiful aspects of each dive, be available to fulfil the divers' needs and satisfy their curiosity, but be always watchful: something unpredicted could happen at any time.
You must be able to get access to the information about the quantity of air left for each diver and the data shown by their instruments.

The type of dive and the level of the divers will make you choose how to get such information: you may invite them to check their instruments and tell you how much air they have left regularly or you can pass by them and take a look at the instruments. Whatever you decide, when the first diver indicates he has 100 bars left, check your air gauge, estimate his air consumption and drive the group to shallower water. As you know, a change in depth makes the air inside BCD and suit change too, thus changing the buoyancy of the divers. Every time you go from deeper water to shallower, turn back to look at the divers and show them you are deflating your BCD. This will make you realise if anybody is unable to control their ascend, and, suggesting to control their BCD, you will make them improve their diving capability. This is specifically useful while ascending and when changing depth, during the dive, to move to less deep water. Be more watchful in shallow water, as small variations in depth cause huge changes of the volume and, thus, buoyancy.

(3)ascent and getting out of the water

Before you start to ascend, be sure all divers are ready and that all understood that the dive is over. Whenever possible, use a rope as a visual reference and ascend very slowly.

Stay close to the divers you have appreciated to have some buoyancy problems and remind them to deflate their BCD. Don't ever miss the safety stop at 5 metres for 3 minutes, unless you dived at 6/7 metres only.

What do you think about it? You can discuss with your ESA Instructor.

If the sea is not really calm, you can hold on the rope up to the surface and advise the other divers to do the same. Finally, suggest them to inflate their BCD when emerged and hold on the rope until it is time to get on the boat. **Emerge always by the bow: the stern is dangerous because of the propellers. Indeed, the captain may decide to use the engine to control the boat in case of rough sea.** Another reason to emerge by the bow is that, in case of strong current, it will be easier to intercept the access point to the boat, while emerging by the stern somebody could be taken away from the current, causing some troubles.

Remember that some of the divers you supervise are occasional divers who don't practise it all year. Not being continuously trained, what you consider to be a soft current may cause problems to others.

It is better to have somebody of the staff to wait in the water with the mask on and ready to use the regulator until all divers

Minitest

1) *To prevent conditions difficult it is useful:*

a. swim calmly, often looking divers

b. *swim according to the faster*

c. *pace of focus primarily on things to show*

2) *It ' s good that the distance to go while diving is determined:*

a. *the things to be observed*

b. *by the time available*

c. *the air consumption*

3) *When there is a condition of fast air consumption:*

a. immediately reach the shallow water and go back to the exit point

b. continue the dive and ascent every where

c. Send back to the exit point the diver who has little air

4) True or false:
in order to prevent someone end up the air during the dive, ask often divers how much air they have, indicating the pressure gauge.

Answers: 1 a - 2c - 3a - 4 true

are back on the boat. This is useful to coordinate those still in the water and avoid that a diver stays too close to another person who is climbing the steps. You can easily perceive the consequences a person could have because of another diver falls on him.

If you are diving from the shore, you can emerge from a distance and swim to reach the shore. **If the sea is very calm such distance can be extremely short as it is not a problem to get under the shore, or if there is wind blowing from the land to the sea causing a surface current that takes away to the sea.**

You could start the dive with great conditions and find that the sea is rough at the end. In this case, stop before the breaks and try to understand the sequence of the waves, in order to choose the right moment to let the divers swim to the shore, keeping the regulator in their mouth.

It is better to stop the dive with some more air inside the bottle to have enough air to swim through the waves. You should plan to emerge in a point free from obstacles, such as a sandy beach, where the divers can reach the shore without putting themselves in danger even if the waves are strong.

Divers with photo or video cameras, torches or other equipment will appreciate your help a lot with ascending and getting out of the water. Try to learn how to use correctly these instruments, in order to offer the best assistance possible.

Post-dive activities

Many divers consider the moments after each dive important as much as the dive itself. In these moments, they can exchange opinions and comment the dive. They can go through all the moments of the dive again and strengthen the relationship between mates. This enable them to continue to enjoy the just completed dive, pleasing them a lot.

It is important that you continue to act as a Diveleader and professional expert after the dive. **Don't stay on your own or take about your equipment more than it needs.** Stay with the customers instead, share their enthusiasm, give advise and information and try to make themselves pleased. Every little helps in doing it, even you assistance for the various operations they are involved in.

Every time you approach them, your words shall be encouraging. You may think about the dive and what to say already during the safety stop, in order to be ready for the discussion at the end of the dive. Even if the site is not that great or the divers are undisciplined or not experienced and make you worry too, there is always something good to highlight.

Minitest

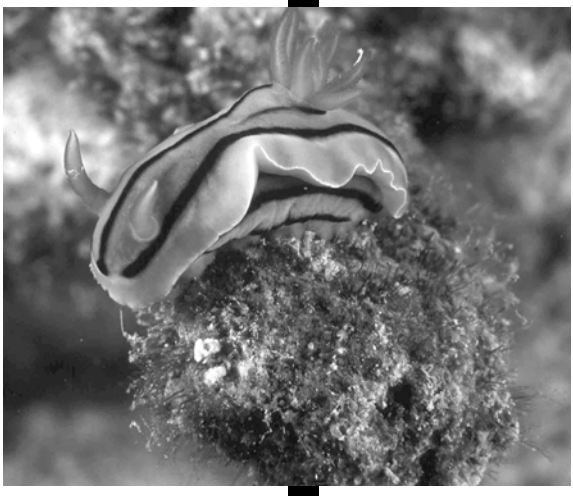
1) *Whenever it is possible, is more useful ascent :*
a. *in blue*
b. *along a rope*
c. *at the stern of the boat*

2) *While a diver climbs the ladder is useful:*
a. *entertain others divers chatting*
b. *Prevent, kindly, someone replaced under the one who is going*
c. *to pick up another diver, immediately behind the first, for acceleration of the return*

3) *If, after start a dive from the shore, the surface is reached with the presence of the surf , you should get out:*
a. *from the beach*
b. *among the rocks*
c. *climbing a pier*

Answers: 1 b - 2b - 3a

Michelle has just finished a dive with two divers: Pete, who is expert and unruly, and Omar, who is constantly having problems with his mask and can barely control his buoyancy. The most spontaneous thing she thinks as soon as she is back to the shore is "Thanks God it's over!". Nonetheless, thanks to her professionalism, she is able to answer Omar' questions "Am I a good diver?" congratulating with him for his ability to empty the mask and complete the dive with no problems, instead of telling him to give up. Then she immediately starts to talk enthusiastically to the divers to recap the sea creatures seen and explaining how exceptional some of them are. "Did you see those yellow snails with the shell looking like a Chinese hat? They were laying eggs. And those two turbots chasing each other? How beautiful they were? Did you see how they were able to camouflage themselves with the seabed? And that little ray! We were really lucky to see all these creatures!". After having attracted their attention and created a relaxed atmosphere, Michelle restart to offer positive comment to the performance of the divers, suggesting techniques to improve their ability. **This makes the divers happy and she becomes an important reference point.** She can be sure that, after this debriefing, she will have a much more relaxed dive the next time. The responsible of the diving centre is really happy that such a professional Diveleader as Michelle is part of his staff.



Sometimes it is the small details to enhance the dives and the Diveleader role

Diving is a service offered by diving centres and professional divers.

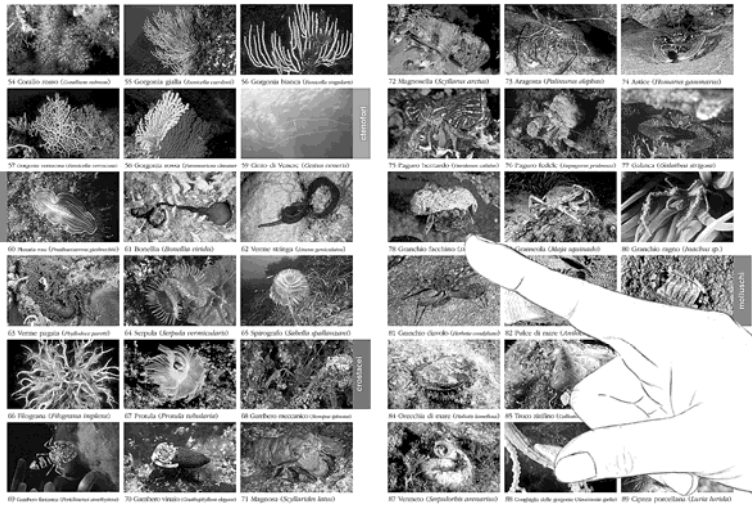
As such, all general rules applied to any services apply to diving too. Furthermore, it is important to be sincere and give the right information: **never congratulate with divers if they don't really deserve it, nor guess the name of fish of places if you don't know them.** The customers will perceive it, and will not have a good impression of your performance. Try to think about a diver who can't control his buoyancy and to whom you had to adjust the BCD during the whole dive. What if you would congratulate with him? He would feel you are making a fool of him, **and he would not choose to dive with you again. How could he trust you?**

If you are not sure you can give the right information, it is better to explain that you don't know the answer, that you will gather some information and then answer. You could even involve them in research of the information reading the ESA Ecodiver "Seas of the World" together. You will probably get to like you and will look for you for the next dive.

It happens, sometimes, to listen to very bad comments that are an indication of lack of both professionalism and aptitude to supervise divers such as "I couldn't wait to finish the dive.

There are no fish at all in this place, never!", or "I hate having to dive with him. Why doesn't he give up?", or "I told you to keep your fins away from the bottom. Why don't you understand?". **Luckily this cases are very few and must not be considered as a reference of your job as a Diveleader.** Take into due account the suggestions you find in this manual. **You will be able act efficiently and will let your passion for diving to grow.**

If you are one a boat for a full day diving, offer the divers your assistance in preparing the equipment, and change the cylinders between two dives, and check that everything is ok.



After the dive, when everybody is relaxed and pleased, **it is easy to propose enthusiastically all the activities promoted by your diving centre,** such as other dives, techniques to improve diving capabilities, knowledge of the species, ESA courses such as **ESA Specialty Diver, ESA Advanced Diver, ESA Prevention & Rescue Diver, ESA Ecodiver** and so on. If you are the owner of the diving centre you will be able to earn more, otherwise you will have the change to increase your salary and enjoy your boss esteem.

The use of the recognition guide, inside the "Seas of the world" manual, extends the dive pleasure.

If you are able to create the right atmosphere, making feel people comfortable, relaxed and please offering your professionalism and highlighting safety and protecting the environment, your job will always be as a holiday and will improve the quality of your life.

Outlines

You can find here below a few suggestions you may take into account when acting as a Diveleader. Your Instructor and the experience will tell you the which is better to apply to the various situations. Observe the way your more expert colleagues behave, listen to the divers' comments, remember you experience as a customer and use common sense.

Safety and comfort of the customers are the most important things to complete a quality dive. Everybody would like to se sharks, whales, groupers, tunas, gorgonians, corals and so on, but, most of the customers consider comfort and safety the top requirement to be satisfied.

Nowadays, many people express the need to have adventures in contact with nature, to stay away from the constraints of everyday life and, sometimes, to have the chance to tell they have done something great.

Anyhow, for most of the people, it must be an adventure that give safety to the maximum extent, respect of time to go back to family and job without unforeseen events, for granted.

The following sequence of information to be taken into account can be useful to prepare your dives as a Diveleader:

Knowledge of the site and environmental conditions

- Experience
- Exploratory dive
- Weather forecast
- Local information
- More expert colleagues

Knowledge of the divers

- Behaviour of the divers
- Dialog
- Log book
- License
- Previous experiences
- Environmental conditions

Briefing

- Introductions
- Difficulty
- Generic information on the site
- Peculiarity of the site

Path

- Species, scenery and historical contests
- Limits of depth, time and air
- Role of the Diveleader
- Couples
- Preparation
- Equipment assembly
- Putting on the suit
- Putting on the equipment
- Check

Entry into water

- From the boat: with the equipment on
- From the boat: putting on the equipment in the water
- From the shore – calm sea
- From the shore – rough sea

Descent

- Make sure the cylinder valve is open, breath from the regulator
- Equalisation

Minitest

1)The first comments after dive should:

a. *Should be as positive as possible*

b. *communicating enthusiasm*

c. *a) and b) are correct*

2) True or false:
the phase post-dive plays a very important role for the success of the dive and the Diveleader.

3) True or false:
it is very important delay one response that give information incorrect.

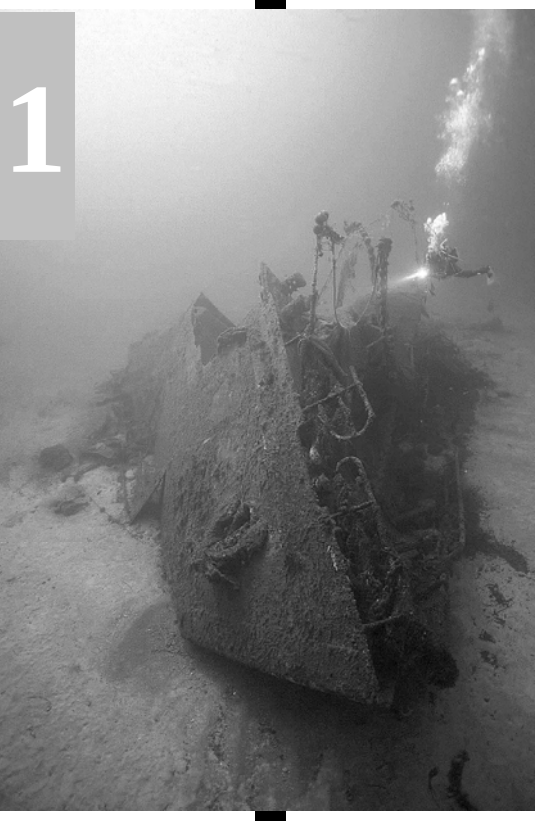
4) Immediately after dive can be the right time to:

a. promote the diving activities

b. enjoy the rest in solitude

c. make staff meeting

Answers: 1 c - 2a - 3 c - 4 a



In the case of wrecks dive is important to know the history of the ship and the causes of the sinking

- Buoyancy
- Using a rope
- With no reference

Dive

- Role of the Diveleader
- Supervision of the group
- Things to see
- Respect of limits
- Instruments check
- Air consumption monitoring
- Orienteering

Ascent

- Using a rope
- With no reference
- Buoy
- Speed control
- Buoyancy
- Safety stop
- Instruments monitoring

Exit

- On the boat with the equipment
- On the boat without the equipment
- On the shore
- On the shore with waves

Post-dive activities

- Comments
- Public relations
- Take care of equipment
- Marketing
- Log book
- Stickers and stamps
- Signature

Orienteering

During your first dives you will have surely wondered how your Instructor, or the guide, could easily go back at the entry point.

Possibly, your being amazed and wondered will have made you feel worried and ask to yourself if you would have been able to do the same thing. One of the reasons many divers fully rely on Diveleader is this: they don't need to think how to go back, so they can enjoy the dive to the maximum extent.

Furthermore, it is a pleasure to know that you are supervised by a highly professional and smart diver.

You have experienced underwater orienteering during your ESA Advance Diver course.

Actually, the principles you learned during such course are those you always need to apply, but you will have to think about the safety of the group. For this reason, during the first dives you will be subject to stress and anxiety, and will be worried that you will not be able to show any interesting thing.

Your Instructor will suggest you to take your time and wait to get experienced. You will become a great guide step by step. Remember that you are responsible of the group you are supervising, therefore, **your choices must be based on the safest conditions you can offer to the divers. If you are not sure about what to do or should any doubt arise when you are starting the dive, don't go too far from the entry point.**

You will feel sure about what to do if you know a site very well thanks to many dives already performed, but it is not always the case. Actually, it could happen to dive where you have never been before and be responsible to supervise some divers. What can you do? Try to **observe the characteristics of the bottom before diving. You may do it from the boat or from, if available and easily reached, from a cliff.**

Able to point the way back is a must of the Diveleader role

The water in the Mediterranean Sea is quite clear, so you can easily understand where you will find sea weed (the water looks blue) sand (water looks white) or rocks (usually yellow), and decide which direction to take. For instance, you may circumnavigate a group of rocks keeping it on your left and leaving the sand on you right. In the Red Sea it is easy to observe the shape of the reef and decide which direction to take, even though it is better to get information about the currents. It could be difficult to recognise the boat at the end of the dive, as there could be many around a site. In this case you can remember the name of the boat, or you can use a rope tied to the boat at an end and to a buoy to the other end in order to find it easily.

The morphology of the coast can help you: under the surface a cliff continues and you can find a wall, while the bottom where the coast is flat slopes down slowly.

When you are already in the water and are waiting for all the divers to gather around, take a look at the bottom the choose your points of reference that you will take into consideration before starting the tour. You could have to turn around to assist somebody who is having problems (in equalising maybe) during the descend. Taking the reference point before starting to dive will help you in finding back the direction you want to follow.

Take note of depth and characteristics of the mooring point and, if you are close to a wall, choose some reference points on the wall itself or set your compass in order to be able to go back to it at the end of the dive. This way, you can head to depth you have decided to reach for the dive and, when the first diver indicates he only has 100 bars left in the cylinder, you can swim back to the wall, reducing the depth, and approaching the exit point.

In many cases it is possible to understand the shape of the reef from the boat and choose a location based on the current

Avoid random directions trying to follow an almost circular pattern, hoping to go back to the mooring point. It is much better to use regular patterns, such as a square, and evaluating the length of the four sides. The first times you may decide to follow almost the same path that another more experienced guide is leading his group through. All you will need to do is to make sure you will maintain the visual contact with the other guide. Anyhow, this can be a successful choice only if you don't meet other bid group of divers during the dive. Furthermore, avoid get to close to the guide you are following, otherwise the two group will mix, causing some confusion to the divers leading to misunderstanding and anxiety.

The already given suggestion to have a compass with you, will help you in knowing where you are during the dive and be able to find the way back to the entry point. Should you not have a compass yet, don't hesitate to buy it and consider it as a standard component of your equipment. You can ask your ESA Instructor for some advice, to make sure you will by the model that better suits your needs.

When you are diving from the shore, it is usually better to swim perpendicular to the shore itself, following the indication of a compass. To plan your dive with the compass, position yourself at the entry point and choose the most clearly identified point of reference. Then, following the compass and the direction opposite to the previously set, you will be able to reach the entry point. This technique is mainly useful any time you need to complete the dive right at the entry point, such as when diving from a small beach or the pass of a barrier reef.

It could happen that will enter in caves while diving, or that you dive on wrecks to be explored inside.

Be careful. Orienteering inside caves or wrecks can be difficult and dangerous.

A rope safely tied to a fixing point external to the cave or wreck and unrolled from a reel is usually used to find that way back to the open water. This kind of dives are usually beyond the purpose of purely recreational dive. All professional and non-professional divers need to be specifically trained and need to respect some safety requirements.
As you will learn, or may have already learnt, during your ESA Wreck Diver, you shall avoid parts of a wreck (such as internal cabins) or a cave that don't let you have a constant visual contact with the exit.
Another advice: dive, dive, and dive! Anytime you can, dive and learn to direct yourself. The ability to know which direction to fall can be developed only practicing. A good way to get your orienteering capability started is the ESA Orienteering Diver course. If you have not attended it already, ask your Instructor to give you some information.

Keep with us the compass can solve an orienteering problem

Out of the water

Luke, the leader of a great scuba diving club, has planned a trip to the Red Sea for him and the divers who would like to spend their three-day Easter holidays diving. He called Philip, who runs a diving centre in Hurghada, and booked a boat for 30 people, specifying they don't need any specific assistance while diving as some of the instructors of the club are going to be on the boat too. All they will need is the boat, cylinders, an assistant on the boat and the captain. Philip knows Luke and he is aware of the fact that Luke is very good Instructor and a leader to rely upon. Therefore, he accepts the booking offering two assistants and the captain.
It will be Jeffrey and Mike, two Diveleader, who will provide the needed assistance to Luke's club. They will alternatively dive with the group and supervise the dive from the boat with the captain. Jeffrey will dive the first time and will show all peculiar characteristics of the site. He will not have to supervise the divers, as they are with Instructors of the club. Furthermore, trying to supervise such a big group is almost impossible. Anyhow, Jeffrey will be watchful and ready to offer his assistance whenever needed. He will brief the group about the dive and will inform the divers about the species seen.
Mike will remain on the boat, and will ease the entry into water, support the divers and check that everything is ok (diving equipment, spares, first aid kit, oxygen, …)
He will brief the group telling them what signal they must wait before jumping into the water, how to communicate from the surface to the boat and vice-versa. He will make sure all divers are back on the boat the end of the dive, will keep a note of who have dived and how many times. He will register the name of the each site they are diving in, weather conditions, dive partners, depths, time of the dive and duration. He will help the captain while mooring too.

During the dive, Mike will place himself in good observation point on the boat, and follow the divers observing their breathed out bubbles on the surface, why not, with a binoculars. He will be wearing something suitable. He will have to concentrate and check the overall site in order to recognise any emergency or request for assistance.

During the three days, the two Diveleader offered their assistance and give advice many time by substituting O-rings, regulating and adjusting masks, helping during preparation, while entering into water and back on the boat, providing water. The Diveleader have accomplished these tasks cheerfully, and congratulating to the divers for their good diving capability and performance. Their support has been highly appreciated and Luke have already booked another holiday. Philip is satisfied and proud of having chosen two professional Diveleader's to supervise the group of divers and is grateful to them.

The role of Diveleader varies in accordance with the needs of the diving centre they work for and the services offered to the customers. Therefore, it is not unusual to be responsible for activities for which you don't need to dive.

Assisting divers outside of the water could be needed:

- when the divers have their own guides and/or instructors
- when the diver centres establishes that a qualified person remains on the boat or on the shore to support the divers
- to let each member of the staff to have a long surface interval

Of course, it is much nicer to dive, but a real professional diver must be aware of the tasks he can be directed to accomplish.

Therefore, whenever it should happen, accept it and do your best in order to offer the best service to the customers. Chapter 3, "The handy assistant", will inform you about the possible out of the water for which your professional skills as a Diveleader are necessary.

Cylinders only?

As you may have already seen during your diving holidays, snorkelling is practiced by many people. Many of the usually request to be assisted by a guide. Actually, group of snorkelers are usually very big, and you may be requested to supervise one. In this case, all of the information you have received during your training and working as a Diveleader, together with the experience you have gained, will be very useful. First of all you must be sure that all the customers can do it safely.

Minitest

1) *The best condition to orienteering with precision it needs when the Diveleader:*
a. *has a long experience on the dive site*
b. *decides to cross a sand land*
c. *plans to make a circular path*

2) True or false:
the compass is a tool essential for a Professional Diveleader.

3) *To improve their capacity, a Diveleader can:*
a. participate in the ESA Orienteering course
b. make a lot of experience
c. a) and b) are correct

4) True or false:
even out of the water, the Diveleader work can be very valuable and rewarding.

5) *E 'preferable to work as Diveleader being out of the water when:*
a. *the group of divers is large*
b. *Divers are led underwater by other*
professionals, require this
c. *a) and b) are correct*

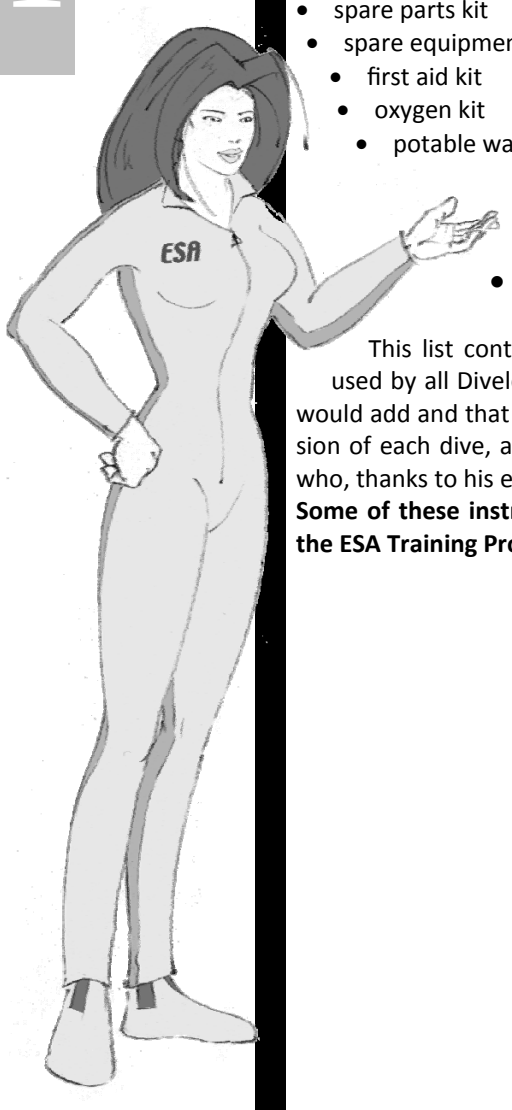
Answers: 1a - 2true - 3c - 4true - 5c

You shall choose a place suitable for snorkelling. All the snorkelers shall entry into water when the conditions are favourable; rough sea, current, poor visibility or environmental dangers (such a very shallow reef that could injury some people and be damaged too) shall be avoided.
Be sure they can easily float and ask them not to free dive without being properly supervised. The "dive partner" approach shall be applied also for this experience; the closest each other all divers are, the better.
Help those who may have some difficulties in breathing from the snorkel, and suggest them to use a buoyant jacket, a pony tank with regulator specifically designed for an easy snorkelling.
Snorkelers look for the same things that motivates divers: adventure and amusement. After having made sure that the safety conditions are respected, think about their needs. If you give them adequate information about what they are seeing or what they can expect to see it will be easy for you to catch their attention. This will enable you to complete a successful snorkelling experience. What you learned during the ESA Ecodiver course will be extremely useful when supervising snorkelers and the manual "Seas Of The World" will be a winning tool.
The scheme to apply to snorkelling supervision are similar to that used for dives: you need to know the participants and the place, you shall brief them, supervise and control them, you will have to indicate what to observe, assist them after they are back on the boat or on the shore and take care of public relations
All the tools to be used could be the same, and the need to operate either in the water or on the boat or on the shore, without getting "wet", shall always be taken into account.

Binoculars are an indispensable tool for the Diveleader

Useful tools
As all the responsible and skilled professionals, the Diveleader shall be equipped with all instruments and tools that enable him to work in the best conditions. For instance, **you will be surprised by understanding better what two distant divers on the surface are telling each other, if you observe them with a binoculars.**
Beyond all the standard complete and efficient equipment, a professional Diveleader shall have the following tools:

- a table to register names of the divers and data of the dives (such as the ESA Dive Organizer)
- map of the sites
- binoculars
- radio
- mobile phone
- echo sounder
- GPS
- compass
- acoustic beacon
- board



- cards for the identification of the species
- ESA “Seas of the World” manual
- sunglasses
- protective cream for the sun
- spare parts kit
- spare equipment kit
- first aid kit
- oxygen kit
- potable water
- _____
- _____
- _____
- _____

This list contains some of the instruments and tools commonly used by all Diveleaders. Try to think of any additional thing that you would add and that could be useful for the preparation and the supervision of each dive, and add it to the list. Discuss it with your Instructor, who, thanks to his experience, may give you the right advice.

Some of these instruments will be useful during your involvement in the ESA Training Programs that will be treated by the next chapter.

Congratulation!

At this point you have already studied this first chapter. This enable you to interact with the Instructor efficiently both during the explanation of the Theory Units and the practice in and out of the water. The information you have just received are extremely important: the start to build your foundation as a professional ESA Diveleader. You have understood how important the experience and the organisation of all phases of a dive in detail are: they can prevent problems and enable you to offer the best service to the customers. Ready for your first briefing? Surely you are, so don't worry if your feel nervous: it is normal! Perhaps the supervision of a dive is what you are mainly interested in; remember that, even if it looks like a recreational moment, it is an important activity and you are responsible to make everything to go well, with specific reference to safety of divers.

Remember that the satisfaction and amusement of the divers is important. Try to know as much as possible about every dive site: you will be able to supervise every dive more efficiently.

As you have red, a Diveleader continues to work after the dive and, usually, it is when he is able to make himself pleasant and estimated by the customers. If this is done in a nice environment you will enjoy to entertain your customers.

You will have understood how important underwater orienteering is; if you have not already done it, don't hesitate: attend the ESA Orienteering Diver course. Every time exactly find the right point to finish the dive your customers will be impressed and will ask you to dive with them again. Orienteering is important for safety too.

Maybe you have never thought how important is a professional diver when they assist divers remaining out of the water. Now you know it is one of the tasks that you could be requested to accomplish. Be ready to do it professionally as your performance will play an important role in the successful completion of the dive.

It is not nice to find out you have a flat tire and no puncture in the car. In order to avoid similar situations when diving, make sure you have all needed instruments and tools to operate with the maximum efficiently always. You will have found interesting the paragraph about instruments and tools; start to use them during this course. You will appreciate them reading the next chapter, in the section that deals with the support that you can give to the ESA Training Programs.

What have you learned?

This test has the purpose of reviewing the most important information of the previous chapter, to improve your knowledge, and to be ready to the next appointment with your Instructor. Answer the question choosing the correct answer among those listed below, specifying if a statement is true or false or filling the blanks. Show this test to your Instructor: should you need it, he will provide you additional information and clarification.
Good luck!

1. The first professional level within the ESA Training System is the:
   a. ESA Prevention & Rescue Diver
   b. ESA Diveleader
   c. ESA Instructor
   d. ESA Diveleader Instructor

2. To attend the ESA Diveleader course you must satisfy the following requirements:
   a. have the ESA Advanced Diver licence (or comparable) and the ESA Prevention & Rescue Diver (or comparable)
   b. have at least registered and countersigned 60 dives on the log book
   c. provide a valid medical certificate
   d. all of the above

3. To get the ESA Diveleader license, you must have attended the following courses:
   a. ESA Orienteering Diver, ESA Nitrox Diver and ESA Dry Diver
   b. ESA Archeo Diver, ESA Deep Diver and ESA Wreck Diver
   c. ESA Ecodiver, ESA Deep Diver and ESA Orienteering Diver
   d. ESA Deep Diver, ESA Orienteering Diver and ESA Night Diver

4. True or false?
   You will receive your license, after having satisfied all the requirements, directly from your Instructor. Anyhow, to operate an ESA Diveleader, you must receive the adhesive validation from ESA to stick to the license, and must have an adequate insurance coverage

5. To establish maximum depth and time limit for a dive, you must know
   a. date, depth, duration and at what time the last dive finished
   b. weather and sea conditions
   c. level of preparation and experience of the divers
   d. a. and c. are correct

6. True or false?

Getting as much information as possible on divers and dive site is needed to plan a dive.

7. Should the sea be rough it is better:

a. to postpone the dive
b. dive somewhere else, where the conditions are good enough
c. jump into the water while the boat is pitching
d. a. e b. are correct

8. During a dive, it is advisable that a Diveleader always look at the divers and frequently:

a. checks the residual available air
b. ask them to check their instruments
c. respect the rhythm of the slowest diver
d. all of the above

9. True or false?

You can prevent inadvertent ascends of less experienced divers or than have not been diving for some time keeping them close to you, and reminding them to discharge the BCD every time you move shallower.

10. After each dive, the role of a Diveleader is _____ to improve the quality of the dive.

a. meaningless
b. fundamental
c. useful but not needed
d. not important

I confirm that I have reviewed all my answers with the Instructor and that I have understood the clarifications the Instructor provided to the wrong ones.

Signature _____ date _____

Chapter Two

Support to ESA Training Programs

2

What you will learn

Have you ever seen some workers building a house? If you did, you may have noticed how each worker was responsible for a specific task. The builder, thanks to his experience and skilfulness, can make straight and strong walls. The mason, who usually assist the builder, prepares the concrete, hands it to the builder and makes bricks and tools available when they are needed.

A good instructor has absorbed a lot of knowledge during the Diveleader role.

Working close to the builder, the mason learns how to work and become a builder himself.

The role of a mason is often considered to be a minor one. Nevertheless, the builder would not be able to fully concentrate on his work if he had to think and worry about all the other things; he would build the wall anyway, but it would take longer and the outcome of his work could be different. Therefore, the assistance and support given by the mason is extremely important. This applies to many other jobs: young lawyers usually work with experienced ones and are in charge of preparing documents or researching data or proofs; apprentices works with artists and usually are dedicated to brushes and colours to be provided to the painter until they are able to paint and, why not, to become more famous than their teacher.

The role of a skilled ESA Diveleader that works with an Instructor is of extreme importance for the training of divers: the Instructor can concentrate mainly on the training activity and, therefore, be more efficient.

Working with an Instructor, you learn to arrange all activities better and better, to deal with customers, how to improve diving skills, supervise those how are been trained, and learn how to teach. All these topics will be useful during your ESA Instructor Course that will bring you to a higher level of your professional growth.

This chapter will provide you all necessary information on which you will base your capability to assist divers and Instructor; training on the job and suggestions from Instructors will help you to improve such capability and start to work.

Finally, your professional skills will be tuned when working with the most experienced Instructors.

As always, we will deal with preparation and experience and on the fact that planning is important to support an Instructor. You will receive useful advice on the best way to supervise and support the training ses-

sions in order to make them more efficient for both Instructor and divers. Read with attention and underline the most important statements or the unclear ones, take notes and don't hesitate to ask for explanations to your ESA Instructor.

Preparation and experience

A Diveleader must be prepared and experienced to arrange and supervise dives, and to support at his best the training programs established by ESA. In addition to preparation and experience, your attitude to taking care of divers will complete you as a Diveleader.

The following example can give you some highlights on the importance of preparation and experience. Read it and discuss it with your Instructor. Jack is not going to dive with experienced divers today: he is entrusted to support Andrews, an Instructor who is conducting a Prevention & Rescue Diver course.

As always, Jack is already at the diving centre before the customers arrive, so Andrews takes the opportunity to plan with the Diveleader the activities to be carried out.

Andrews explain to Jack the targets that must be met during the exercises, where they will be done, and ask him to take care of arranging everything. While Andrews revises all he will have to do, Jack starts to deal arrange everything, including check of the cylinders' charge and their location in order to make them easily available to the students. When they arrive, Jack asks them to prepare their equipment and offers his availability to solve any issues. Paula calls him almost immediately to show him her regulator: it is leaking a bit; promptly, Jack lends her a regulator from the diving centre and takes the responsibility to fix her regulator after the dive. After the diving equipment is ready, it is loaded on a van **with life vests, oxygen kit, spare parts and spare equipment, binoculars, radio, buoy, ropes, floats, etc.**

Once arrived at the place chosen for the dive, Jack start to unload the van, but as soon as Andrews calls the student for the briefing, the Diveleader stops and listen to the instructor. He wants to listen to the instructor while he is giving the students all the information about the dive. Jack will have to show the exercises together with Andrews, and he knows he will have to show them slowly and correctly, emphasizing all movements, so that the students will better understand all the phases. After having tried all the exercises, Andrews proposes to repeat them in order to improve the students' ability. He decides to split the group in two: Jack will observe and supervise the more capable couple, and he will stay with the other one.

The buoy signaling the diver cannot be miss among the Diveleader equipment

Jack, while working seriously with the students, tries to entertain them so that, at the end, he is well-liked by them. After the dive, **the Instructor calls the four divers to debrief them. Jack attends the debriefing carefully too,** then he takes care of the equipment, loads the van and check that nothing is left before leaving. All the students help him and in a short while they can go back to the diving centre and start to wash the equipment. All the students ask Jack to comments their capability. It is quite easy for the students to talk to Jack; indeed, they feel closer to him rather than to the Instructor. Therefore, his comments are more appreciated. **When the students register the dive on the log book, Jack advise them and give information on what they should write.** At the end of the day, Jack and Andrews talk together. Andrews congratulates with Jack for good job and give him some advise to further improve.

A perfect neutral buoyancy is a great business card for a Diveleader

As you can see, a Diveleader is of fundamental importance during courses; this is why you should get well trained and prepared, and treasure your experience.

You will use both the preparation the previous courses you attended gave you and all your past experience as a diver.

During this course, you will keep on increasing your preparation: you will learn to support both Instructors and divers, improve your ability to show the exercises, learn new techniques, and so on.

Working on the field together with an Instructor, you will continue to experience and realise how you will get more and more clever in supporting him at the right time, or how easily you will deal with and solve a critical situation, such as entering into water and the controlling the buoyancy.

Your preparation must improve and increase even after this course!

You should improve your knowledge of diving theory continuously: you could have to answer to questions some students may ask you. Remember that students find easier to talk to you instead of talking to the Instructor. Furthermore, it is demonstrated that a good knowledge of theory enables divers to have a better control and management of diving activities.

Keep yourself trained and review exercises and techniques used in all Training Programs continuously: you will have to show exercises to students or give advise. If you can perform all exercises and apply all techniques perfectly, everything will be easier for you.

You must take care of environment and have a good knowledge of its features: it is extremely important to train divers conscious and **aware of the importance of the environment and keen on it**; passion moti-

vates divers' willingness in continuing their training and optimise their knowledge.
Improve your orienteering techniques: you will have to lead students during the dives and give suggestions on the correct performance of orienteering or research exercises. **Develop good communication skills both under water and outside: it will be easier to make yourself understood and give divers the needed information**.
Learn how to maintain equipment: you could have to solve problems on the dive site in order not to miss a specific dive of a course.
Take into due account what is under your responsibility: during training programs the Instructor leads, but you will be a valuable help.
You will easily understand that quality, preparation and expertise are fundamental both to operate during training programs and, as you have already red in Chapter 1, for the organisation and supervision of recreational dives. Furthermore, they will be useful if you decide to become an ESA Instructor.

The Diveleader takes care of the logistics

Planning
Since it is the Instructor who leads and takes all decisions on how a course is held, you may ask what a Diveleader should plan.
Try to imagine the preceding scenario again. At the end of the dive, after is has been registered on the log book, the four divers go away. Andrews congratulates with Jack, gives him some advise and informs him that the next appointment for the ESA Prevention & Rescue Diver course is the day after at 3:30 pm. They will use a dinghy, the students will have to search a divers who will simulate that he got lost underwater and to properly assist a diver simulating that an accident occurred.
Jack is really professional Diveleader, so he will try to prepare all the needed tools in order to make sure that all the training activities are carried out with no problems, and let the Instructor to concentrate on the training itself. He will check the weather forecast, in order to choose the best place, and will check that the dinghy is fully equipped and the fuel tank is full. He will check his own equipment to make sure it is complete and to avoid any waste of time.
The Instructor could ask the Diveleader to plan the dive sometimes, but, of course, he will have to check the plan and approve it.

2

Tasks

In the previous paragraphs you have already identified some of the tasks that can be carried out by a Diveleader during the ESA Training Programs. Let's try to summarise them in order to have a more complete picture. It is really useful to know, in anticipation, what people may expect you to do or that may ask you. You will be ready and more efficient this way. Furthermore, **it is important that you know what you can do and what you shouldn't do. This way, you will avoid to do things you are not responsible for and that could legally harm you.**

A licensed ESA Diveleader that has renewed his association and with active insurance can support the ESA Instructor during the ESA Training Programs, accomplishing the following tasks:

- take care of logistics
- upon approval of the Instructor, provide all that is needed to manage emergencies and first aid facilities
- make sure that what necessary is available
- participate to the demonstration of the exercises
- supervise and help the students while their getting ready and entering into water
- conduct some training activities in accordance with the ESA Instructor Manual and under the supervision of the ESA Instructor
- take the students from the entry point to the point were the dive starts, as chosen by the Instructor
- take the students back to the shore or on the boat
- supervise the class while the Instructor is showing an exercise or working with a specific student or solving a problem
- supervise and help the students while exiting from the water
- supervise students while they are taking care of the equipment after the dive, and advise, if needed
- cooperate with students for the registration of the dive on the log book
- participate to briefings and debriefing
- discuss with the Instructor about the course
- be a reference point for the students
- answer to questions asked by students correctly and in compliance with ESA standards and facilities

The overall training is under the ESA Instructors responsibility. They will have to be present and approve everything.

Minitest

1) To offer the best support during the Training ESA courses, the Diveleader requires:
a. adequate own staff
b. training and experience
c. a) and b) are correct

2) The role of Diveleader during the courses:
a. can be of great importance
b. have marginal importance
c. is irrelevant

Answers: 1b - 2a

The demonstration of the exercises

It could happen that the Instructor asks you to demonstrate the exercises specific to a course. Whatever the course is, there are some key points you must take into account while demonstrating. Let's review them together.

Students learn psychomotor exercises by reading manuals, watching videos, listening to the Instructor, watching both the demonstration and other divers, and through their own performance. Among these means, the most important is the performance of the exercised by the divers. How hard would have you found to empty your mask if nobody had shown to you how to do it? It would have been really difficult!

By demonstrating the techniques to apply before performing the exercises gives the students a great change to focus their attention on each phase of each exercise; indeed, it is much easier to imitate an exercise and try the related techniques under water instead of remembering its explanation. Furthermore, the demonstration shows that an exercise can actually be done. This is didactically important, mainly on a psychological point of view.

It is essential that you can perform the exercises perfectly in order to demonstrate them well. This is why your ability to perform the most important exercised of the ESA Open Water Diver course will be evaluation by the Instructor during this course.

To make an effective demonstration out of a an optimal performance you will have to make some considerations.

Your position for instance. You must be close enough to the class in order to let everybody see all the specific details, but away enough to let everybody see the exercise.

You must be able to focus the attention of all students on you. Should anything be a cause of distraction, such as a turtle, enjoy it together with the students and delay the demonstration at a second time.

Consider the exercise as it was made of smaller and simpler exercises that need to be connected each other but that must demonstrated one by one. Each phase shall be demonstrated slowly and all moves shall be emphasised. For instance, if the student has to look toward the surface to empty the mask, you must accentuate the rotation of your head, as if you had to look at someone at your back.

Demonstrate the exercise in the most simply way possible. Show only the right moves and avoid the intentional mistakes; they could be cause of confusion.

Your demonstration of the exercise shall be accurate, elegant and simple; wide moves and slowness will make the exercise appear clear and easy to perform. You need regularly training to do this and, during such training, it is important that you try to be as much accurate as possible. Being trained will makes you a successful Diveleader and will make you ready for the ESA Instructor Course (ESA IC).

Minitest

1) True or false:

During the Training Programs, planning can be carried out only by the Instructor

2) *The Diveleader can also cover the dive planning, but:*

a. *Instructor must check and approve each particular*

b.only for the ESA New Diver course

c. *only for the ESA Junior New Diver course*

Answers: 1false - 2a

Support while getting ready to dive

During this phase a professional diver can do its best giving an invaluable support both to the Instructor and the divers.

Diveleaders can be helpful arranging all that is needed and supporting the students in this phase. A Diveleader checks that there are cylinders enough for everybody, Instructor included, and making some spare ones available (the number depends on the objective of the dive and on the number of divers), measures the air pressure and checks that O-rings are correctly places and valves are working correctly. **He prepares the equipment at the students' disposal, checks all regulators, controls, belts of BCD's, collects all needed suits and weights, and makes sure that all masks are equipped with a snorkel.**

It takes longer to give the equipment to the students the first time, as you could have solve problems or satisfy some requests. After having assigned the equipment to each student, register the number written on each piece of equipment and the corresponding name. This will enable you to prepare everything in anticipation and without mistakes.

It is useful to entrust the equipment to the students sometimes. They will prepare it on their own following your explanation, before the lesson starts. In this case you will have to supervise everything to avoid that they accidentally exchange some piece of equipment or that someone arrives on the dive site with the wrong suit or with something missing.

Offer your help and, **if anybody is late, prepare his equipment** so that the delay is not cause of any troubles for the class or cause of pre-dive stress for the late diver. Recommend him to be on time and reassure him that a delay doesn't affect the final result of the course.

During the most busy periods, the equipment could be used for more than one course a day, therefore, the registration of the name of students and associated equipment is of paramount importance. Should some students use their own equipment, suggest them to personalise it, so that now problems occur.

Make sure that all that is needed is available and ready: first aid kit and oxygen, emergency plan, spare equipment, tools and spare parts, buoy, binoculars, radio, echo-sounder, GPS, safety equipment, safety stop station with cylinder, floating rope and rubber ring, ropes, and so on.

Attend the briefing held by the Instructor; you will be more effective during preparation, entry into water and dive.

You could be requested to supervise the students while they are preparing the equipment. In this case, your role will be really important for both safety and training purposes. Observe everything, give the right suggestions and help those who need it. Remember that being polite

Minitest

1) True or false:
During Training Programs, the Diveleader can replace Instructor teaching.

2) *A Diveleader can:*
a. *organize the logistical aspects*
b. *ensure that all need are available*
c. *a) and b) are correct*

3) *Students often turn to the Diveleader their questions, so he have to worry about:*
a. *correctly answer*
b. *answer according the ESA standard and by ESA stuff provided for the training*
c. *a) and b) are correct*

Answers: 1false - 2ca - 3c

with your student the training will have better results. Therefore, try to be kind and comprehensive, but avoid to do what they should do, for instance, assembling their equipment.

Take the participants' preparation level into account while supporting them: the first times they assemble their equipment you may help them a lot, with the aim of enabling them to do it on their own during the course. During the first lesson of an ESA Diveleader Course, you may have to give advise to the students on how to prepare the equipment in the best way; anyhow, don't do it instead of them.

Try to create a nice atmosphere while supervising these phases: encourage them to dive close to their mate and comment their results positively. This helps them to remember what they have learned.

Stimulate their enthusiasm about their dive, praise the panorama (even thought it is the same you have seen many times), appreciate the good weather. Should the sky be overcast or it is raining, cheer them up explaining that divers can enjoy this weather: how unlucky those who wanted to stay on the beach and sunbathe are!

In the stages preceding the dives the Diveleader role is crucial.

Pay attention while they are entering into water, assist them to make everything easier, be sure they have checked their equipment. **You should verify that the valves are open and that there's enough air pressure in the cylinders**. Don't let them enter into water before the Instructor have told you they can, and that they check that there are no obstacles or other divers in the water in front of them.

Explain the best procedure to enter, being sure that they are all listening. This will avoid that anybody will dive too early or in the wrong way. Follow the instructions the Instructor gave you while doing it.

Support during the dive

A Diveleader can accomplish many important tasks during a dive, mainly by supporting the Instructor that is teaching.

You will always work under the direct supervision of an ESA Instructor during the ESA Training Programs. He will have to approve all activities and evaluate the level of learning of all participants to the courses.

An ESA Diveleader cannot work autonomously, unless for what is established in the ESA Instructor Manual. This is one of the reasons why you should have a copy of the this manual, and check that you are allowed to do.

As you will see at chapter 5, being aware of what you are allowed to do

is important under a legal point o view.
Pay utmost attention to the instructions the Instructor gives you and to the briefing he holds with the students. You will be able to understand what you will have to do under water this way. Although you have to respect the instructions the Instructor gives you conscientiously, you can try to improve your support to the ESA Training Programs. For instance, you can try **to create a nice atmosphere during the exercises, keep the class under control, entertain the students** without causing excessive distractions, keep the visual contact with the Instructor, avoid that the students perform the exercises without the direct supervision of the Instructor, remind the class to check the instruments, make the students practice signs, and so on.
Imagine you are diving during a Open Water Diver course. The Instructor asks you to supervise the class and asks a diver to perform an exercise: horizontal simulation of the "ascend while breathing out".

- You are behind the students when the Instructor asks you to supervise them. What is the best thing to do before the Instructor gets far during the exercise?
- What will you do to improve the learning of the students or amuse them without causing excessive distractions while you are alone in front of them?
- After they have simulated the ascend horizontally, the Instructor will start to exercise that requires to remove the weight belt, move it away and put it back on.
- Which will be your best position in order to observe the Instructor and supervise the class?
- Should you move close to the instructor to help the student who is removing the weight belt and avoid that he inadvertently ascend?
- A student tries to perform the exercise before the Instructor asks him to. What do you do?

Consider this scenario and try to answer the questions, write your thoughts on the manual and discuss them with your Instructor during the lesson.
The Prevention & Rescue Diver made you realise that an emergency can happen even if you do anything to prevent it, and that it is absolutely important to react to solve it promptly and properly. The same could happen during the training programs; in this case, your role as an assistant to the Instructor is of vital importance.
Should a student has a problem while he is with the Instructor, you will have to supervise the class on your own. **You will have to stay in front of the class, make the student feel comfortable, safe and stay all together, and keep an eye on what the instructor is doing**. If a student of the class has a problem while the Instructor is with another student, you will have to assist him and, at the same time, to inform the Instructor so that he can take back control of the class.

Minitest

1) *To adequately demonstrate an exercise, it is important to:*
a. *practice often the exercises*
b. *making a briefing rather long*
c. *run faster and in a perfect manner*

2) *To make the exercise more understandable is useful:*
a. *write on a blackboard all steps*
b. *break it down into small exercises*
c. *to show for first the possible errors and then the exercise*

Answers: 1a - 2b

It can happen that novices ascend without giving any notice while they are waiting for their turn. Make sure that they ascend without holding their breath, escort them and avoid to stay with them perpendicularly on the class: the movement of the fins could disturb those who remained under water. Ask them to inflate their BCD and reassure them listening to their problems and giving them your advice. Inform the Instructor whether the situation is under control or his help is needed. In the latter case, take control of the other divers immediately and, if needed, bring them back to the shore and make sure they all exit from the water.

Once again, experience and common sense will help you to decide the best solution.

You will have already understood that Instructor and Diveleader should be able to understand each other perfectly, that it is useful to keep the students all together, either close to the Instructor or to the entry point, that it is important to give the good example and to work preventing problems.

Remember that, usually, the most critical emergencies are caused by an error by the staff on which other negative events add. This way, a small problem turns into a real accident easily.

You can easily imagine that any decision taken could have some legal consequences, therefore you will find chapter four, that deals with the responsibility of a Diveleader, very useful.

When the instructor is engaged to perform skills, in the class control is assigned to Diveleader

In this paragraph you have found some of the less nice characteristics of your work as a Diveleader; the reason for mentioning them is that you now are warned and aware that acting as a Diveleader is really important, notwithstanding the Instructor's presence.

The good results of the training to the students, the relationship you will establish them and with the Instructor **will reward you and make you to appreciate your hard training during this course.**

Support after the dive

When a dive is over, the Instructor must concentrate on the debriefing and the comments on the exercises performed by the students, on the strategy to follow the next dive, on the suggestions he will have to give. Therefore, it is really important that you continue to assist the Instructor directing the students in order to complete all the activities in the best way.

Indeed, some courses include exercises to be performed after the dive. In order to **offer your help during this important phase without interfering with the training**, listen and apply strictly the instructions given by the Instructor.

Being an experienced diver, you know that all divers must take care of

their equipment after the dive, and how important it is to listen to the debriefing held by the Instructor.
Keep the students all together and ask them to respect the rules gently but firmly, so that any waste of time is avoided.
It could happen that a student is in a hurry and needs to run away (maybe he has to go to work). In these cases, you can help him to disassemble the equipment and taking care of it, but remind him that this is an important phase of the course, and that it is better for him to repeat these exercises the next time. Be sure that you help him after having checked with the Instructor if it the case or not.
After the dive you shall know were all the students are and be sure that everything is going well. Offer your collaboration during the registration of the dive on the log book providing all the related data, signing it and asking the Instructor to sign it too. This signature of the log book is extremely important and should be done before letting the students go.

Notify to the instructor if everything is ok

Based upon the place were the course is held you could have to take the responsibility of arranging activities not directly linked to scuba diving, such as arranging a party for the end of the course during which the licenses will be handed to the students.
If you are working in hot climate or cold climate countries, make sure the students are fresh (or warm) enough and at ease before asking them to perform some exercises.
Based upon the specific course, and if the weather conditions are good enough to do it, the Instructor could choose to dive from a boat. Nevertheless, such conditions could vary and the sea could be rough during the trip back to the harbour. Should it happen, help the Instructor to give all the information and directives needed to guarantee the maximum safety of each student aboard. For instance, you could tie all their equipment to the boat, ask them to seat down and wear the lifejackets.
Another important advice: **avoid any argument with the Instructor or other members of the staff in front of the students.** You would damage your professional image and make the affect the efficiency of the training system.

Support during theory teaching.
Theory is usually taught by the Instructor, who may ask you to assist him to make the information available to students more effectively. For instance, after a presentation about the dive tables, the Instructor could ask you to carry out a workshop to let the students practice together with you and improve their ability in using them.

Students find easier to ask questions about their doubts about the lessons held by the Instructor to the Diveleader. Considering this, your support during the lessons will be of primary importance; you will be a real assistant to the Instructor who will collaborate with you to improve both quality and results of the ESA Training Programs. **This is why you should always have a good knowledge of theory.**

A good approach would be that you review all ESA training aids at your disposal, starting from the ESA Open Water Diver manual; it gives you information about all general rules. The manuals for the ESA Advanced Diver, ESA Ecodiver, ESA Deep Diver and ESA Orienteering Diver courses or other ESA Specialities, together with your skilfulness as a Diveleader, enable you to be prepared about the diving techniques and environment related information. You can get detailed information about physiology during dives, prevention of problems and how to manage them in the ESA Prevention & Rescue Diver course manual. Indeed, this manual will contribute to your knowledge of theory of dives. Such knowledge and your awareness will be further increased when you attend to the theory lessons held during the ESA Training Programs.

You will offer an adequate and effective support during the theory lessons thanks to your detailed preparation. Furthermore, you will be able to prevent and manage difficult situations, pass the ESA Diveleader exam easily and, why not, to get ready for your next professional goal: the ESA Instructor Course (ESA IC).

Minitest

1) *Arrive at work with appropriate time in advance in order to:*

a. *prepare all the necessary*

b. *have time to try equipment*

c. *a) and b) are correct*

2) *To improve the students training is useful:*

a. *assemble personally their equipment,*

b. *before each exercise oversee preparation, offering correct suggestions.*

c. *to show for first the possible errors and then the exercise*

3) *During an OWD course, when the control of a exercise involves an Instructor's far distance, the Diveleader:*

a. *should remain behind class*

b. *should gain time doing play other exercises to students*

c. *should get to front of the class in order to establish a eye contact and a better control*

4) *If during a training exercise in a confined water student go suddenly on surface:*

a. *remind them of inflating the BC and stop fins*

b. *move it from the vertical group view, maintaining eye contact with Instructor*

c. *a) and b) are correct*

Answers: 1a - 2b - 3c - 4c

2

Congratulations!

Now you have more information about what you can do as an ESA Diveleader during the ESA Training Programs. As always, your professional development will improve thanks to experience and training on the job with the Instructor, till you will become essential in any training activity.

Therefore, you will improve and play a more important part thanks to the ESA IC program.

Now you can answer questions such as "how important preparation and experience are when helping an Instructor?", "what do I need to plan to make sure that the participants to the ESA Training Programs learn effectively and enjoy their course having regards to safety?", "which tasks can I accomplish as a Diveleader?", "how can I offer by best support during all phases of a training dive?".

Probably, you can't wait to stay under water with the Instructor, take part to the active part of this course and enjoy the emotion of supporting and participating to the training of new divers. Don't waste time then! Answer the questions of the questionnaire, correct them together with your Instructor who will be happy to make an appointment in your new classroom: under water!

2 Minitest

1) *After the dive, organized that:*
a. *the class remains united*
b. *everyone takes care to the equipment*
c. *a) and b) are correct*

2) *Before the students were depart and participate other activities:*
a. *take reservations for the restaurant*
b. *make sure that each has registered the dive*
c. *Celebrate the end of the dive*

3) *The ESA Diveleader must have excellent theoretical knowledge, mainly for:*
a. *conduct themselves presentations*
b. *answer correctly the theoretical student questions*
c. *a) and b) are correct*

4) *To improve their theoretical knowledge, an ESA Diveleader can:*
a. *read all manuals provided for the ESA Training Programs*
b. *attend different ESA Training course acting as Diveleader*
c. *a) and b) are correct*

Answers: 1c - 2b - 3b - 4c

What have you learned?

This test has the purpose of reviewing the most important information of the previous chapter, to improve your knowledge, and to be ready to the next appointment with your Instructor. Answer the question choosing the correct answer among those listed below, specifying if a statement is true or false or filling the blanks. Show this test to your Instructor: should you need it, he will provide you additional information and clarification.
Good luck!

1. A Diveleader must have _____ to operate during the ESA Training Programs:
   a. attitude
   b. preparation
   c. experience
   d. all of the above

2. During the training of ESA divers, a Diveleader can:
   a. take care of the logistics
   b. make the students that are waiting for their moment try the exercises
   c. decide if a student has satisfied a specific requirement
   d. all of the above

3. The demonstration of the exercises:
   a. must be clear enough to make the student see all the techniques used
   b. must be done really slowly
   c. must be done when all the students can look at it
   d. all of the above

4. During the ESA Open Water Diver and ESA New Diver courses, it is advisable that a Diveleader:
   a. assembles the equipment instead of the students
   b. assists the assembly of the equipment and offers to help, in accordance with the indications provided by the Instructor
   c. makes things difficult providing the students with incompatible parts of the equipment
   d. gives the students half recharged cylinders to observe the way they react

5. In order to prevent delays and avoid that the training program is inefficient, the ESA Diveleader must:
   a. have the kit of tools and spare equipment
   b. teach instead of the Instructor
   c. shout at them who arrive late to the lessons
   d. ask for the photography for the license

6. True or false?
   Getting information on the specific course, on the students and on the dive site is needed in order to plan the dives for such course.

7. The Diveleader, in order to attend the briefing of the Instructor cautiously, should:
   a. arrive on time and prepare all the needed equipment before the briefing
   b. not take care of the equipment during the briefing
   c. check the equipment during the briefing
   d. a. and b. are correct

8. During a dive, a Diveleader should observe the divers continuously and:
   a. maintain a visual contact with the Instructor
   b. ask the divers to check their instruments
   c. make them feel confident and happy
   d. all of the above

9. Registering a dive on the log book during the ESA Training Programs is:
   a. optional
   b. needed only during the first courses
   c. needed for the speciality courses only
   d. a fundamental part of the course

10. True or false?
    A Diveleader can improve his knowledge assisting the ESA Training Programs and reading the related manuals.

I confirm that I have reviewed all my answers with the Instructor and that I have understood the clarifications the Instructor provided to the wrong ones.

Signature _____ date _____

Note

Chapter Three

The handy assistant

What you will learn

Probably, after having had a great party to celebrate the achievement of an important goal such as your Diveleader license, you will look for your first job as a professional diver.

Indeed, this ESA Training Program will bring you from the recreational activity to the professional one. Maybe you have chosen to attend this course to be a full time or part time professional diver.

Although most of the new Diveleaders think that diving is all they will have to do to work, there are many tasks that a professional must be able to carry out. The manager of a diving centre is responsible of hiring human resources and must be able to select people. This is why this course includes Complementary Workshops.

This chapter describes the most important tasks and answers questions such as: "What else can I do as a Diveleader beyond diving?", "How do I recharge the cylinders?", "What shall I learn to maintain the equipment?", "How can I record a diving site and return to it again?", "How can I exchange information with the diving centre when I'm on the boat?", "What are the GPS and the echo sounder? How do they work?", "What are the most important knots?", "What can I do after a dive or a course to make my customers' experience unforgettable?"

The description you can find in this chapter is quite simple. Remember that you will learn much more experiencing everything with your ESA Instructor.

The Diveleader not only refill the air tanks, but monitors the air quality and performs routine maintenance

Recharging the cylinders

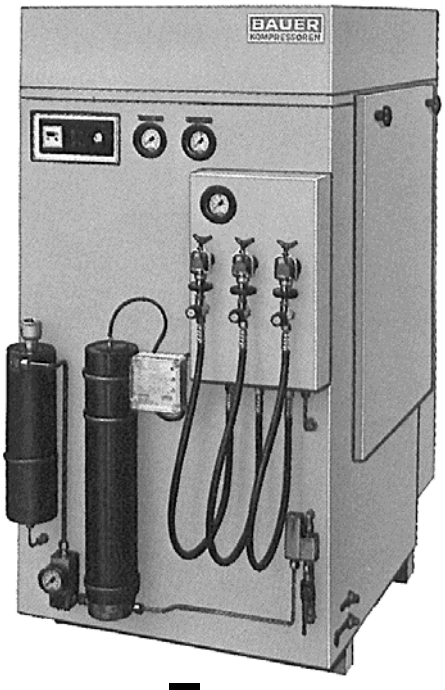
Recharging cylinders is of fundamental importance for scuba diving: it is not possible to dive without recharging them.

Nowadays some new closed and semi-closed circuits apparatuses are available on the market (the so called "rebreather"). Their autonomy is longer than that of a regular cylinder, but they are not diffused that much, and they are equipped with small cylinders that need to be recharged anyway.

Most of the dives are done using cylinders. This is why a Diveleader

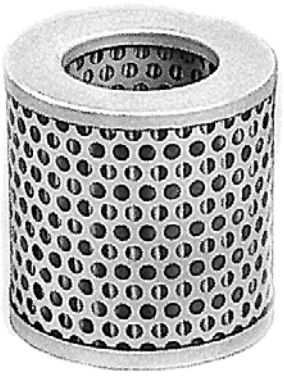
able to recharge cylinders is a more interesting assistant for the owner of a diving centre.
Recharging a cylinder is quite easy; nevertheless, a high level of professionalism is mandatory to guarantee that all safety parameters are respected.
During the ESA Open Water Diver you learned that you must breath pure, filtered and high quality air under water; this is a must to avoid the risk of contaminations that could cause physiological problems such as nausea and headache while diving, other pathologies after the dive, or even death caused by carbon monoxide poisoning.
Another important thing to consider is that all the components of the equipment used to recharge the cylinders are subject to the high pressure.
What you will read hereafter and your Instructor's suggestions are valuable for your career as a professional diver.
An air compressor is constituted by a staged pumps (that aspirate and compress air) activated by an electric motor or an internal combustion engine. Each stage compress the air at a higher and higher pressure up to the nominal one. To repair pumps and motors/ engines it is necessary to attend specific courses held by the compressors manufacturers.
A Diveleader can perform the ordinary maintenance that is needed to guarantee the quality of the air and to prevent malfunctions of the compressor.

A compressor silenced: the dark larger cylinder is the filter whose internal cartridge must be replaced periodically



A diving centre is successful if it can propose quality dives; the quality of the air is of priority importance in characterising a dive. Furthermore, the failure of a compressor during the month of August (high season in the Mediterranean Sea) is cause of economic damages and lost of image that may not be easily recovered during the season.
Since there are many types of compressors, you will learn the standard procedures for the compressor used during this course, but you will have to read the instructions issued by the manufacturer of the specific compressor you will use and ask information to your most experienced colleagues.
Being a machine with moving parts, the compressor needs to be lubricated, therefore it is important to check the lubrication oil level when requested by the maintenance manual or, better, even before.
The lubrication oil must withstand specific quality standard requirements. It could contaminate the air that is pumped into the cylinders because of wear and tear of the components of the compressor: if the oil withstands the requirements if will not

cause any harm to the divers, even if they breath contaminated air. A small quantity of oils that don't match the requirements can be extremely dangerous instead.
To prevent this inconvenient, the compressors must be periodically checked by qualified technicians and the scheduled maintenance must be performed.
An indication of small quantity of lubrication oil in the air is the time needed to recharge a cylinder: if it takes longer than usual it means that compression rings may leak. You can avoid that oil accumulate in separators and filters by draining the condensate frequently. **Usually, such draining is automatically operated by timers controlled electro valves, but some compressors are not equipped with such an effective device, so you have to remember to do it.**
You can maintain a high quality of the air by draining the condensate and substituting filters often. The user manuals of compressors establish the lives of filters; you must respect this information to change them. Nevertheless, in some areas, such as the Mediterranean and the tropical ones, the high workload of compressors and the high temperature and humidity originate the need to change filters more often, reducing the maintenance intervals specified in the user's manuals. It is the manager of the diving centre who is responsible of arranging these activities at an organisational level; you will have to respect the available information, to suggest a more frequent substitution in some specific periods, and warn the manager in time in order to prevent shortage of spares.



Bear in mind that even the most beautiful diving site of the world may not be enjoyed if the air is not good. The substitution of filters is not difficult; you only need to learn the correct technique from more expert people and following the instructions of the user's manual. To prevent damages to the compressor and, most important, in order not to keep you harmless, it is important to discharge the air contained in the circuits of the compressors. Furthermore, all threads must be treated with extreme care in order to prevent explosions. **O-rings need to be visually inspected carefully and periodically substituted.**
Some compressors stops if the substitution of the filters is not done when requested by the manual; it is convenient to know that it can happen, in order not to worry about an alleged failure of the machine. Therefore, in case a compressor stops, the first thing to do is to check the board that controls the substitution of the filters.

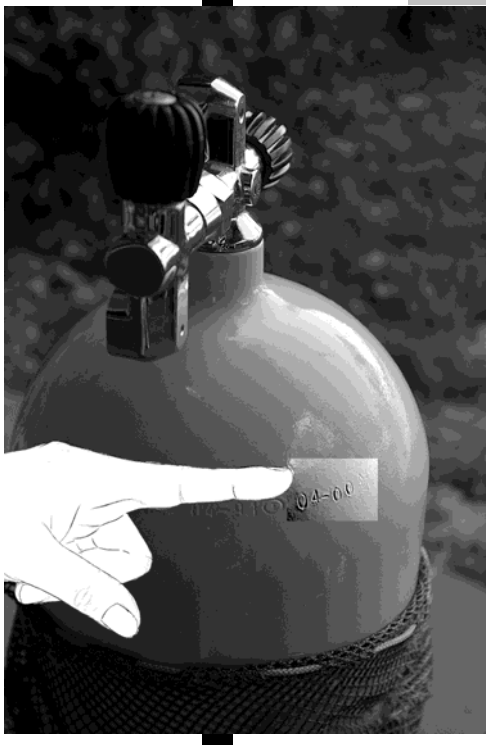
Special oil for breathing air and filter are two important components for routine maintenance of the compressor

Recharging cylinders is quite easy, but since not all compressors are the same, you will have know the correct procedures for the specific compressor you are using. Your more experience colleagues will give you the information you need.

First of all, remember that you cannot recharge cylinders that have not passed the periodic inspection, and that you need to check the nominal pressure before recharging them. You will understand the legal consequence of your actions in the chapter that deals with responsibilities.

The empty cylinders must connected to the output of the compressors, then the you need to open the valves to let the air flow to the cylinders. Usually a pressure switch stops the compressors when the nominal pressure is reached. To disconnect the cylinders from the compressor you have to close the valves, to discharge the pressurised air from the circuit (just like you do before removing the regulator from the cylinder) then you can disconnect them. Sometimes the cylinders are recharged immerged in water; this reduces the heating of the cylinders and the potential damages in case of explosion. In some countries this is not allowed. If the cylinders are periodically inspected and the compressor is manufactured correctly, the possibility that an explosion occurs is really low, even though it cannot be completely excluded.

The data on the tank neck indicates the date of the last test



Try to be cautious when recharging a cylinder: don't put your face close to valves, pressure gauges or pressure lines to try to localise an air leakage; **don't stay close to cylinders or compressors if not needed, don't let the divers enter the recharge area or to stay close to the compressor.**

There are compressors that are equipped with accumulators that are automatically recharged when their internal pressure is lower than an established value. With theses compressors the recharge of cylinders is really quick, as it is done by pouring compressed air from the accumulators.

In some countries the accumulation of compressed gasses in accumulators with a volume bigger than a specified one implies the application of laws and rules. Therefore, it is extremely important that compressors are operated by qualified and authorised people.

If you have already attended the ESA Nitrox Diver course, you have learned that recharging cylinders with gasses other than air, such as nitrox, is subject to specific rules and procedures. If the diving centre where you are attending the course is equipped with a compressor able to produce nitrox, tray to take advantages and learn as much as possible from the people authorised to operate it.

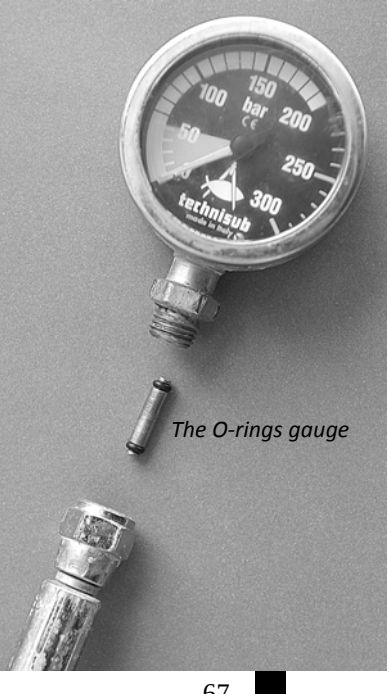
Minitest

1) *The air must be pure and filtered, to prevent*
a. *intoxication of carbon monoxide*
b. other diseases
c. *a) and b) are correct*

2) *To ensure the air quality, you must replace filters:*
a. *in advance of the schedule proposed by the home manufacturer*
b. *just when someone complains about the air quality*
c. *once every 3 months*

3) *Before to refill the air tank, you should check carefully:*
a. *the test date of the tank*
b. *the maximum pressure the tank can be submitted*
c. *a) and b) are correct*

Answers: 1c - 2a - 3c



The O-rings gauge

In any case, bear in mind that the oxygen at high pressure and concentration is dangerous, and that a mix of oxygen and grease is highly flammable.
Another piece of advice: as you know cylinders are heavy and you may have to lift many in a day if you are recharging them. It is important to manage them carefully in order to prevent problems to your back: bend your knees and use the muscles of your legs to lift them instead of using you back.
You will operate on a real compressor with your Instructor during the training session of this course.

Looking after and maintaining the equipment
Imagine a beautiful sunny day, with no ripple in the sea; you are on a boat moored at the buoy of the diving site and the divers are ready to dive. All of a sudden, a diver come close to you and tells you his mask's belt got broken. What do you do? Maybe you are thinking that the answer could be "I will substitute the belt"! Yes, you are right but, how many times have you already done it? Substituting a mask's belt is really easy, and working as a Diveleader you will surely have to do it. But to do it, you need to have a spare belt (as already stated at chapter 1) and you must be able to do it quickly in order not to make all the divers wait.
Furthermore, as you have already learned during your ESA Prevention & Rescue Diver course, **the maintenance of equipment is of fundamental importance to prevent accidents.**
Have you already noted how easy it is to perform the fundamental exercises of the OWD course after having practised some times? It is important that a professional Diveleader has already tried to solve problems suffered by the customers. During the workshop on the equipment you will learn to

- Substitute a mask's belt
- Substitute the mouth piece of a regulator
- Substitute the O-ring from the cylinders' valve
- Clean and learn the inflation device of a BCD
- Fix a suit
- Test a regulator on the field
- Substitute the first stage's piston
- Substitute pawl and shaft of a normal valve
- Substitute the O-rings of a pressure gauge
- Install a buckle on a weight belt
- Equip a BCD with the belt needed to mount it on a cylinder

There are other operations that you should be able to do; you will learn them during the course or when you will start to work.
Once again, experience and formation will help you in improving your preparation; thus you will become a complete and irreplaceable professional diver, not only for the divers but also for your colleagues.
Finally, **maintaining the equipment is important on a legal point of view,** therefore, you need to be sure that you can do it with full knowledge and precision. You could consider the possibility to attend a course held by equipment manufacturers and become a qualified technician.

Going back to diving sites
As you have already red at chapter 1, a Diveleader is like a tourists' guide that brings the divers to the most amazing dive sites.
You could have to find new diving sites and be able to return to sites you have already been before during your career as a Diveleader. Likely, the maritime authorities of some countries have understood how important is, to protect the environment, to place mooring buoys for the diving centres' boats. While such buoys can make your like easy, how can you go back to a specific diving site not indicated by a buoy? **You can use instruments, such as echo sounder and GPS locator.** What if you have to cast the anchor close to a wreck that is laying on a sandy area if one of the instruments is not working?
During your course you will learn how to take the cross bearing with some specific objects on the coast. Also fishermen use sophisticated instruments to find go back to specific areas of the sea, but all of them can take bearings. You can also take the compass bearing of a diving site, always considering some reference objects on the coast.

To take a compass bearing:
- Choose two still objects on the coast (high and narrow, if possible); the distance between them should be such that you have to turn of about 90-120 degrees to look at one and the to the other
- Direct the compass on each one of the objects and register the course
- Repeat this operation three times for each object
- Take the mean value of three bearings

To go back to the diving site with a compass
- Sail toward the site you want to find
- Localise the two reference objects on the coast and keep on sailing until one of them is aligned to the cross bearing you took

Minitest

1) To be most effective on the dive site it is useful:
a. *try in advance work on equipment*
b. *have pieces of replacement*
c. *a) and b) are correct*

2) *To prevent possible legal implications, it is useful:*
a. *acquire the qualified officer qualification*
b. *not to make any type of intervention on the equipment*
c. *act only on the equipment friends*

Answers: 1c - 2a

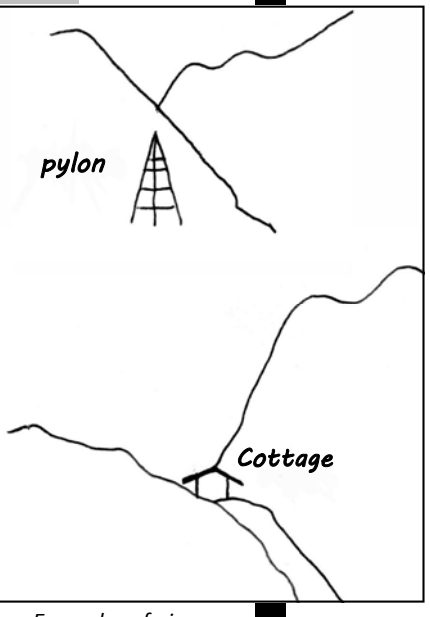
- At this point, maintain the course until the second object is aligned to the other cross bearing
- Direct the compass to the two objects and verify that the indication of the compass is that you registered

Remember:

- The greater the distance between the two objects, the more accurate the bearing is
- The effect of a small error in a bearing you took increases proportionally to the distance between you and the object
- It is difficult to be accurate when the sea is rough

To take a cross bearing:

- Localise two aligned objects on the coast (high and narrow, if possible)
- Localise two additional aligned objects on the coast (always high and narrow, if possible)
- Trace on a board a sketch of the coast and the four objects. Then trace a line joining the aligned objects for each couple of objects; the intersection between the two lines represents the position of the boat
  - The angle between the two lines shall be 90 degrees at least
  - The objects must be fixed (a crane is not usable)
  - The bigger the distance between the aligned objects, the more accurate the bearing
  - You must see the aligned one in front of the other to have the maximum accuracy



Examples of aims alignment to detect a land's point: it is important that between the two aims there is an angle of at least 90 °

To go back to a diving site with a cross bearing

- Head the boat to a direction such that you can see a couple of selected aligned objects
- Move back and forth on this direction until the other two objects are aligned
- You are on the diving site when the objects of each couple are aligned

Remember:

- This method ensure a high accuracy if used correctly
- You must practice a lot to use this method effectively
- Try to make a cross bearing even if you are using a GPS
- To be sure you can find again a specific diving site, draw or describe the cross bearing, bearing in mind that it could be used by someone who has never been there before.

You can practice the bearing techniques on the shore: you could hide a coin under the sand and take a bearing of its position. Go away, go around and then try to use the bearing you took before to recover you "treasure".

Usage of GPS and echo-sounder

It's 9 o'clock a.m., and Fairy Tale, a boat belonging to a diving centre, is heading to a diving site. Vincent, the captain, after having left the harbour, gets in touch with diving centre via radio to check that it is working properly and to confirm that the boat has left with all of the divers on board.

The GPS give indications to Vincent about the needed adjustments to the route in order to reach the chosen site. **When less then a mile is left, Vincent turns the echo sounder on to be sure to anchor close to the right place.** After having anchored, he calls the diving centre to confirm they have arrived and that the divers are about to get into the water with the guides, Joanna and Andrea.

Vincent remains on the boat during the dive. He checks that everything is fine and helps the divers when they are getting into the water and coming back on board. Before leaving the dive site to go back to the harbour, he calls again the diving centre to confirm that the dive was completed successfully. Then he heads back to the harbour using the route set in the GPS. A final call to the diving centre is made when the boat is moored at the pier.

This brief story is to show how useful it is for a Diveleader to be able to use instruments that support sailing, and that keep the boat in touch with the diving centre. **Although a captain is usually expert and able to use such instruments, a Diveleader should be able to use them for emergency needs.**

Marine radios are portable and fixed. Whatever the specific features of each model, the main characteristics are all the same. To communicate you need to know which channel you shall use (i.e. channel 16 for emergencies, channel dedicated to the diving centre, channels used by local boats, and so on). **Make sure that the radio is on and properly tuned.** For almost all models you need to bush the microphone button to talk and to release to listen.

The Instructor will show you how to use a radio, and you will practice. Every time you are on a new boat ask where the radio is and learn to use it. You may have to use it for emergency needs.

The same rules applicable to all electronic instruments applies to radios as well: read the user manual before using them.

Remember that the usage of marine radios is ruled by specific regulations than must be respected.

You will learn to use an echo sounder and a GPS during the course, and the Instructor will give you all the needed suggestions.

The GPS (Global Positioning System) is an electronic instrument that gives you the coordinates of your position on the hearth.

Minitest

1) To detect a point with the compass, it is good to choose

a. *two objects standing, tall and thin*

b. *two objects distant from each other, in a way to form an angle of 90 ° / 120 °*

c. *a) and b) are correct*

2) *To ensure maximum precision, noting a point, with the aims to land:*

a. *the two objects must be aligned and need to overlap*

b. *the two objects selected must be low and wide*

c. *the two objects must be very close to each other*

Answers: 1 c - 2a

It uses signals generated by satellites design for this purpose. There are many models of GPS: some of the contains electronic nautical maps, some can lead the captain into the harbour to the exact mooring place, other can be interfaced with the automatic pilot of the boat and guarantee that the boat follows the route with a good accuracy.

They have a memory and can be used to fix diving sites. **When you take a bearing of a site, make sure that the GPS is properly set and that you are exactly on the site** (take care of rough sea and current); fix the point using the appropriate button and register the coordinates on the board. You can take the bearing three times in order to be sure of the accuracy of the instrument.

Although the precision of the GPS is high, considering that a few metres offset could make you loose the exact diving site, it is useful to use the GPS in conjunction with an echo sounder. The latter is able to read the profile of the seabed, and it works by registering the time between the emission of a signal the receipt by a sensor of the echo of such signal reflected by the seabed. Some models can give many useful information on the nature of the bed and on the fish under the boat. Some models show an indication of the depth and the profile of the seabed on a display; other trace the profile on the paper, and gives you the possibility to keep a record of the site.

Read the instructions carefully and make use you set the appropriate scale before measuring the depth.

Usually these instruments are not waterproof. Take care of them properly, so that they don't give you any problem when you really need them. Imagine you are in the open sea and the engine not working and the sea is rough. How would you feel if the radio didn't work after having got wet because of a couple of waves?

A GPS portable, with compact size.

Making knots and behaving on a boat

As almost all diving activities are often carried out using a boat, the Diveleaders may have to operate on board. In some cases, such as in the Mediterranean Sea, **the Diveleaders who work for diving centres are responsible of driving and taking care of the boats,** usually dinghies specifically equipped for divers.

To drive some kind of boats a driving licence is needed. This is established by the local laws.

This course will not enable you to get a driving licence, but will prepare you to support the activities on a boat. Indeed, even if the boat is driven by someone else, you will have to cooperate during departure, mooring and docking. For this reason, you should be able to make the most common knots.

Your instructor will teach you to make the following:

1. **bowline knot**; it is not like a noose knot, it safely ties and can be easily untied even if it has been strongly tied
2. **clove hitch**: it can be used on a mooring bitt or on a mooring ring, and is useful to moor the boat to pier quickly
3. **other knots,** such as that used to join two ropes with different diameter, or to link a flag to its staff

The instructor may decide to teach you other knots; they could be specific to his area. **Try to learn as much as possible: what you learn today can be useful tomorrow.**

The three knots above can be useful while recovering something from the seabed (it will surely happen to do it). For instance, you may have to search for a lost anchor, and it will be important for you to know how to tie it to a rope correctly, quickly, and without loosing it again. It could happen that you are the captain of a boat to be driven to a diving site; the following notions will be useful and will avoid bad impressions or problems.

Be always sure that:

- both boat and engine are in good shape
- the engine cooling system is working (there must be water flowing through the engine and you should see it going out the drain)
- there is enough fuel to cover three time the distance between the harbour and the diving site
- the fuel ducts are no leaking
- the anchor is available, its chain linked to the rope, and the rope safely secured to the boat
- the ropes are long enough, that they are tidy stowed and ready for use
- spare sparking plugs are available if the boat is equipped with an internal combustion engine
- a safety stock of lubrication oil is available
- there is enough fresh water and drinkable water
- all the safety feature requested by the applicable laws are available
- the communication equipment are working properly (radio, mobile telephone and so on)
- first aid kit and oxygen are on board
- there is no shortage of spare equipment and parts
- a tool box is available (spanner for sparking plugs included)
- Should the engine stop and you cannot start it again, it could be due to many causes. First of all, try to stay away from potential dangers, anchor in a safe way, calls the diving centre and make a troubleshooting checking:
- the fuel level

Minitest

1) Before starting a radio transmission:
a. check that it is on and on the right channel
b. turn off the engine of the boat to avoid interference
c. ask permission to local Coast Guard station

2) The GPS is a valuable navigational aids, it is based on signals:
a. sent by radio units placed on important garments
b. sent from satellites specially prepared for this purpose
c. sent by warships

Answers: 1a - 2b

- that the safety plug that shut off the engine in case the driver falls is not connected
- the connections of fuel ducts are not leaking
- that there are no obstruction to the fuel ducts, such as something heavy left on them
- that the fuel ducts are not bent, that there are no bottlenecks or leaks
- there is enough lubrication oil
- the cooling system is working
- the electric cables are properly connected

Even on a new boat could there is the possibility to have problems with the engine. Therefore, when conducting a boat, you should always try to follow safe routes, staying close to the coast, but away enough to avoid rocks and obstacles. Should the boat stop, you need to have enough time to anchor before the wind blows the boat against the rocks. Try to sail where the water is not too deep, so that you can anchor without letting the rope to run short. During the course you will have to lead a dive from the boat. During such dive, the Instructor will advise you on the correct behaviour of a professional diver.

A Diveleader may be to conduct a boat for bringing the divers on the dive point

Weather forecast

"Hello, this is the … Diving Centre. …! Oh yes, I remember. Hi! How are you? … Great! Ah! You want information about the night dive, don't you? We still have not decided, the weather is not that great and the forecasts are not really good. As you know, our policy is that if it can be done, we go for it. Maybe we choose a sheltered place, is it ok for you? Ok! Call me at 6 pm and we'll make a decision. If we can't today, we'll make an appointment for anther time. … Ok, thanks for your call, speak to you later!"

This is just an example of how a diver could have to give information if the conditions for a dive exist or not. Actually, based on the above telephone call, it looks like an expert Diveleader is quite tempted to foresee the weather himself.

Although there are no meteorology lessons in this manual, you will try, together with the instructor, to understand how you can foresee the weather conditions. This is an important task for the development of your professionalism; it enables you to plan the best dives and take in consideration your responsibility (see chapter 4).

You need some time and experience to foresee the weather conditions. Anyhow, you will find the following information useful.

In order to orient yourself and better understand how the weather conditions change, try to localise the north direction form the diving centre, from your home and the harbour. Try to get information about the most common winds and on their seasonal intensity from the

most experienced colleagues and from the sailors. Take a note of how the environmental conditions change.
Usually big dark clouds are an indication of a storm that is approaching. A dark band over the horizon suggests that a strong wind is coming from that direction; it could bring storm and rain-
If you see a white band, you could expect heavy rain that, during summer time, is not cause of concern, except for an unexpected lack of visibility; if you see such a band, verify that the route you intend to keep is not cause of collisions with obstacles and be ready to keep it using a compass.
When it starts to rain and there is no visibility, reduce your speed and wait: season heavy rains don't last long.
Of course, you must not think that you can leave the harbour when there is the possibility that the weather conditions could get worse: the above suggestions are give to you so that you know how to react in case you find yourself in those conditions by chance. Should it happen, don't be afraid, try to understand how the weather will change, and ask information to the most experienced colleagues. **The decision on the possibility to dive or not must be always taken cautiously.** You can learn how to understand the weather forecast you can find on the internet or diffused by newspapers, TV, radio and channels 16 and 68 of the marine radio.
Here there are a few suggestions.
Ask the fishermen and sailors that leave in the area about the most reliable weather forecast system they usually take into account. **Observe how the weather changes, if it follows the forecasts, and try to register it.** Localise exactly the area where you are: when it comes to weather forecast, the Mediterranean Sea is divided in areas; **the sea between Sardinia and Tuscany is west northern Tyrrhenian Sea.**
Don't listen to the weather forecast for your area only; if the wind blows from the north, try to understand what is happening in that direction: it will give you an indication of what the weather conditions will evolve.
When the weather forecasts are on a map, you can see the isobaric lines: the are lines that runs through points at the same pressure. The closets such lines are, the higher the pressure gradient is, the strongest perturbation and the fastest the wind will be. **Although high atmospheric pressure is usually an indication of nice weather, this is not always true for those who are sailing**: the air flows from high pressure areas to lo pressure ones; this is cause of wing and rough sea in the high pressure area.

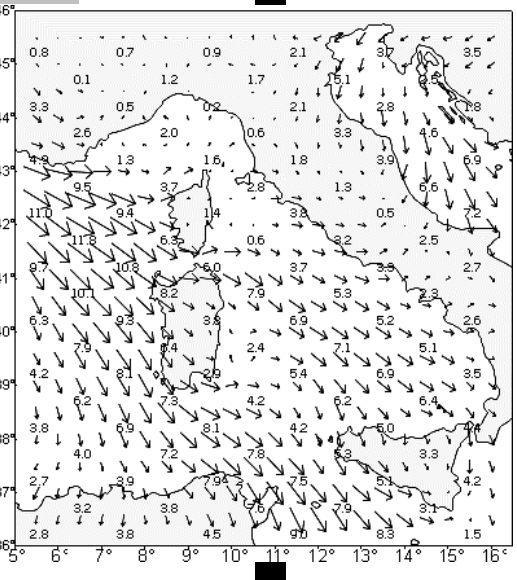
The experience helps us to understand and predict changes in the weather conditions and to predict bad weather

The barometer, an instrument used to measure the atmospheric pressure, is useful to make weather forecast: if the pressure reduces usually the weather changes to bad; if it steady the weather is going to remain the same. If the pressure rises slowly there could be good weather arriving, otherwise, if it rises fast, there could be strong wind.

In case of strong wind and rough sea, observe your area from a panoramic viewpoint and localise the most sheltered and the most exposed areas. **Areas that on a map may look sheltered could be the most exposed instead; they must be avoided.**

Since you red at chapter 1 that you should not go when the sea is rough, you may ask yourself why you should pay attention on how the weather changes. The reason is that the weather is unpredictable sometimes, and it could change suddenly when you are sailing or at the site for the dive. Therefore, if you try to understand such changes you will be able to find a safe and better place for the dive.

As stated at the beginning, this paragraph is not meant to be lesson of meteorology; it is just a collection of basic information a Diveleader should have. Indeed, you will be requested to decide if the dive can be done or not. **Be curious and work closely with the most experience people;** you will gain the needed experience and competence, and you will be satisfied when you will understand how the weather is going to change.



An example of weather information on the Internet: the forecast wind direction and wind intensity.

Welcoming customers and registering reservations

A Diveleader is a professional and valuable figure, essential for the management of a diving centre. As such, a Diveleader must be able to accomplish any specific task of his job. **Welcoming customers and registering the reservations are two very important aspects: the customers' opinion on the diving centre is usually based on the way they are welcomed.**

The registration of the reservations and the way they are managed has as an influence on the diving centre. You will try to accomplish these to important tasks with your Instructor, who will suggest the best way to interface with people, on the base of the area where you are working. Notwithstanding the area you are working, there are some key points that must be taken into account always.

The first two chapters of this manual made reference to experience and preparation, and to the fact that they need to be mixed with the right attitude. These features are of primary importance for both welcoming customers and managing the reservations.

Who welcomes customers must take care about the way you look; this will contribute to the opinion the customers will have of the whole diving centre.

If you work in a place where people is on holiday, you don't need to wear anything formal. Anyhow, you should take care of your look, be pleasant and cheerful, and be enthusiast about diving. You are becoming a Diveleader because you like dive. This must stand out!

If you work in town, you may need to wear something formal instead, such as a tie or a dress. The manager of the diving centre will give suggest what to wear.

Communication has in important role too. You must express yourself correctly and be able to provide correct information kindly and showing your interest for safety and recreation for your customers. **Try to be able to provide as many information as needed, even those not strictly connected with diving,** such as a good restaurant. This make the service offered by the diving centre as completed as possible.

You must be able to answer questions related to diving; a real professional cannot give wrong information. When your customers need to talk to you don't be in a hurry: make themselves to feel comfortable and let them to explain exactly what they want instead of drawing their own conclusions. **It is nice to make your customer happy and help him in finding what he is looking for.**

Just on arrival destination, a group of divers and their buddies hear the briefing on the structure and activities available. An example of a professional reception

Be prepared means to have the right knowledge, attitude and speech capability. These features makes you have a fruitful conversation with a customer.

As far as reservations are concerned, you need to know how the rules and principles of the diving centres.

Furthermore, you need to be skilled enough with computers.

What if you put together on a boat experienced divers and a not experienced one? Let assume that that day the selected site is really nice, but for experienced divers only. If the Diveleader that leads the dive decides to change site, he will make the skilled divers unhappy. If the Diveleader don't let the not experienced customer dive, he will be upset and will complain with the manager of the diving centre. If the Diveleader doesn't change the site and let the not experienced customer dive, this results in the infringement of the training system. Indeed, the latter establishes the requirements that you need to satisfy and that you need to show that you have successfully completed a training program before you go for some specific dives. Therefore, if the Diveleader let the not experi-

enced diver to go beyond the limits of his licence, the diver could phase conditions that may affect his safety.
Your Instructor had to satisfy the requirements of a training program to become an ESA Diveleader Instructor. Such program gives the basis for a specific preparation related to the important topics you are studying now.
Again, try to learn as much as possible when working close to expert colleagues. This will help you in developing common sense, attitude and knowledge of the area you are working in.

Arranging parties

Do you remember the end of your courses? You were euphoric probably, happy to have reached such an important goal, and willing to celebrate. Your customers are willing to celebrate too, therefore, is important to plan at the end of the courses or at the end of a certain number of dives a party to distribute licenses and certificates. **Considering that the Instructor is mainly busy in filling in forms and comply with the bureaucratic requirements, the could arrange a party better than a Diveleader?** Nobody! The Diveleader is the right person! Agree with the manager of the diving centre what to do, be available to organise parties for the delivery of the licenses or every time that group of divers leaves.
You don't need to arrange expensive parties; all you need is to make everybody happy and pleased. Start with the end of this course: arrange your party and … have fun!

Minitest

1) *When you reach in a new work location:*
a. *identified where is the north, compared to some known dive points*
b. *informed about what is the prevailing wind*
c. *a) and b) are correct*

2) *Generally, when atmospheric pressure rises slowly and constantly:*
a. *can be expected good weather*
b. *will surely come a sudden storm*
c. *will stand strong wind within minutes*

3) *The desk clerk:*
a. *they don't need to care about their image*
b. ***t****hey have to care about their image*
c. *does not play an important role in dive center*

4) *When you interact with a future guest:*
a. *don't give him time to express their expectations or requirements*
b. *tries to be helpful, foul talk and not take hasty conclusions*
c. *offer only information concerning the dive center activities*

Answers: 1 c - 2a - 3b - 4b

Congratulation!

Even though reading this chapter was not particularly demanding, considering the fact that the topics treated above contribute to your formation, you should have found it interesting. Now you are more informed about what you could do as a Diveleader employed in a diving centre. You will know what to do when the manager will as you to recharge the cylinders. You will try all the activities described in this chapter with the Instructor during the training workshops. You will have fun and learn new things and techniques useful for your career. You will find them useful when you will decide to become an ESA Instructor to complete your professional growth and access more job opportunities.
Your ESA Diveleader license is an indication of the fact that during your course you have learned how to accomplish tasks other than those to be carried out when diving. Now you know how important they are.

What have you learned?

This test has the purpose of reviewing the most important information of the previous chapter, to improve your knowledge, and to be ready to the next appointment with your Instructor. Answer the question choosing the correct answer among those listed below, specifying if a statement is true or false or filling the blanks. Show this test to your Instructor: should you need it, he will provide you additional information and clarification.
Good luck!

1. To improve your knowledge, this ESA Diveleader course include workshops on:
   a. recharging cylinders, care and maintenance of the equipment, returning to a dive site
   b. use of radio, GPS and echo sounder
   c. making knots and behaviour on board, weather forecast, welcoming customers, receiving reservations, organising parties
   d. all of the above

2. If a cylinder has not been tested within the date reported in the stamping:
   a. you can recharge it one time only
   b. you should not recharge it
   c. you can recharge it regularly
   d. you can recharge it under the owner's responsibility

3. During the workshops of the ESA Diveleader course you will try to:
   a. substitute mask-belt and flippers-belt, mouthpiece of a regulator and O-ring of the cylinder valve
   b. cleaning and lubricating the inflation mechanism of the BCD, fixing a suit, connecting a buckle to the weight belt, equipping the BCD with the cylinder retaining fastener
   c. diagnose the cause of malfunction of the regulator on the field, substitution of the first stage piston and O-rings of the manometer
   d. all of the above

4. You can take the bearing of a dive site using:
   a. natural points of reference on the coast
   b. the compass
   c. the GPS
   d. all of the above

5. True or false?
   To be sure you will be able to return to the dive site, draw the map and take the bearings considering that they could be used by someone that doesn't know the place.

6. It is useful that a Diveleader knows how to use radio, GPS and echo sounder:

a. even if he is confident that he will work on a boat with an experienced captain
b. only if the boat can be governed by someone else
c. to teach it to the students
d. only if he thinks that he will work on a wide lake

7. The bowline knot is particularly useful because:

a. everybody can do it, also those how have never tried to do it before
b. it can be easily untied, even if it was strongly tightened
c. it is a safe knot that don't run
d. b. and c. are correct

8. True or false?

A Diveleader must make sure that he has enough fuel on board, an adequate anchor and that the boat complies with all the local laws and rules before leaving the harbour.

9. The isobars are

a. lines joining points at the same depth
b. lines joining points at the same altitude
c. lines joining points at the same atmospheric pressure
d. substances that are not influenced by pressure changes

10. True or false?

Welcoming customers and registering reservations are two important tasks among those a Diveleader can accomplish.

I confirm that I have reviewed all my answers with the Instructor and that I have understood the clarifications the Instructor provided to the wrong ones.

Signature _____ *date* _____

Note

Chapter Four

The right example and the responsibilities

What You will learn

Matthew and Lucy are about to dive. It is one of their first dives after the ESA Open Water Diver Course. Sarah, a smart Diveleader, will guide their dive along a droop. The two divers are really impressed by Sarah's ability to control her buoyancy: they see her getting as closest as possible to a beautiful anemone without using her hands and are amazed when the see her going backward to move away from the animal. Matthew and Lucy start to behave just like Sarah; they try to control their buoyancy they improve their ability a lot. Sarah congratulates with them during the dive and, once back on the boat, they congratulates back to her for her capability to move in the water. They are ask her how to further improve, ask information about the ESA Hover Diver course and decide to attend it soon.

This example shows you how important the behaviour of a professional diver is, both when working but in every day's life too.

What if Sarah was a not well manned guide, who doesn't control her buoyancy, kill sea urchins to feed fish, lean against sea organisms, concludes the dive away from the boat and so on?

As an ESA Diveleader, you are a professional, an expert divers, someone the other divers could emulate. It is surely a great responsibility, but it is really satisfactory both professionally and on the human relationship point of view.

Furthermore, everything you will do as professional diver could have legal repercussions. Let assume that you decide to go for a dive when the weather conditions are not the most favourable ones that an accident that depends on your decision occurs. Who would you say is responsible for the accident?

This chapter answers questions such as "What effects does my behaviour have on other divers?", "What could the risks associated with an improper behaviour be?", "How can my make the other divers follow my example?", "Why should I set a good example when I am not working?", "How can I prevent legal repercussions?", "Which could be my responsibilities during the ESA Training Programs?", "How can I take my precautions if I work in a diving centre where gas mixes other than air are used?". Reading this chapter you will understand the importance of what you do as a guide, as an assistant to the Instructor, and as a diver. You will recognise that your behaviour can have ethical, moral and legal effects, as well as influence the training.

4 *The rough sea, for the Diveleader may not be a problem, often it's for customers.*

Effects of an improper behaviour

The initial paragraph shows you how the behaviour of a Diveleader can influence the divers: a good and highly professional behaviour plays an important role on the training of the two divers. Let's have a look at an opposite example.

Peter has a considerable experienced as a diver and works for a diving centre as a guide. He is use to sail and dive even if the weather conditions are not the best ones, and he is really strong. Let's follow one of his dives to understand how the Diveleader can influence the behaviour of the divers.

Today the sea is rough and it is windy. Lucy and Frances ask Peter if he thinks they can dive, reiterating that they would prefer not to dive. Peter answers that the dive can be done and pushes them to prepare their equipment. After having completed the boarding operations, they leave the harbour and head to White Sand Island and moor in a sheltered place. The dinghy waves a lot, but Peter wear his BCD with an unusual technique, lifting it above is head and then letting it slide on his back. The two divers, impressed by Peter's skill, try to do the same, unsuccessfully. They can hardly stay up and are able to wear their BCD's only after many trials. **Think about the problems they could have had and discuss them with your Instructor.**

The maximum depth they will reach is 30 metre. After having exchanged the "OK" with the two divers, Peters start to swim with his head toward the seabed using his flippers at a considerable speed. Lucy tries too, but she needs to stop as she has problems in equalizing and her right hear hurts. She tries to solve the problem keeping her head high but she can't. Frances reaches her and exhort her to get shallower and try to equalise again. After a while Lucy solves the problem and the two divers start to descend again. In the meanwhile, Peter remained deeper and observed everything showing signs of impatience.

During the dive he finds the nest of an octopus and decide to catch him to entertain the two girls. He doesn't care about the fact that to catch the octopus the nest is destroyed and that the poor animal is treated bad by the divers. **Think about the consequences of what Peter has just done and discuss them with your Instructor.**

As the visibility is not good and the conditions could get worse, Peter decides to close the dive after 13 minutes only. They use the rope to ascend and, when they are 5-metre deep, Peter instruct them to wait for 3 minutes in order to complete the safety stop, while he ascend directly to speed up the boarding operations.

It is a good example, isn't it? Probably the two friends will think that if an expert diver as Peter avoided the safety stop, they can avoid it too.

Before helping them to get back on the boat, Peter lights a cigarette and throws its end in the water as soon as Lucy and Frances are back onboard. The trip back to the harbour goes well and in 35 minutes the three divers are back at the diving centre. After having taken care of their equipment, the girls ask Peter to sign their log book. He does it but keeps on mumbling that they don't need to do it, that he has not been registering his dives for long, that it is just a waste of time, and now he doesn't know how many dives he has done.

You should bear in mind that everything a professional diver does is considered by the other divers to be something that can be done too; they will try copy professional divers' behaviour.

Moreover, people use to copy the most impressive actions that, needless to say, are the most dangerous ones.

Think about this example and try to identify the possible consequences that Peter's behaviour could have on the two divers. You can discuss them with your ESA Instructor during the next lesson.

Disturb an octopus is a useless action

Risks

Let's think about the previous example again and suppose that one of the girls, while trying to wear the scuba equipment, fell and hit her back on the steel bar used to secure the cylinders. Let assume that, notwithstanding the panic and shock, she is lucky and didn't hurt too much. She could have remained paralysed! Although she didn't hurt too much, she will have to wear a corset for 40 days and she will not be allowed to work for 60 days. The girl's father claims compensation to the diving centre and Peter is judged to be responsible for what happened mainly for his choice to dive with the rough sea, but also because he taught a new technique to wear the scuba equipment indirectly. Furthermore, the judges cannot find this technique in any manual they consult.

You can easily understand how many risks can be originated by improper behaviours. They can be of many kinds and have many level of gravity.

Your improper behaviour could:

- Affect the validity of the training programs
- Increase the chance that a problem occurs
- Affect the credibility of Institutions and Authorities
- Reduces the number of new trainee
- Make people think that scuba diving is dangerous
- Affect the setting of favourable laws and regulations
- Prevent cautious diving centres from working in specific protected areas
- Make the stipulation of favourable insurance policies difficult
- Reduce your credibility if you suggest a correct behaviour and then act improperly

Minitest

1) *A diver, for emulate the Diveleader, wearing the cylinder "Hooding"*

a. *may lose balance and crash*

b. *can Injuries the spine column*

c. *a) and b) are correct*

2) *A Diveleader that go, at full speed, in a descending upside down:*

a. *gives a good example*

b. *does not have any divers control, engaged in a so delicate phase*

c. *a) and b) are correct*

Answers: 1 c - 2a

4

Not always improper behaviours have all the above direct consequences; usually a problem is generated by the combination of causes. Anyhow, when a diver becomes a professional one, he must duly take into account all the consequences that his behaviour can have. Remember, an improper behaviour is not a good example.

A Diveleader could decide to act in a not qualifying way because he feels the need to be admired by the other divers or seen as a extraordinary diver. The experience of those who have been working in the scuba diving field for some time shows that a serious and cautious behaviour is better: it makes your customers appreciate your work. Furthermore, as they may travel and dive with many diving centre, they will surely be able to see the difference and will remember who offered a better and safer service.

What you can do

Sometimes inadequate behaviours are not due to the willingness to be admired, but to the a good level of experience and originated by the need to limit the efforts. For instance, some divers insist that with wearing the scuba equipment lifting it above the head and letting it slide on the back is easier with a dry suit; others say that entering into the water with a forward overturn is less traumatic for the cervical area of the spine. This could be true, but these techniques require strength and ability and must be performed perfectly to avoid any harm; these two factors are of paramount importance if you consider that some people leave away from the sea or lakes, and dive during a limited period of time every year.

Think about what you have just red and about the example presented in the previous paragraph when you are with other divers.

Shortly, once again, stop, breath and think about the fact that your role is important, and that your action can have an influence on formation and safety of divers.

Your behaviour must be based on the way you want the other divers to do; don't be tempted to draw the others' attention. Focus you attention on the techniques that can make the life of the divers simple without limiting their safety and preserve the underwater life.

For instance, use a rope as a reference while ascending, make the divers see that you are checking your instrumentation frequently, that you use the controls of the BCD, that you stop at 5 metres for 3 minutes for a safety stop always, that you emerge slowly, holding the rope and staying close to the boat, that you inflate your BCD once emerged, that you keep the mask on either the snorkel or the regulator in your mouth, that you take your fins off only when you are on the ladder, and so on.

Think about your equipment too! Sometimes you see very smart guides that use old and worn equipment. Some divers could think that using this kind of equipment shows that they dive a lot and that they have a great experience. Actually, a **Diveleader should give the correct example to the average divers and show that the used equipment is fit and**

efficient. Furthermore, using fit and efficient equipment increases your safety and makes the possibility to hurt yourself or to be liable to legal repercussion remote. We will talk about it in the next paragraphs.

Your recreational dives

Remember that, as a professional diver, you will be considered as a reference also when you dive with your friends, just for fun. Your friends will try to behave just like you because you are a smart and experienced diver. They think that anything an experienced diver does is the right thing to do, even if they learned something else during their courses.
Your responsibility is surely less when you dive, not for work, with your friends or other divers, but it cannot be underestimated. The next paragraph will elaborate the last statement and you will understand why your behaviour must be appropriate even when you are diving for fun.

Matter of responsibility

Have your ever heard about accidents happened to skiers? Consider the following example and try to make a comparison with your professional obligations.
It is wintertime, two experienced skiers persuade a your girl to go for an exiting excursion. She refuses as the chosen path is too dangerous and the weather conditions are not good enough. The two friends continues in trying to convince her until she accepts to go. Unlikely, they are carried away by an avalanche. The two friends don't have so many problems, but the girls is seriously harmed.
The two skiers had gone for a simple excursion; there was neither instructor/pupil nor guide/customer relationship between them. Nevertheless, the parents of the girls instituted proceedings against the two skiers, based on the fact that their daughter was convinced by them and that she didn't really want to go, that the conditions were not good that day because they could have caused avalanches. The media diffused the information that the two skiers were brought in front of a judge and considered guilty.
As you see, this brief tale can be easily compared with the above paragraph that dealt with diving for fun. Try to imagine the outcomes of a similar situation when you are officially operating as a guide.
When you work as a scuba diving guide or assistant to the Instructor, **negligence is the measure of everything that you do when it comes to responsibility.**
For instance, if you decide to dive with strong wind and rough sea, you are liable for anything that happens because of the bad weather, even if you are sure that you did everything in the right way. Of course, you could be right, but if somebody institutes proceedings against you, and proves that you are responsible, you could be judged to be guilty (even if you are not) unless you can demonstrate the opposite.

Minitest

1) *A wrong Diveleader behavior can:*
a. *reduce the value of the formative Training Programs*
b. *Its useful as an example on "how not to do "*
c. *a) and b) are correct*

2) *Often a Diveleader that behaves inadequately he does:*
a. *to show off and admiration*
b. *study new techniques to teach divers*
c. *to test the divers*

Answers: 1a - 2a

What do you have to do

Your behaviour, when working as a Diveleader, shall be such that you can be easily defended. You must be able to demonstrate that you are acting according to principles and common sense, respecting ESA standards and local rules.

It is clear that if you plan and guide people deeper than 30 metres in a Country were you cannot, and a diver gets harmed, probably he will ask you to compensate him because you acted like a professional who didn't respect a law that you were supposed to know and respect.

As far as responsibility is concerned, the following list includes what you should do to protect yourself and to improve safety during recreational dives:

- **behave properly all time: your behaviour could put those divers who emulates you in danger**
- use all equipment requested by the ESA Standards or more, if needed, and be sure it is in good conditions and it works properly: this enables you to demonstrate that you did everything to avoid problems related to the old and worn equipment
- be sure all divers have all that is needed to dive, and that the equipment is efficient, especially if it is hired by you or by the diving centre you are working for
- **take in due consideration the weather conditions:** if you decide to go for a dive with divers, you are responsible for any problems that could occur
- be sure that the divers are fit for the specific dive or for the weather conditions: acceptable conditions could be fine for a Diveleader or a skilled diver but not for not experienced one or psychophysically weak. Once again, you have to decide and be responsible for your decisions
- **respect the limits for each diving license:** you could be charged with negligence and the insurance may not pay. The ESA Standards establish that the ESA Professional must respect all specified limits also when they are diving during ESA Training Programs and not
- respect all standards established by scuba diving industries: as they are ratified and accepted by many professional divers they are valid and to be duly taken into account
- respect all local laws and rules, as established by the ESA Standards
- make sure of the high quality of air or any other mix of gas supplied to the divers: breathing a contaminated gas can be the direct cause of an accident and makes who prepared it responsible
- **attend the highest number of courses** that qualify you as a professional operator of scuba diving industries that you can: this enables you to demonstrate your experience and that you have acted properly. For instance, should an accident due to a regulator that you fixed without having the needed qualification to do it happen, whatever you could say to prove your good faith could not have the same effect that it could have if you were trained. The same applies

Minitest

1) *When do you plan to use techniques that can be dangerous, copied from other divers, the Diveleader can:*

a. *execute it when divers are not observing*

b. *execute it and explaining to the divers that is not good to prove them*

c. *stop, take a deep breath, think about the possible consequences and give up, using safest techniques*

2) *During the ascent, the Diveleader who wants to give the correct example:*

a. *ascent near the rope slowly*

b. *it should enhance his perform when take off the excess air from the BCD and executes the safety stop of 3 minutes at 5 meters*

Answers: 1 c - 2c

in case of an accident to a diver that is diving with you, and that is using a cylinder containing a gas mix other than air, i.e. nitrox

- plan emergency procedures; you will demonstrate that you have acted properly and that you have done everything to help effectively. A delay in the actuation of the emergency procedure could be considered to be your responsibility. For any specific information, please refer to the ESA Prevention & Rescue Diver Manual
- make sure the first aid kit and oxygen kit are available and efficient; you will bring help promptly. As recommended in the ESA Prevention & Rescue Diver Manual, **remember how important giving oxygen in case of a decompressions sickness is**
- attend the ESA Oxygen First Aid course that enables you to give oxygen: you will demonstrate you that you are competent and that you have brought help in the best way, and that you have preventively acquired all the information needed to operate with oxygen kits
- in case of accident, be understanding and interested in the victim; even thought the accident occurred because of your indications and recommendations were not taken into account, maintaining your self control will help you from a legal point of view
- contact a doctor! Decisions about health are the doctors' responsibility, therefore, don't hesitate to put a victim into the hands of the doctor. Try to contact a doctor event thought the problem appears to be not so big
- safety first! **Dive cautiously and respect the limits.** Imagine that you are diving for the third time in a day, and that you have exceeded the non decompression limit; a diver can't control his buoyancy and ascends too fast, what can you do to help him? Not that much. The person that will have to ascertain whose the responsibility is, will take this into consideration. Putting yourself in danger to help that diver would put in danger all the other divers too. Moreover, this would contribute to giving a bad image to scuba diving to all people and to the Authority

Remember that a professional role involves responsibility

Responsibility during ESA Training Programs

All that you do makes you responsible, even when you help an Instructor. Surely, being the course carried out by the Instructor (remember, ESA Diveleaders cannot conduct Training Programs) he will have the biggest responsibility for what happens. Nevertheless, if you recharge a cylinder with a high concentration of carbon monoxide and this causes an accident, don't you think that you are responsible for this? The same applies if you give the students equipment that don't fit them or that is not working properly. What do you think about it?

Prepared further by attending the Oxygen First Aid course

4

Imagine that you are on the surface with a class of students attending the Open Water Diver Course, while the Instructor is diving with a couple of students, and that you decide to dive on your own to observe an organism that you sow from the surface. A students follows you but he loose his control and cannot orient himself anymore. After having tried to rejoin the class, he is frightened by something, starts to panic and ascend keeping the air in his lungs. Who is responsible for what happens? Sure, the Instructor is leading the course, but you will share the responsibility, as you had the task of observing the class and you didn't.

You could be with the class while the Instructor ascend with a couple of students, and you could decide to make a student to try an exercise. During the exercise the student has some problems and decide to ascend; who will control the class? If something happens, the responsibility will be assigned on the base of the action that originated the problem; you had to supervise the class, not to make the student exercise. A student could decide to ascend even if you didn't ask to do any exercise; in this case the problems, if any, is not originated by you.

Usually the Diveleaders have a turn for teaching, and have a good experience acquired working closely with the Instructors. Many divers consider the Diveleader course as a step to become an Instructor. These circumstances could make a Diveleader, quite rarely luckily, tries to teach without being qualified to do it. Remember! The fact of being skilled and capable, you have not been trained to be Instructor yet. You will be responsible for whatever happens: if is just like driving a car without having a licence. In case of an accident you will be responsible for everything. **Furthermore, the fact of teaching without being qualified for it affects the validity of the Training Program,** and have legal repercussions.

Air and more

You could work in a dive centre that gives you that have the facility to recharge the bottles with gas mix other than air: nitrox, or oxygen enriched air, is the most diffused.

You have learned, already during your ESA Open Water Diver course, that to use nitrox you need to apply specific procedures and respect strict rules. **This is due to the high concentration of oxygen in the gas mix.** The ESA Prevention & Rescue Diver Manual taught you that high oxygen partial pressure can intoxicate the central nervous system. This leads to convulsions with no preventive symptoms and causes the diver to drawn.

As far as decompression limits are concerned, these are extended thanks to the smaller quantity of nitrogen in the gas mix, when using nitrox. The use of nitrox have a potential risk: if the diver takes the wrong cylinder or measures the percentage of oxygen erroneously, he could exceed the non decompression limits without being aware of it, ascend not adequately and suffer of decompression sickness. **What can you do as a Diveleader to prevent these accidents and, consequently, reduce your responsibility?**

Consider the following:

- attend the ESA Nitrox Diver course; it gives you all the needed information
- make sure that the equipment used by the divers is suitable for the specific gas mix
- verify that the diver that asks you to dive with nitrox is qualified to do it
- be sure that the diver checks the air mix with the analyser
- check that the divers avoid to use the wrong cylinders
- make sure that all local laws and rules are respected
- plan every dive in a safe way and with a good safety margin
- whenever possible, ask the diver to sign a declaration that he has checked the oxygen percentage, that he is trained to use it, that he knows all the rules and relieves you from the responsibility of what could happen
- be sure that compressor and all applied procedures are valid and conform to the applicable rules

There are other gas mixes used for dives beyond the limit of the recreational ones. **This don't relieves your from you responsibility when you work for a diving centre were these type of dives are offered to the customers.** Indeed, you can apply all the above suggestions. Don't be frightened, just be aware of the consequence of your actions in case of an accident, and behave cautiously, always.

Minitest

1) *The Diveleader has responsibilities:*
a. *only during Professional course*
b. *all times he/she dive with other divers*
c. *only when signing a form*

2) *If, in a day of strong wind, Diveleader decides to go out anyhow, probably the responsibility are:*
a. *on Diveleader*
b. *will be exclusively to the participants*
c. *only on the boat owner*

3) *To avoid legal implications the Diveleader must:*
a. *observe the certification limits, regulations and laws*
b. *acquire the most number of skills and qualifications*
c. *a) and b) are correct*

4) *In case of accident, the Diveleader must:*
a. *demonstrate understanding and interest in the victim*
b. *beware the victim from engaging in the underwater activity*
c. *declare to be guilty even in case contrary*

5) *The Diveleader cant' act as Instructor, mainly because:*
a. receives a different salary
b. the instructor may report
c. has not yet received the training and qualification required

Answers: 1b - 2a - 3c - 4a - 5c

Minitest

1) *The use of nitrox implement special procedures and the respect of well precise rules:*
a. *for the highest oxygen concentration present in the mixture breathed by the diver*
b. *for the high cost of the mixture*
c. *a) and b) are correct*

2) *Among the things that a Diveleader can do for prevent accidents and reduce his responsibilities are:*
a. *need to acquire specific skills*
b. *ensure that the diver has the skills and the necessary certifications*
c. *a) and b) are correct*

Answers: 1a - 2c

4

Congratulation!

Reading this chapter was not so pleasant, but being discussing such an important topic for a professional diver is a must. Now you are informed about your responsibility and have one more reason to behave in the most proper way.
Who decides to become an ESA Diveleader does it because he is strongly motivated, that's why you need to be informed about this important aspect of your future job. What you learned reading this chapter enables you to start to work as a Diveleader being strong awareness. You could think that having to be responsible is too heavy a burden; actually, the advantages deriving from this job are so many and compensates the risks. The most experienced professionals say that it is quite easy to work and reduce risks and legal repercussions. All you need to do is to apply what you read in this chapter, respect all the rules you learned from you first diving course, continue to study and attend courses in order to be always prepared to work as an ESA Professional. You will look closely at these subjects during a specific lesson of the ESA Instructor Course.
Do you know that there is a department of ESA that deals with all legal related subjects? Keep in touch with the Staff of ESA; you will be informed about new laws that rules scuba diving in your area!

What have you learned?

This test has the purpose of reviewing the most important information of the previous chapter, to improve your knowledge, and to be ready to the next appointment with your Instructor. Answer the question choosing the correct answer among those listed below, specifying if a statement is true or false or filling the blanks. Show this test to your Instructor: should you need it, he will provide you additional information and clarification.
Good luck!

1. True or false?
   Using techniques that involve specific ability and physical strength is important because the divers can try to lean them and use them.

2. A Diveleader that asks his customer to make the safety stop while he doesn't do it:
   a. demonstrates that he takes care of the safety of the divers
   b. puts in danger his and the divers' safety
   c. gives a wrong example that can lead to confusion
   d. b. and c. are correct

3. The risks that can derive from un improper behaviour are:
   a. diminish the value of the Training Programs
   b. damage the environment
   c. reduce the number of people that start to dive
   d. all the above

4. True or false?
   A Diveleader should demonstrate that he is experienced and has many dives registered on his log book using damaged and worn equipment.

5. A Diveleader must behave correctly:
   a. also when he dives with his friends
   b. only when he is assisting the Instructor during the Training Programs
   c. only when he is supervising many divers
   d. all the above

6. True or false?
   As far as responsibility is concerned, either you supervise licensed divers during a dive or assist the Instructor, everything that you do can be considered to demonstrate that you are negligent or not.

7. The ESA Standards establish that the affiliate professionals must respect the imposed limits:

a. only if requested by the local laws
b. only if the Diveleader works for an ESA Point
c. only during the ESA Training Programs
d. always, even if, when he dives for other reasons other than the ESA Training Programs

8. As the safety of the Diveleader has effects on those of the divers, he must:

a. take care of his safety
b. dive carefully
c. respect all the limits
d. all the above

9. During the ESA Training Programs

a. the Instructor is responsible
b. the Diveleader can be responsible too
c. both can be responsible if the contract says so
d. the Diveleader is never responsible

10. True or false?

The Diveleader that works for a diving centre with facilities to recharge nitrox cylinders must get informed, trained and specifically qualified.

I confirm that I have reviewed all my answers with the Instructor and that I have understood the clarifications the Instructor provided to the wrong ones.

Signature _____ *date* _____

Note

Chapter Five
Marketing and communication

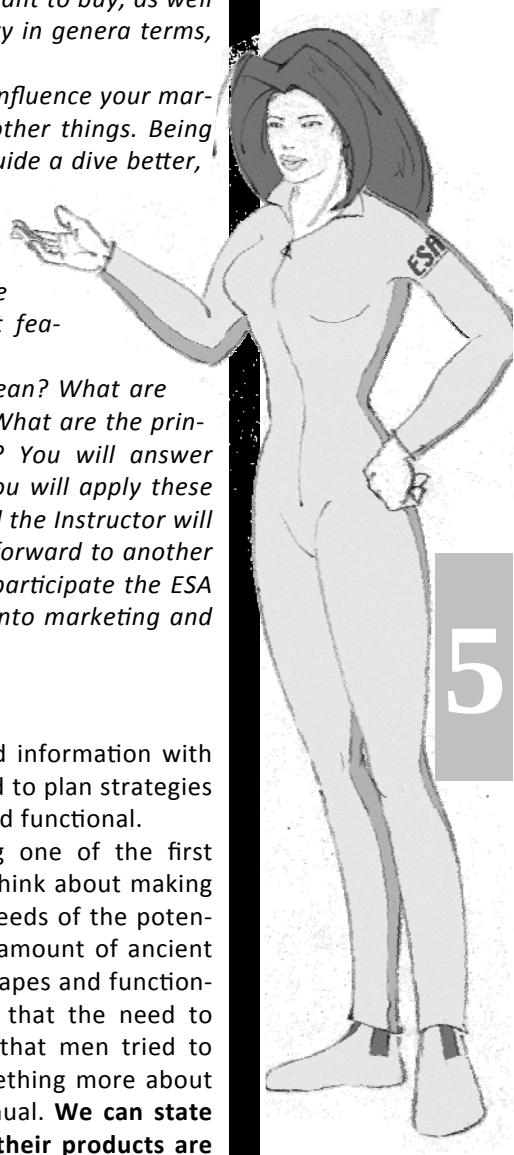
What you will learn

As you have already read in the first two chapters of this manual, a Diveleader can establish important relationships with divers supervised during dives and students attending the Training Programs. A Diveleader is a reference point for divers, has he will be requested to advise them about training and equipment they want to buy, as well as gadget, training tools, and scuba diving activity in genera terms, including courses, holidays, dives and so on.

Communicating is an important feature that can influence your marketing and advertising capability and for many other things. Being able to communicate efficiently is important to guide a dive better, to help the Instructor during the ESA Training Programs, to provide adequate advise to customers and so on.

This chapter provides the instruments to improve your capability to use better such an important feature.

What is marketing? What does fair marketing mean? What are its principles? What can an ESA Diveleader sell? What are the principles of communications? How can I improve? You will answer these an other questions reading this chapter. You will apply these answers during the workshops of your course, and the Instructor will help you to improve. Should you decide to move forward to another important step for your professional career and participate the ESA IC (Instructor Course), you will further get deep into marketing and communication skills. Enjoy!



What is marketing?

People have always tried to exchange things and information with other people. In doing this, they have always tried to plan strategies needed to make such exchanges more efficient and functional.

Probably, prehistoric men, while manufacturing one of the first tools made in stone to "sell" to others, used to think about making them more attractive or answering the specific needs of the potential customers. This research evolved. The huge amount of ancient objects found shows a continuous evolution of shapes and functionality. Archaeologists assessed that it is evident that the need to make exchanges more efficient was a problem that men tried to solve in the antiquity. By the way, to know something more about it, you can ready the ESA Archaeology Diver Manual. **We can state that men have always tried to make sure that their products are**

bought by customers, and to increase their sales. Anyhow, specific studies on marketing and teaching of marketing techniques are quite recent. The experts in the field of marketing consider the starting point to be the problems occurred at the New York's Stock Exchange in 1929. These problems caused the worst economical crisis that we can remember.

Such crisis was solved by the establishment of specific rules for control and production and logistic planning techniques. They improved economical exchanges and made economy grow.

A stall in Madagascar

Marketing is a consequence of the discovery of the consumer and of his needs, and of the relationship between seller and buyer.

Creating a optimal product that doesn't meet the needs of customers is useless; think about it: there is no baker without people who need bread; there is no need to build ski resorts if there are no skiers.

Being a professional diver, you will have to use marketing techniques often. The first thing you must be aware of is that, without marketing, there would not be so many divers; scuba diving would be for few people only.

As you have already read, the study and the application of marketing techniques is quite recent; their application to tourism started in the seventy's and, since then, tourism based economy grew up constantly.

The application of such rules to scuba diving started late and today, still, there is the opportunity to develop better strategies to open scuba diving to more and more people.

One of the components of marketing is the transmission (or communication) of the information that a product with specific features is available on the market, highlighting its advantages and value. This is how you can easily act when you are working: you will have the chance to inform the customers about existing scuba diving products and of their advantages. You will foster marketing of equipment, dives, diving holidays, courses and so on.

Therefore, marketing is an activity that fosters, in our case, exchanges between scuba diving industry and divers.

The next paragraph will give you information about the so called "win to win" marketing technique. This is a well established and successful technique, based on the fact that there are neither winners nor losers, but that a an actual exchange at par.

With time you will learn more about marketing and you will choose the strategy that is more suitable for you. Nevertheless, a fair relation between producer and consumer provides the best advantages to all, specifically in the medium and long terms.

Fair marketing

Jenny is spending her holidays diving, and wants to buy a suit. After the first dive of the day, Louis, the Diveleader who supervised her during the dive, talks to her and the other divers about the beautiful creatures sow during such dive. Being enthusiast of Louis professionalism shown during all phases of the dive, including preparation and debriefing, Jenny thinks that he can give her the right advise about the suit. She waits until he is free to ask him where he think it is more convenient to but a suit, which type she should buy to dive early and late summer and what is the adequate price for it. Louis gives her the advise she needs, providing her with useful information. Furthermore, he tells her he is available to go with her to the best shop of the area to help her to choose her suit. Jenny appreciates Louis' offer and makes an appointment with him. It doesn't matter if, due to Louis' previous planned business, she has to wait for one day more: she **is sure that he will help her in buying what she really needs.** The same day, Louis meets Eleanor, the owner of a diving equipment shop. He tells her that he will bring a potential customer to her shop. Promptly, Eleanor informs him that there is a quite good looking suit available that, due to his not good quality, she is not able to sell, and tells him that should he convince Jenny to buy it, he would receive a percentage of the selling price. Being attracted by the easily earned money, Louis thinks that, as Jenny trusts him, he can convince Jenny that such suit is good for what she needs it for. And so it happens, although she makes the point that the suit is quite different from those she has always used: it is 4 mm thick, it is stiff, has the zip on the front, and his a bit oversized.

The morning after Jenny is happy while the boat is bringing her and the other divers to the dive site. She his pleased about her new suit, and is appreciating how easily she can put it on. The weather is beautiful that morning, and the chosen site is very famous for its attractiveness.

Jenny starts to shiver earlier than usual during the dive, and asks Louis to ascend. He asks her to wait a bit, as the dive is almost at the end. Back on the boat, **Jenny is cold and looks like she is the only diver who didn't enjoy the dive.** Paul, and ESA Diveleader spending his holidays in the same place asks her what's wrong. She answers that the dive was really nice, but that she was too cold, so she didn't enjoy it at all, notwithstanding the fact that she was happy to try her new suit at the beginning. Paul asks her to show him

Minitest

1) For the ESA Diveleader, the marketing plays a role:

a. *unimportant*
b. *fundamental*
c. *useless*

2) *Marketing is a specific activities that aimed:*

a. *the products sale*
b. *to make the producer more rich against the seller and the buyer*
c. *the promotion and implementation trade*

Answers: 1b - 2c

the suit. After a quick look, he tells her that her suit is not appropriate for that sea during that period of the year, and that she should have bough a suit with other features.

Can you imagine Jenny's disillusionment? She feels she was betrayed by the person she considered to be the best to rely on!

What do you think the effect of this problem be on the relationship between customer and guide?

What would have behaved just like Louis or differently? And if you were the customer, would have you continued to choose the same diving centre or looked for another one? Would Jenny encourage his friends and colleagues to go to the same place and dive with Louis once she's back home a at work?

Discuss your answers with your Instructor.

To feel cold underwater may depend on a wetsuit too large

According to professional divers and to researches performed by the marketing experts, the fair sale is that that give you the best revenue, even though this is on the long term.

There are people who think that when a potential customer enters a shop, he cannot leave without buying something; in this case, the shop assistant is insistent and don't hesitate to annoy the customer.

Other people decides what the customer must buy, irrespective of his needs. Others base their business on the fact that some customers will not be back to their shop and take advantages from it. Others simply wait without spending any efforts, hoping they have what a potential customer, if any, could ask for.

The theory of fair marketing is different, as it is based on the mutual satisfactions of both customer and seller. Let's see how this theory can be applied when working as a Diveleader. Remember that you will improve your marketing skills attending the ESA Instructor Course and specific workshops.

Establish a good relationship with the customer. A Diveleader is considered to be a friend, and a person to rely upon. Be what customer expects you to be, always.

Show all services and equipment you, the diving centre you work for and scuba diving industry offer; sometimes some services or equipment are not requested for because the customers are not aware that they are available. Give advise based on actual facts; should you have a lack of information, be aware of the fact that you can't know about everything. You'd better admit that you don't know something instead of giving wrong information.

Improve your formation always: a skilled person is a more reliable one and his advise are duly taken into account.

Learn to listen to your customers and to understand what their needs are: it will be easier to offer something they will buy. For instance, it is worth it informing people who like photography that there is a course for taking photos underwater to see if they are interested.

Each time you are proposing something to sell, put yourself in your customer shoes and ask yourself "Would I be happy?", "Would I but again from this person?"

Make the customer enthusiast about scuba diving, sea and lakes, water and nature. As you have read at Chapter Four, you will be a reference point for both behaviour and quality of life.

Don't insist too much in offering something: should the customer annoyed by you, he will not accept your proposal and avoid you in the future. Sometimes people accepts to buy something to get free from the seller, but not always!

Indeed, the customer must feel that he is free and that he is making his own choice.

Don't propose products that your customer cannot buy insistently; he could feel not at ease and could decide not to buy from you anymore.

Your look and attitudes say something too! You don't need to wear a jacket and tie or change your personality; taking care of your look and appropriate behaviour are usually appreciated when you work.

Show that you value the service you are offering and that you are interested in its **quality, including comfort, amusement, seriousness, safety and professionalism.** Don't put a customer in danger to avoid to deny; i.e. don't let a customer dive deeper than he can just to have him on board to fill the boat and earn more. Should he have a bad experience you could lose the customer and more.

Remember that a dive is just a piece of a puzzle composted by the overall scuba diving industry. Indeed, **scuba diving market is vast and includes also areas that are not strictly connected to the dive itself**. Your role is of primary importance: often, the fact that some people get interested in scuba diving depends on how you approach with the customer of the diving centre or shop you work for. We will treat another important subject in a couple of paragraphs: communication.

Customer satisfaction does not depend on the beauty of the area, but also from the correspondence between the bid and the actual quality of the product

Minitest

1) *For the marketing purposes, before to propose the purchase of a service or a product, it is important to:*
a. *try to know the customer needs*
b. *determine in advance the percentage of commission on sale*
c. *ensure that the customer is not very competent in matter*

2) *According to the marketing fair philosophy:*
a. *only the seller receives advantages*
b. *both the seller and the buyer receives benefits*
c. *only the buyers receive benefits*

3) True or false:
every approach with a client must be conclude with the sale of a product or a service

Answers: 1a - 2b -

What advise are for

Diving

The information you give a customer that asks for information about the best diving sites can make him decide to dive with you or to go somewhere else. When you give information, you must take into account both customer and your diving centre expectations: verify the level of his license and experience (remember Chapter One) without appearing too strict or permissive. Find the right balance between former and latter and give the sensation that you are doing anything possible to satisfy his needs.

Don't highlight the features of the most famous and renowned sites; usually these places are do popular that emphasizing their beauty could create disappointing expectations. Talk about the less known places too, highlighting the fact that you can show them interesting features, even those that the "ordinary" divers don't see. This will make the most of your professionalism and value your product. Highlight quality and advantages of your services (i.e. a specifically comfortable and safe boat, punctuality, and so on).

Diving techniques and training

You will have already had the chance to observe many people diving and the techniques the use when diving. Therefore, you may feel the need to comment such techniques in order to help these people in improving their diving skills. In other cases you may feel the urge to rebuke them as their techniques are not good enough, they have negative effects on the submarine life and supervising them is really hard. Anyhow, this is wrong as it would negatively influence the effects that marketing has on scuba diving.

Try to put your self in your shoes: think when you were an inexperienced diver, and that you are talking to a customer that is paying for a service. Furthermore, don't forget that being hard with a diver and highlighting their poor techniques only is wrong. Indeed, a person that receives an appropriate advise from the Diveleader will be satisfied and encouraged in spending efforts and time to improve. This is marketing.

Furthermore, suppose, after having given the proper attention and advise to a diver with problems in being properly trimmed, to propose him the ESA Hover Diver course. He's likely to trust you and accept your proposal because you have shown him that you are doing it to satisfy his needs.

Sometimes, in holiday resorts, it happens that you succeed in establishing the needed relationship with a divers and motivate them in attending new courses right at the end of their holiday. Don't worry! Your will have done a good job anyway.

If you give him the right advice and information he will remember you even if they attend courses somewhere else, he will come back soon.

Assist divers and help them to improve their techniques, is a fundamental part of the Diveleader role.

Equipment

Do you remember about the proper behaviour a Diveleader must show everyday? **You know that giving the correct example using modern and efficient equipment it is important.** This is important for the divers' safety, but for the sale of equipment too. As you will better understand during your professional career and ESA Instructor Course, selling equipment is important for the revenue of manufacturing company and seller, and have effects on a larger scale. Indeed, the development of new equipment is based on researches that can be carried out only with the money invested by the equipment manufacturers. New equipment enable divers, old and new ones, to practice scuba diving in a safer and simpler way.

Furthermore, a high volume of sales increase the produced quantity reducing the production costs. This way the selling price can be reduced as well and a higher number of people can buy their own equipment. Remember, **your proper example and advise about equipment can make the scuba diving business grow.** Informing the divers about those components of the equipment that can satisfy their needs and marketing equipment can be convenient for you, even if you are not directly involved in the sale. Indeed, giving advise to the divers interested in purchasing the ideal component can offer you new career opportunities that will diversify your role in the business, improve your background and flexibility.

The use of modern and efficient equipment promotes the development of underwater industry.

Travels

Joseph, an ESA Diveleader that works for a diving centre seasonally, learned soon that, thanks to his professionalism, the divers that get to know him decide to spend more time with him. They find that relying on a professional diver they know very well is extremely advantageous for safety, quality and amusement.

One of the services offered by Joseph is the travelling with his customers. **This gives him the chance to increase his revenue**, visit new places and maintain the relationship with his customers.
This is just an example of the business opportunity related to promoting travels for divers. It could happen that your customers ask you information in order to decide their next destination; for this purpose, arranging a collaboration with a tour operator and having contacts with diving centres in many areas of the world can be really useful.
Be always ready to go toward your customer needs and try to satisfy them. Get informed about resorts and diving centre and visit them when possible; you will offer a better service.

It often happens that customers ask to the Diveleader about to plan their holidays

Spontaneous advertising
You gain a new good customer every time you satisfy the expectation of a diver: he will talk about you enthusiastically at home, with his friends, with his colleagues and so on. **He becomes your most effective "advertising agent".** This is what "spontaneous advertising" is. If your marketing skill are such that his expectation are not satisfied, you will lose a customer, and he will talk negatively about you.
This applies to all the advise you have read about till now and to every day work as well. Try to be able to satisfy your customer offering the best service, always. As you have already read, this is convenient both to your customer and to scuba diving business, yourself included.
Remember: **"spontaneous advertising" is one of the most economical and effective promotional means; you only need to satisfy your customer expectations.** It doesn't take that great efforts, and makes your work pleasant, happy and really satisfying. Sometimes if is useful to renounce to an immediate earning: it brings to greater results in the medium and long term.

Communication
Marketing is based on communication. Any kind of exchanges are based on communication. Indeed, communicating is fundamental for marketing and all of the other tasks you have to accomplish when you are working. The previous chapters dealt with information to be given to divers before, during and after a dive; you need to communicated correctly to make sure that divers to what

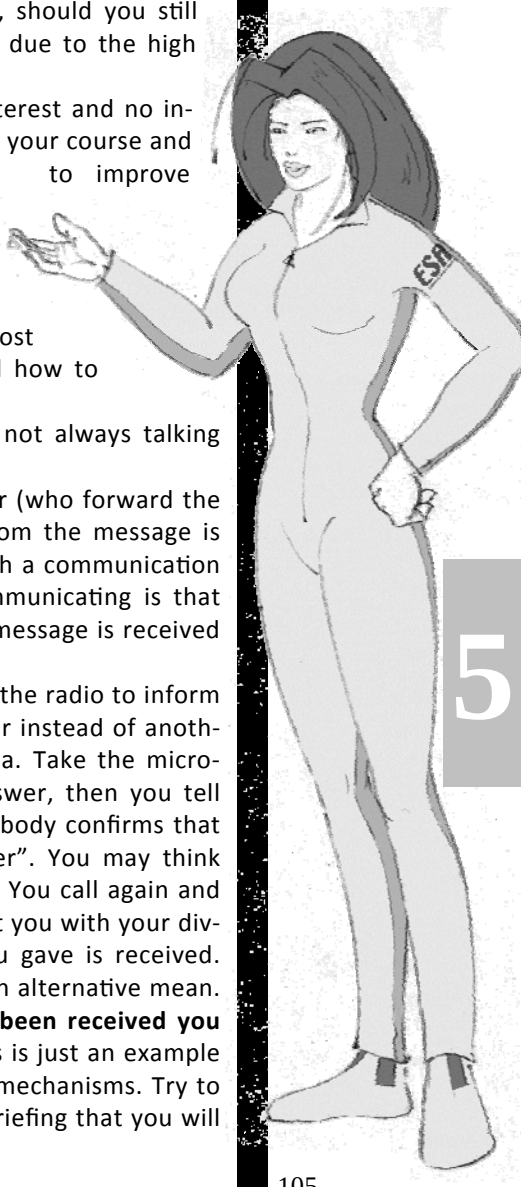
you want. You use communication techniques when recommend a diver to rinse and take care of the equipment after a dive. It is true, a good Diveleader, as well as a good Instructor, must have the right communication skills.

Notwithstanding the fact that such skills are often considered to be a gift, it can be improved. The Diveleaders are motivated in doing it as they are willing to take care of the divers and to work in scuba diving. This motivation makes your communication skills improve because, as you have already read before, working with other people means communicating with them.

You may feel stressed and excited during your first briefings; don't worry: you will get better with experience and, should you still feel something after some year, think that it is due to the high value you give to what you are doing.

Generally speaking, no excitement means no interest and no involvement; let yourself go and take advantage of your course and Instructor, to that you will build the fundaments to improve the way you communicate.

Communicate is essential to convey messages useful for your work



Communicating is a studied discipline, and there are specific schools and courses that teach it at the highest level. It is not possible to provide more details, but you will study the most interesting aspects that will let you understand how to improve and become more effective.

You can communicate without talking; indeed, not always talking means communicating.

Communicating assumes that there is an speaker (who forward the message) and one or more listeners (those whom the message is addressed to). The message is forwarded through a communication mean. The difference between talking and communicating is that the latter assumes that you make sure that the message is received correctly via a feedback.

Let assume that you are on a boat and are using the radio to inform the diving centre that you are going to a harbour instead of another, because of the adverse conditions of the sea. Take the microphone and call the diving centre until they answer, then you tell them what you are going to do. Assume that nobody confirms that they understood that you said after your "roger". You may think that they understood, but how can you be sure! You call again and try to use other radio stations that could connect you with your diving centre and ensure that the information you gave is received. Maybe you have a mobile phone, and use it as an alternative mean. **Only after you are sure that you message has been received you can proceed with what you planned to do.** This is just an example that makes you understand the communication mechanisms. Try to use it when you work, for instance, during the briefing that you will held and imagine the following.

is exciting to be able to pass on to others our passion

You could brief the divers while they are preparing the equipment or watching the seaside view: you briefing will not be effective even if it is best they have ever heard. **You will have a confirmation of its ineffectiveness as soon as you see the diver doing things different from those you told them.** In this case, don't get nervous, think that you have done something wrong and try to improve: understand the cause (the listeners were not ready to get your message) and correct the way you communicate with them at the first occasion.

You can improve in communicating only if you get a feedback of the information you give: verify that it is received and effective. Each time you realise you were ineffective, try to understand why and correct the cause, you will make a great step forward.

Being a Diveleader, you will communicate daily and in many occasions. The ESA Instructor Course will teach you to present the scuba diving theory in order to be the most effective and persuasive possible. **It will be exciting to see that your students have learned to dive and understand what you mean promptly thanks to your communication skills.**

The next points contribute to improve your skills. Make always sure that:

1. Are giving the right message
2. Are using the most appropriate transmission mean
3. Are stimulating your customers' interest
4. Give the appropriate value to what you are proposing
5. Are conveying information when the listener can understand
6. Are tuning yourself in order that the listener can understand
7. Are patient
8. Get feedback of the message you gave
9. Challenge yourself to improve

Remember that emotion and tension, sensations that you usually feel when you speak to the class, are feelings that make people realise how much you value what you are doing.

As a Diveleader, you will apply the communication techniques frequently: every time you talk to the divers you are supervising, when you are marketing equipment and services, to protect yourself against legal implications, and so on.

Remember that communication is not limited to talking; there are many ways of giving a message to the customers, behaviour included. Indeed, as you have read at Chapter Four, behaving properly you will make your diver to act correctly and your briefings' effectiveness will increase.

Congratulation!

If, after having read this chapter, you know how important marketing and communication are for an ESA Diveleader, you have correctly received the message this chapter is meant to give you. You are able to answer questions such as: What is marketing? What is fair marketing? What are their principles? What can an ESA Diveleader sell? What communication is made of? How can I improve?

Take advantages of the workshops included in this ESA Training Program applying all that you have learnt reading this chapter. Your preparation and experience are fundamental for your professionalism and, consequently, for your background and career, as well as for all other aspect of this fascinating job. Don't get satisfied with what you learn during your ESA Diveleader course only: attend other Training Programs. Would you like to learn techniques to teach scuba diving techniques to your students efficiently? Become an ESA Instructor attending one of the most exciting ESA Training Programs: you will obtain more details about marketing and communications. Furthermore, and widen your professional horizon.

Minitest

1) *To be most effective, a Diveleader has to offer tips:*
a. *with real knowledge about*
b. *matching the reality*
c. *a) and b) are correct*

2) *The Diveleader can have an important role in the offering the Continuing Education:*
a. *because it is often seen as an expert*
b. *during the comments relate to the diving techniques*
c. *a) and b) are correct*

3) *The spontaneous advertising*
a. *is very effective*
b. *plays a marginal role*
c. *a) and b) are correct*

4) *The main communication elements are:*
a. *transmitter, receiver, message, code and channel transmission*
b. *issuer and message*
c. *receiving message*

5) *To determine is the communication there was is important:*
a. affect a very rich in content intervention
b. the exposure choice
c. *verify if the message was received (feedback)*

6) True or false:
Often nervousness that is feel during a public communication, is a internal factor perceived only by the issuer

Answers: 1c - 2c - 3a - 4a– 5c
6true

What have you learned?

This test has the purpose of reviewing the most important information of the previous chapter, to improve your knowledge, and to be ready to the next appointment with your Instructor. Answer the question choosing the correct answer among those listed below, specifying if a statement is true or false or filling the blanks. Show this test to your Instructor: should you need it, he will provide you additional information and clarification.
Good luck!

1. Marketing is a specific discipline with the objective of _____ and _____ the commercial exchanges.
   a. promote/make happen
   b. select/promote
   c. make happen/limit
   d. a. and b. are correct

2. Listening a customer is important to identify
   a. what he is looking for
   b. what he needs
   c. his expectations
   d. all the above

3. The best sales technique is based on:
   a. waiting that a customer asks for a product
   b. informing the customer that the product he needs exists
   c. highlight the advantages deriving from buying a specific product
   d. b. and c. are correct

4. When you give advises on the dive sites, you must highlight:
   a. comfort and services offered by the diving centre
   b. most interesting characteristics and advantages of the less famous dive sites
   c. preparation and professionalism of the personnel
   d. all the above

5. When you realise that a diver needs additional training, making the Diveleader bear more effort, it is better:
   a. to rebuke the diver highlighting his defects
   b. to give him proper advise and inform him about the advantages deriving from continuous training
   c. discourage him
   d. make him feel responsible for the unsuccessful dive

6. Considering the importance that the sale of the equipment has for the whole scuba diving industry, the Diveleader:

a. must give the proper example using new and proper equipment
b. must suggest that the divers buy valid equipment
c. based on his experience and knowledge, must offer to help the divers in buying the equipment
d. all the above

7. The Diveleader must use the techniques of communications when he works, specifically:

a. when he is briefing
b. always
c. when he helps the Instructor during the Training Programs
d. when he want to sell a product or a service

8. Communicating is effective when:

a. the listener receives the message correctly
b. the voice is loud
c. the transmission mean is specifically modern
d. all the above

9. Which one of the following is an element of communicating:

a. speaker
b. message
c. receiver
d. all the above

10. True or false?
Verifying that the information is received correctly (feedback) has an essential role when communicating.

I confirm that I have reviewed all my answers with the Instructor and that I have understood the clarifications the Instructor provided to the wrong ones.

Signature _____ *date* _____

Chapter Six
Getting deep

What You will learn?

There is a lot of excitement at the diving centre today; the students of the ESA Open Water Diver course are about to have the final exam and have gathered together for a revision of the subjects. While they are discussing together, a group of divers is back from their dive. David, the ESA Diveleader that usually assists the Instructor during delimited and open water dives, is with those divers. As soon as David enters the diving centre, all the students asks him questions and clarifications about doubts arisen during the review. Talking to the Diveleader is easier than talking to the Instructor; indeed, the Diveleader is considered to be closer to the students than the Instructor. The answers they will get are really important for them and, therefore, must be accurate and complete.

This is one of the reasons why a Diveleader must have a deep theoretic knowledge of scuba diving phenomena. As already stated elsewhere in this manual, a good knowledge is needed to plan and supervise dives in the best way possible, to support the Training Programs properly, prevent problems easily, to interact with the other divers in case of emergency, to defend yourself in case of legal disputes, to use marketing and communication techniques more effectively. Furthermore, you will have to demonstrate that you are adequately prepared on the theory, passing the final exam that closes this Training Program. You will not have problems in passing this exam, as it deals with what you have already studied during your courses and taken into account during all your dives. All you need is to review all subjects in detail and to bear them in mind. You will find useful to review some of the ESA manuals used during your courses, such as Open Water Diver, Ecodiver, Advanced Diver, Prevention & Rescue Diver and ESA Speciality Training Programs. The following pages will not repeat the information you can find in these manuals; the rationale is that an ESA Diveleader must know the training tools used during the courses designed by ESA well. The experience acquired till now and the training you have been involved to during this course will make reading such manuals more efficient; surely, you will make some specific considerations about information that could have gone unobserved during your previous courses.

Part One: physics and physiology

Physics

The fundaments of this subject are described in the ESA Open Water Diver Manual, which details the application of such fundaments to scuba diving. The ESA "Seas of the World" manual gives you the possibility to get detailed information about physical and chemical properties of water and sea. You will be able to answer questions such as "Which are the most important physic laws and principles for a scuba diver?", "How do I calculate ambient (or absolute) pressure? And the hydrostatic (or relative) one?", "How long does a cylinder last?", "How can I calculate the quantity of air needed to lift an object that lies on the bottom?".

Energy: the sun
Material: rocks and sea water

Matter and energy

Understanding the fundaments of scuba diving physics is important for a diver; such fundaments are based on the knowledge of matter and energy and related phenomena.

By "matter" we intend anything that takes space and has a mass. As you will read in a while, it takes energy to modify any property of the matter, such as speed and direction of a particle of matter, temperature and state of the matter,.

Everything that surrounds you, and your body, is constituted by the matter. More than one hundred simple elements concur in building the matter (mercury is an element, for instance). The elements have specific chemical and physical properties and cannot be divided simpler elements.

Each element is made of atoms, that is made of a nucleus (with protons and neutrons) and electrons. It takes million of atoms to cover the thickness of one hair. The most important feature of the atoms of one element is that they have the same properties of the element itself. Molecules are made of atoms bonded together. Some molecules are able to react and combine with other molecules. Other are inert and don't react, or, at least, they don't do it naturally. Indeed, as you will read in a while, gas with inert molecules influence the rules and the behaviours of divers.

The matter (including elements or substance made of molecules bonded together) **has three states: solid, liquid, gaseous** (vapour

and gas). An evident example: the water can be solid (ice), liquid (as we usually see it) and gaseous (vapour).
The three states of matter have the following features:

- **Solid**: has its own shape and volume and cannot be compressed
- **Liquid:** has it own volume, cannot be compressed but don't have a specific shape; liquids take the shape of their container
- **Gaseous**: don't have a specific shape and volume, can be compressed, spread quickly taking space and mixing with gasses and vapours.

Liquids and gasses are called "fluids".
The state of a substance depends mainly on temperature and partially on pressure. In the solid state (the coldest state of matter) all molecules are aligned and vibrate constantly. As the temperature rises, the molecules increase their vibration, tend to move to all directions and the solid passes to the liquid state. If the temperature rises further, the molecules move more and more and leave the surface of the liquid, passing to the gaseous state. **This can be easily observed heating ice that turns to water and then to vapour.** Vice versa, cooling down vapour, it turns to water and then to ice.

The three states of matter are always in front of us: the clouds are gaseous, the liquid is the water and the beach minerals are the solid state

The energy is the capability of a system to perform work or to transfer heat. Without taking into account the energy developed by atomic reactions, it can be stated that the energy cannot be neither created nor destructed, but transformed in the following types:

- mechanical energy – it assess the fact that the motion can happen (potential energy) or is due to the motion itself (kinetic energy); a suspended load has potential energy that depends on the height on the sea level and mass of the load. When such load is released it increases it kinetic energy as it falls faster and faster
- thermal energy – it depends on the quantity of heat inside the matter and is strictly linked to the movement of molecules; the faster the molecules move, the higher the thermal energy
- luminous energy – it propagate thanks to electromagnetic radiations; it is used by the green plants for the chlorophyll photosynthesis, a chemical reaction that produces the oxygen that is needed by the whole planet
- electrical energy – it is generated by the interaction between electrons (negatively charged) and protons (positively charged). The battery of a torch for dives is an example of a device able to accumulate electrical energy

• chemical energy – it is accumulated by matter in dependence on its molecular composition; combustibles (such as petrol, coal and methane) release this energy in the form of heat during combustion

All of these definitions are stated here above to enable you to better understand principles, laws and phenomena that will be described in this chapter.

Characteristics and features of water

As stated before, all information about chemical and physical properties of water can be found in the ESA Open Water Diver Manual and in the Seas of the World Manual that is used during the ESA Ecodiver course. The following information are the most simple ones; they are those you need to solve problems and better understand the topics treated later on in this chapter.

The water:

- is about **800 times** denser than the air
- conducts the heat **20 times** faster than air
- conducts the sound 4 times faster than air
- makes objects appear bigger and closer because the light deviates when passing through its surface
- absorbs the light making colours disappear when you going deeper and deeper. The first colour that disappears is the red, the last is the blue (in the sea) or the green (in the lakes)
- 1 litre of salt water **weighs 1,03 kg**
- 1 litre of fresh water **weighs 1 kg**
- the pressure increases of **1 BAR every 10 metres of salt water and 0,98 BAR every 10 metres of fresh water**

Temperature, luminosity, quantity of salt dissolved, particles suspended and substances mixed with water have influence on all of the above properties.

The principle of Pascal

The pressure applied to an enclosed fluid is transmitted undiminished to every part of the fluid, as well as to the walls of the container. Assume there is a hose closed to one end and to the other connected to an open tap. The hose has a certain number of holes with the same diameter. You will see the gushes of water from all the holes covering the same distance (the higher the pressure, the longer the distance).

This principles helps in understanding why the human body can bear specifically high pressure and the mechanism of spontaneous equalization.

The pressure is the result of a force applied on a surface; its unit is kilograms per square centimetre (in the decimal metric system) and pound square inch (PSI, in the British system).

Minitest

1) *In simply way, the three physical states of matter are:*
a. *solid, intangible and fluid*
b. *solid, liquid and gaseous*
c. *fluid, solid and granular*

2) *Decreasing adequately the temperature, a liquid state can pass to:*
a. *gaseous*
b. *aeriforms*
c. *solid*

3) *A car parked downhill with the parking brake actuated is an example of mechanical energy:*
a. *kinetics*
b. *chemistry*
c. *potential*

Answers: 1b - 2c - 3c

The principle of Torricelli

The atmospheric pressure at the sea level correspond to 760 millimetres of mercury.

This principle explain the weight of air and measure it.

For sake of information, it was Galileo Galilei who first demonstrated that the air weighs; **all creatures, human beings included, are subject to the weight of the air constantly.** It happens even though you cannot feel it, because the pressure of the air is equally acting all over your body (see the principle of Pascal).

A watering can helps to understand the principle of Pascal

Evangelista Torricelli made the following experiment. He took a glass tube, closed at one end, with the cross section area of 1 square centimetre, and filled up with mercury. He filled up a basin with mercury and put the glass tub upside down (the close end up, the open end immerged in the basin). Torricelli observed that some of the mercury flowed from the tube to the basin, then he measured the length of the tube still filled in with mercury: 760 mm. This height was due to the balance between the weight of the air acting on the mercury in the basin and the weight of the column of mercury in the glass tube. Therefore, this experiment established that the atmospheric pressure at sea level corresponds to 760 mm of mercury per square centimetre. The weight of the mercury left in the tube (about 1 kg) is the weight of the air acting on 1 square centimetre. **This weight is originated by a column of air about 20.000 metres high.** The unit of measure of the atmosphere is based on such weight and is set at 1 ATM (atmosphere) that corresponds to 1 BAR (14,7 psi in the English system).

The mercury is 13.6 times heavier than water. Therefore, the same pressure of a column of mercury with 1 square centimetre base and 760 mm high (1 ATM) is given by a column of fresh water with the same base and about 10 metres high (760 x 13,6 = 10336 mm = 10,336 m). This calculation is the base of the demonstration by Blaise Pascal that the pressure of a column of 10 metres of salt water is 1 ATM.

You have already studied that the pressure increases of 1 ATM or 1 BAR every 10 metres of salt water. **Remember, fresh water is lighter than salt water, therefore, you need to go a bit deeper to have the same pressure increase.**

Minitest

1) *The water is about _____ dense air.*

a. *800 times more*

b. *800 times less*

c. *80 times more*

2) *One liter of distilled water weight:*

a. *1 kg*

b. *900 grams*

c. *100 grams*

Answers: 1a - 2a

The law of Boyle and Mariotte

If a gas is subjected to compression and kept at a constant temperature, the volume is inversely proportioned to the pressure.

Based upon the experiment carried out by Torricelli, it was possible to measure how the volume of a gas changes with pressure. A U glass tube with 1 square centimetre cross section and one closed end was used for this experiment.

Boyle poured 760 mm of mercury in the U tube. The air contained was compressed and moved toward the closed end. The scientist measured the height of the trapped air and then poured other 760 mm of mercury, doubling the pressure. The measurement of the height of the trapped air showed that it was the half of the preceding measure.

To verify the principle of Torricelli enough a bottle and a bowl

It is a quite simple and interesting experiment, don't you think? You can make the same experiment diving a 10 metres with an empty bottle. Use your emergency regulator to fill half the bottle with air, then ascend keeping the bottle open and keeping it upside down. You will see the volume of the air increase and doubling. Indeed, the pressure halves from 10 metre (2 ATM) to the surface (1 ATM), letting the volume of the air double. **You apply this important law every time you dive.** This law explains why you have to discharge the BCD and dry suit and must not hold your breath while ascending, why you have to make the safety stop, why you need to equalise, why being well trimmed in shallow water is harder than in deep water.

For a diver it is interesting to consider that, ascending from the depth, the volume changes more rapidly when approaching the surface. For instance, the volume of a balloon that contains 8 litres of air at the sea level is halved at 10 metres, where it becomes 4 litres. It is necessary to get 30 metres deep to halve it again; at pressure at 30 metres is 4 BAR, and at that depth the volume of the balloon is reduced to ¼ of its original volume (2 litres). As you can see, in this case, the vertical distance you need to cover is 20 metres, not 10.

depht	pressure in salt water	pressure in sweet water
0 m	1 bar	1 bar
10 m	2 bar	1,98 bar
20 m	3 bar	2,96 bar
30 m	4 bar	3,94 bar

The pressure varies differently in salt water and fresh water

If you want to halve the volume again (1/8 of the original one, 1 litre) you would have to bring the balloon to 70 metres (40 metres deeper more) and have a pressure of 8 BAR acting on it.

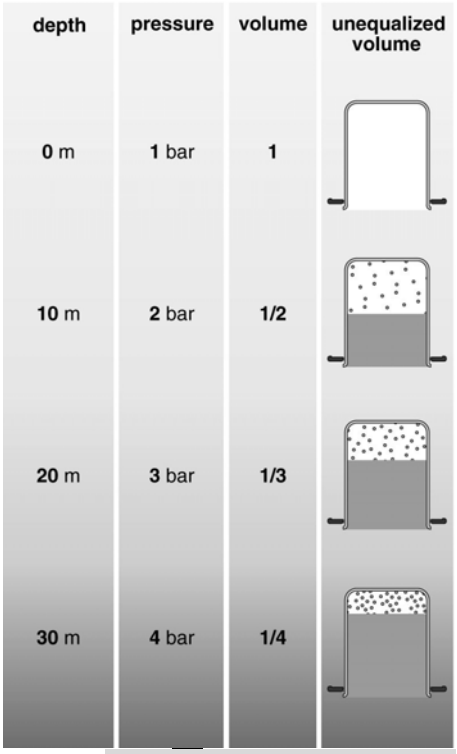
The same proportion is valid while ascending; the only difference is that as the depth decreases, the volume increases.

The law of Boyle and Mariotte helps in understanding the phenomenon of air consumption: to maintain a given volume container unchanged (i.e. the lungs of a diver) you need to fill the container with more gas if the external pressure increases. Assume you free dive, starting from the surface with 4 litres of air in your lungs, and to go at 10 metres deep, where the volume is divided by 2 (10 metres = 2 BAR), therefore, 2 litres.

As you have learned during your Open Water Diver course, the volume of a scuba diver doesn't change because the regulator supplies air at the ambient pressure (you cannot breath if the air is not supplied at a lower pressure). A diver that breaths at 10 metres, where the pressure is 2 BARS, takes from the cylinder a quantity of air that

is double than that is taken at the sea level. In other words, the volume of the air in the lungs is unchanged, while the its pressure and density is double. Therefore, the duration of the cylinder will be halved. **The air consumption is proportional to the ambient pressure, and is easily calculated dividing the duration at the sea level by the ambient pressure,** if stress and cold and other factors remain unchanged too. For instance, should a cylinder last 2 hours at the sea level, how long will it at 30 metres? 30 minutes! Indeed, dividing 2 hours (120') by 4, that is the absolute pressure at 30 metres, in salt water, the result is 30'.

Pressure and volume variation In salt water



Now try to calculate the duration of a cylinder a 40 metres, if this lasts 60' at 10 metres. You may think you need a formula to answer this question. You are right, but you can proceed this other way: **if you know how long a cylinder lasts at a specific depth, you can calculate its duration at the sea level, by multiplying it duration at that specific depth by the ambient pressure.** Then divide the duration at the sea level by the ambient pressure at the new depth. 60' (duration at 10 metres) x 2 BAR (pressure at 10 metres) = 120' (duration at the sea level) : 5 (ambient pressure at 40 metres) = 24' (duration at 40 metres).

Based upon the above, you can easily try to calculate a volume starting from the current depth to a given one. For instance, what is the volume at 40 metres of a flexible container that is 2 litres at 20 metres? 2 litres at 20 metres are 6 litres at the sea level (2 litres x 3 BAR); the volume at 40 metres is 1,2 (6 litres : 5 BAR).

The principle of Archimedes

The buoyant force on a submerged object is equal to the weight of the fluid displaced. If, while changing the ignites to the outboard engine of a dinghy, one of the ignites fall in to the water, it sinks, notwithstanding the fact that it is smaller and lighter and the dinghy that is bearing the weight of people and engine. The principle of Archimedes explains this phenomenon: if an object has a shape that displaces a quantity of water that weighs more than the object itself, it is positively trimmed. Vice versa, should the shape be such that the displace water weighs less than the object, the object is negatively trimmed and sinks. **An object is neutrally trimmed when there is a balance between its weight and the weight of the water it displaces.** You establish such bal-

Minitest 6

1) *The pressure is a weight:*
a. *pushing from the outside only inwards*
b. *distributed over a surface*
c. *that pushes up*

2) *The weight of the atmosphere to sea level corresponds to:*
a. *760 mm Hg*
b. *14.7 psi*
c. *a) and b) are correct*

Answers: 1b - 2c

ance when you are able to stay still at a certain dept. without moving hand or fins.
Usually a diver is neutrally trimmed changing is overall volume using the BCD or breathing. To lift a heavy object from the seabed, you need to increase its volume in order to change its trimming. In this case, you can use a lift bag that increases the volume of the object it is linked to, making it "lighter". What must be the capacity of a lift bag to lift a block of reinforced concrete that weighs 500 kg and with a volume of 300 litres? The calculation to be done is quite easy, especially if the block is in fresh water (consider that 1 litre of fresh water weighs 1 kg). **The buoyant force acting on the block is 300 kg (1 kg for each litre of displaced fresh water); such force makes the block "lighter": 500 kg (actual weight) – 300 kg (buoyant force) = 200 kg (lighter weight).** Therefore, the capacity of the lift bag must be 200 litres to make the block neutrally trimmed in order to lift it with one finger. Remember, should the capacity be higher than 200 litres, you will have to deflate it while ascending to eliminate the excess air (law of Boyle and Mariotte) to control the speed.

At this time the diver moves a lot of water that weighs as much as him. Thus remains suspended in middle water.

Three factors influence on the buoyancy of an object: weight of the object itself, volume of displaced liquid and weight of the displace liquid (that is, the density of the liquid). What is the amount of air you need to use to inflate the lift bag if the block is in salt water? Considering that the salt water is denser than fresh water (1 litre of salt water weighs 1,03 kg) do you need more air or less to lift the block?

If you have already swum both in fresh water and salt water, you already know how easier buoying in salt water is.

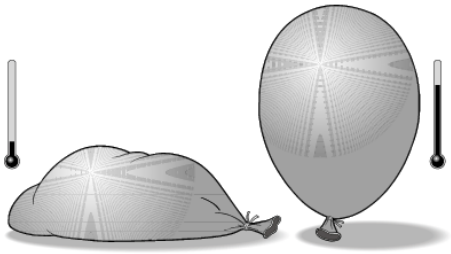
As the salt water is heavier, the block is subject to a higher buoyant force. Indeed, 300 litres of salt water weigh 309 kg (300 x 1,03). Therefore, the weight of the block submerged in salt water is 191 kg (500 kg – 309 kg = 191 kg). You would to inflate only 191 litres of air in the lift bag to make the block neutrally trimmed in fresh water, but you need to displace less salt water. The quantity is easily obtained dividing 191 kg by 1,03 (the weight of a litre of salt water); it is 185,43 litres. You need to inflate the lift bag with 185,43 litre only, 14,7 less than in fresh water.

The law of Charles

The volume of a given amount of dry ideal gas is directly proportional to its absolute temperature provided the amount of gas and the pressure remain fixed.

You will have noted that a flexible container filled in with gas (for instance a dinghy or the tyres of a bicycle) seem to change their consistency during the day. In the morning, when the temperature is low, the dinghy appears to be a bit "soft", as if someone deflated it during the night. As the time goes by, the temperature increases; this will make the dinghy appear more inflated. You can make a very simple experiment: put an inflated balloon in a place where the air temperature changes during the day. You will see that the volume of the balloon will increase the it will become stiffer as it reaches its maximum expansion.

The balloon increases in volume with the temperature increase



The law of Gay-Lussac

The pressure of a gas at a fixed volume, is proportional to the temperature.

With reference with what you have just read about the law of Charles, the French scientist Joseph Gay-Lussac studied in deep and published what Charles had studied, assessing that if the volume is fixed (a cylinder for instance) temperature changes cause pressure variations only.

This law explain why you should recharge cylinders immerged in the water, and why you should not keep a cylinder in a car under the sun.

When a cylinder, charged at 200 BAR, is immerged in cold water, the inner pressure can be reduced considerably; it depends on the temperature in the place where it was charged and the temperature of the water were the dive takes place. You can calculate the pressure variation in a approximate way, by reducing (if temperature drops) or increasing (if temperature rises) 0,7 BAR per each degree C. For instance, what is the inner pressure of a cylinder at 10°C if it was recharged at 200 BAR at 40°C? 40°C – 10°C = 30°C (temperature drop); 30°C x 0,7 = 21 BAR (pressure drop); 200 BAR – 21 BAR = 179 BAR. Once in the water, the inner pressure of the cylinder is about 180 BAR instead of 200.

As explained in the paragraph "matter and energy", this phenomenon is due to the movement of the molecules of gasses that constitute the air.

Minitest

1)With a constant temperature the volume of a gas varies _____ to pressure.

a. *directly proportional*

b. *insignificant compared*

c. *inversely proportional*

2) *To calculate the volume of a given quantity of gas that is carried by surface to a given depth:*

a. *this surface volume must be divided with the ambient pressure value*

b. *multiply the volume present in surface with the ambient pressure value*

c. *subtracted the volume from the pressure value*

Answers: 1c - 2a

6

Minitest

1) *When an object moves a quantity of water that weighs more than itself, it:*

a. *sinks*
b. *floats*
c. *remains suspended in middle water*

2) *If an object weighs 23 kg and moves a volume equal to 10 liters of fresh water, it is:*

a. *positive*
b. *neutral*
c. *negative*

3) *If the subject of the previous question is put in salt water, it will be:*

a. *positive*
b. *neutral*
c. *negative*

Answers: 1b - 2c - 3c

The law of Dalton

The total pressure of a gas mixture is the sum of the partial pressure (pp) of each gas.

The dry air is made of nitrogen (78,084%), oxygen (20,946%) and other gasses (0,97%). As you have already learned during your ESA Open Water Diver course, for practical reasons connected to scuba diving, we consider the other gasses to be negligible, and assume that the air we breath is made of oxygen (21%) and nitrogen (79%) only.

At sea level, where the ambient pressure is 1 BAR or 1 ATM, you can easily calculate the partial pressure of the two gasses: it is the 21% of 1 BAR for oxygen (0,21 BAR) and 79% of 1 BAR for nitrogen (0,79 BAR). Dalton assessed that the effect of a gas on the organism is dependent upon its partial pressure.

If the organism can tolerate a maximum oxygen partial pressure of 1,4 BAR, the maximum depth you can reach breathing pure oxygen is 4 metres (where the ambient pressure is 1,4 BAR).

What is the depth beyond which, breathing compressed are, oxygen becomes toxic?

The oxygen pp is 0,21 BAR at the sea level; it make it increase beyond 1 BAR a diver must go to 40 metres, where the pressure is 5 BAR (0,21 x 5 = 1,05 BAR). Getting 20 metres deeper, were the absolute pressure is 7 BAR, the oxygen pp goes beyond the value of 1,4 BAR (0,21 x 7 = 1,47 BAR). One of the interesting things that you will learn attending the ESA Nitrox Diver course is the formula to calculate the maximum pressure that you can reach with air: (1,4 x 10):0,21-10=56,6. The limit of 56,6 metres is based upon a pure mathematical calculation, and being cautious is always better; indeed, the diving operators consider the depth of 50 metres the maximum one they can reach with air, even though they work fully supported with excellent assistants.

Moreover, the same formula can be applied to calculate the maximum operative depth when diving with Nitrox. Anyhow, this formula is law is important because:

- is the principle that explains the most of the pathologies and accidents during a dive
- explains why a quantity of carbon monoxide considered negligible at the sea level becomes dangerous or lethal at a certain depth
- explains why nitrogen don't cause any strange effect at the sea level, while it can seriously interfere with the behaviour of a diver that breaths air during the dive
-

The law of Henry

The concentration of a solute gas in a solution is directly proportional to the partial pressure of that gas above the solution.

The way a gas is solute in a solution depends on its pp and on its solubility coefficient in the specific liquid.

This important law explains why when you open a bottle of sparkling water you can hear it breathing and you can see that it sparkles. When you unscrew the top, the water becomes exposed to the air, where the pp of the gas solute in the water is less (see the ESA Open Water Diver manual), making the gas escape from the liquid.

The carbonated beverage in contact with the atmosphere free the excess gas and form the foam

This explains the phenomenon of the Decompression Sickness that you may want to refresh reading the ESA Prevention & Rescue manual. A diver breaths air at a pressure higher than that he breaths at the sea level during a dive; this make the tissues of his organism to absorb nitrogen. Nitrogen is not used by the organism at all (inert gas). There are no specific issues when the diver stays under water: **his tissues continue to absorb nitrogen until the pp of the solute nitrogen equalise the pp of the nitrogen he breaths (saturation).** The hemi-saturation is a specific condition that occurs when the organism has absorbed half the amount of nitrogen that it can absorb. The time needed to get hemi-saturated is 1/6 of the time needed to get saturated.

This happens because the greater the pressure difference (gradient) between solute gas and "pushing" gas, the faster the gas solutes/escapes.

When a diver ascend, the ambient pressure decreases as well as the pressure of the air he breaths. This way, the pp of the nitrogen solute in the tissues of the diver is higher than the pp of the nitrogen the diver breaths. This makes the nitrogen leave the organism of the diver through his lungs, every time he breaths out. Some bubbles of nitrogen can expand at tissues' level: in some cases such bubbles can originate the Decompression Sickness. **When a diver that is suffering of Decompression Sickness breaths pure oxygen (100%), the gradient between breathed nitrogen and solute nitrogen increases and favours the expulsion of such excess gas.** That's why the treatment of a diver that suffers of Decompression Sickness with pure oxygen and a DAN course for first aid with oxygen are strongly recommended.

Remember: in case of alleged Decompression Sickness, Arterial Gaseous Embolism and Pre-drowning Syndrome, **providing pure oxygen (100%) and calling a doctor are of vital importance.** As a Diveleader, you must be always ready, and make sure that (during any phase of your activities) an oxygen first aid kit is available, as well as a detailed emergency plan that helps and makes the intervention by a medical staff more effective and faster.

Minitest

1) *The breathing mechanism is based on the equilibrium research between the pressure:*
a. *indoor and outer air*
b. *atmospheric and hydrostatics*
c. *blood and venous*

2) *The exchange between air and the blood take place:*
a. *in the trachea*
b. epiglottis
c. *in the alveoli*

3) *The airspace not affected by alveoli trade are defined:*
a. *insignificant*
b. *dead*
c. *active*

4) *In the blood, the oxygen is transported:*
a. *by hemoglobin*
b. *by platelets*
c. *by white blood cells*

5) *The hemoglobin is:*
a. *in red blood cells*
b. *in the breathed air*
c. *in particular foods*

6) *The heart is divided into:*
a. *four parts*
b. *three parts*
c. *six parts*

Answers: 1a - 2c - 3b - 4a - 5a - 6a

Physiology

You have already read all the information about physiology related to scuba diving in manuals for your preceding courses, such as ESA Open Water Diver, ESA Advanced Diver and ESA Prevention & Rescue Diver. The following information help you in understanding some phenomena related to scuba diving better. This paragraph will be helpful to make you understand the phenomena of recreational scuba diving; specifically, you will improve your knowledge, be more professional when answering questions that the students may ask you when you work as an assistant to the Instructor.

Breathing and circulation

Do you know why a diver cannot breath using a reed even if few centimetres deep? Because the **breathed in air must be at the same pressure of the ambient where the lungs are,** of course. Have you ever wondered how breathing happens?

Probably, the chapters of this manual and your experience has proven how usual the tendency to establish a balance between different pressures is; for instance, you have learned that the wind is due to the movement of the air from high pressure area toward the low pressure one, and that a gas tends to solute with a liquid until the partial pressure of solute gas and free gas equalise.

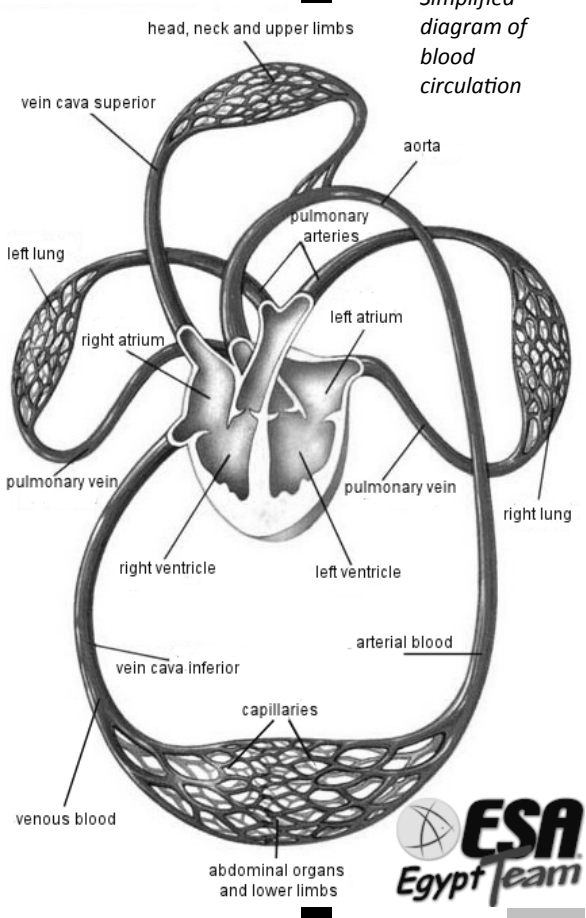
When you breath out, the contraction of your chest and your rising diaphragm reduce the volume of your lungs. Such reduction increases the pressure of the air inside that moves toward outside, where the pressure is lower. The opposite happens when you breath in: your chest expansion and lowering diaphragms increase the volume of the lungs, **reducing their inner pressure to a value lower than that the air around you.** Therefore, air gets into your airways until the pressure inside your lungs and outside equalise.

If you are few centimetres under water, your lungs are subject to a pressure higher than that of the air the sea level; that's why should you try to breath in, the air would not be able to reach you lungs. Indeed, you would obtain the opposite effect.

The air you breath in passes through **nose, mouth, larynx, epiglottis** (that divides oesophagus, that brings food to the stomach, and trachea, were only air can go through). The trachea is like an empty trunk of tree that branches out in smaller and smaller branches (bronchia and bronchioles) on the "top" of which the alveolus, a kind of cluster of really small cavities that, if

opened and jointed all together, make a surface several square metres wide. The alveolus is the place where the exchange between air and blood happens; they let the blood to purify from carbon dioxide and receive oxygen.

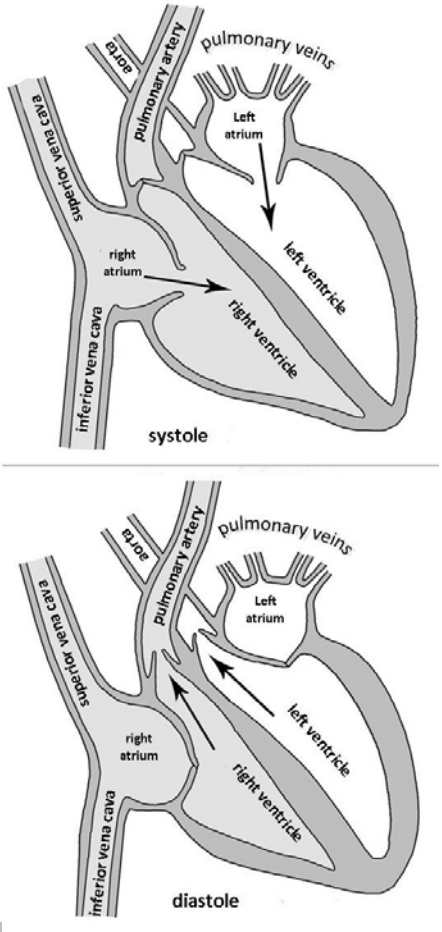
When you breath, you move a certain amount of air, but only the portion that gets to the alveolus is involved in the exchange; all the other areas of the breathing apparatus are defined dead spaces. Snorkel and regulators are dead spaces too, that's why breathing slowly and deeply is important while diving: breathing in a small amount of air fast is like not breathing at all. **The alveolus are surrounded by little vessels called alveolar capillaries.** Alveolus and capillaries have some common walls, through which the exchanges between gas in the blood and gas in the alveolus happen, thanks to the different gas pressure. The blood that is in touch with the walls of the alveolus has a low oxygen pp, while the carbon dioxide pp is high. Thus, the oxygen inside the alveolus solute in the blood and combines chemically with the **haemoglobin contained in the red blood cells**, and that will bring it to all areas of the organism. **The carbon dioxide, instead, will pass from the blood to the alveolus and will be breathed out. How can the haemoglobin bring the oxygen to all the cells of the organism?** Our organism has a large net of vessels with various dimensions that bring the blood pumped by the heart to all areas of the body.



Simplified diagram of blood circulation

The blood circulation is divided in two principal parts: pulmonary circuit and systemic circuit.

Veins and arteries of the pulmonary circuit carry the blood from the heart to the lungs and back. In this circuit, **the arteries contain blood full of carbon dioxide;** the blood that flow through the veins is full of oxygen, goes from the lungs to the heart that pumps it to the arteries of the systemic circuit. **The arteries of the systemic circuit** divides in vessels smaller and smaller (**arterial capillaries**) that reach all areas of the organism and bring oxygen to the cells. The cells release the carbon dioxide to the blood that leave them through the venous capillaries that gather in bigger and bigger vessels, the **veins**, that bring the blood to the heart. The heart pumps



Simplified diagram of the heart in two phases: diastole and systole

the blood to the lungs to the pulmonary arteries in order to oxygenate it, to start all over again.

The heart is a pump equipped with valves, and is divided in four main parts: right auricle, left auricle, right ventricle and left ventricle.

The left auricle receives the oxygenated blood from the lungs that and pushes it to the left ventricle through specific valves. The left ventricle pushes the blood to the arteries of the systemic circuit. **The right auricle receives the blood full of carbon dioxide from the veins of the systemic circuit and pumps it to the right ventricle.** The latter pumps the blood to the pulmonary arteries.

Now you know (or have refreshed) the fundamental information about breathing and blood circulation.

They are useful to better understand some phenomena, proper behaviour of a diver when diving, resuscitation mechanism, and to be aware of your answer to the question students and divers may ask you.

Part two

equipment

Development and production of new diving equipment enable all the people in good psychophysical shape to practice recreational diving easily, just like any other recreational activity. **The equipment efficiency is of paramount importance: it grants safety, comfort and recreation to the divers.** The ESA Prevention & Rescue Diver manual treats some problems related to the equipment and provides some suggestions on their solutions.

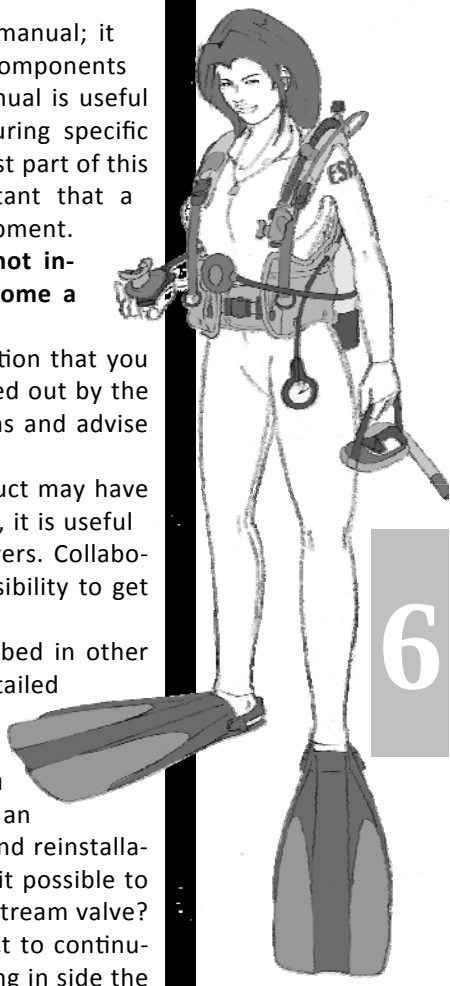
Once again, you can use the ESA Open Water Diver manual; it provides information about all the most important components for the equipment, while the ESA Advanced Diver manual is useful to know those components that need to be used during specific dives. Based upon what you have studied during the first part of this chapter, and as explained here above, it is important that a Diveleader gets a more detailed knowledge of the equipment.

The following information are quite base, and are not intended to provide you the training you need to become a qualified technician that can maintain the equipment.

You will attend a workshop for the most simple operation that you will be entitled to perform; the workshop will be carried out by the ESA Diveleader Instructor, who will provide suggestions and advise based on his training and experience.

Considering the specific characteristics that each product may have and the responsibility deriving from their maintenance, it is useful to attend a course held by the equipment manufacturers. Collaborating with an ESA Scuba Point, you will have the possibility to get easily informed about such courses.

All the specific pieces of equipment sufficiently described in other ESA Manuals are not considered in this chapter; the detailed information you will find hereafter are related to the components for which a better understanding of the way they work and related features are needed. You will find answer to the following questions: what is an hydrostatic test? How is it carried out? Why removal and reinstallation of a cylinder valve are critical operations? How is it possible to work on the inflation devise of a BCD? What is a downstream valve? Why is a regulator that is not working properly subject to continuous flowing? What are the main causes for water leaking in side the second stage of the regulator? What should a diver consider before buying a suit? How does the main instruments (such as a manometer) work? What should a Diveleader know about scuba diving computers? Which pieces of equipment contribute in improving efficiency and safety of the Diveleader?



Flippers, mask and snorkel

You can find information about these components in the ESA Open Water Diver manual. As a Diveleader, you must take care of your customer when you help them in choosing their equipment.

Make sure that the flippers are of the right size (too small flippers can cause cramps and make divers feel cold; too big flippers can easily be lost) and that the belt or "scarpetta" are sound.

Check that the fasteners works properly.

The mask must stick to the face of the diver, hold the nose and let him see clearly; the components must not have any flaw. To check the existence of any flaws, put the rubber/silicon parts under traction. Verify that the locking and adjustment mechanism works properly.

Verify that the snorkel is equipped with a hook to link it to the mask, that the dimensions are the right ones and that the mouthpiece is sound.

Good adhesion to the face, wide view and easy access to nose compensation are the characteristics of a good mask

Cylinders and valves

As explained in the ESA Open Water Diver manual, the cylinders are extremely important because, thanks to resistance of materials used to pressure and gas compressibility, they make you bring under water a considerably high quantity of air.

Chapter 3 explained you that some specific rules must be respected when recharging them; the law of Charles tells you why you should recharge them immerged in water and why their inner pressure drops when put in cold water, and that they become dangerous if exposed to high temperature.

The quantity of gas contained in a cylinder depends on its pressure and capacity (200 BAR x 12 litres = 2.400 litres of air).

When a cylinder is contaminated by toxic substances, it must be visually inspected inside and carefully cleaned applying special treatments (tumbling, sandblasting, washing and drying).

A cylinders must be tested as requested by the applicable laws and every time that it is hardly bumped (i.e. it falls from a car that is moving) or if it was exposed to high temperature (hot painting) or if a flaw is detected on his wall (visual inspection, tumbling).

The cylinders can be used only for the specific gas stated in the related stamping and on its certificate (air only in cylinders for air, nitrox in cylinders for nitrox, and so on) to avoid dangerous confusions or explosions (cylinders for air have 4 sectors painted in black a white).

Removing and installing the valves on a cylinder are very critical operations. Attempting to remove the valves of a cylinder that is not fully discharged, reinstall it wrongly or using a different thread can cause serious accidents (a cylinder charged at 200 ATM contains a

gas exercising a pressure of 200 kg per square centimetre in all directions).
These operations must be reserved to qualified laboratories and technicians for reasons mainly linked to safety and legal implications.

The valves should be properly protected when moving or transporting the cylinder, in order to avoid bumps or torsions.

The taps work like normal taps for the water, are designed to stand high pressure and to avoid any leakage of gas from the cylinder. They are made of materials (chromium-plated brass usually) different from those used for the cylinders, therefore, galvanic currents can easily corrode the neck of the cylinders. The annual visual inspection of the cylinders is useful to check any corrosion and substitute the O-ring that seals the gaps between cylinder and valves. If a tap leaks, it means that Teflon stopper is excessively printed and the screw driven by the knob is not able to push it against the seat from which the air flows (it can be prevented avoiding to tighten the taps too much). If the air leaks from the screw on the knob, probably the shaft is broken (because of a bump) and the O-rings cannot seal the cylinder as properly.

The substitution of the shaft and pawl is quite easy, but it is important to respect the assembly scheme and use original spares. Remember that the cylinder must be completely empty to substitute the pawl.

It is important for a Diveleader to improve his knowledge and capability attending one or more maintenance courses held by the equipment manufacturers from time to time. Ask for information at the ESA Points and register as a participant at your earliest convenience.

The above operations are the same both for DIN connection and other kinds; indeed what changes is the connection between valves and regulator.

Those valves that can be converted from DIN to INT it is important to screw the adapter carefully, without tightening too much when using the hexagonal wrench.

In a diving centre where the adapters are screwed and unscrewed frequently, when the interface between regulator and valve leaks, and the O-ring on the outer face of the adapter is correctly in place, probably the O-ring of the inner face is missing. The lever valves for high pressure have a different mechanism, even though similar to that used for water.

Spindle lock and closing a tap of the tank: the most worn parts are the O-ring shaft and tablet

Minitest

1) *To compensate the medium ear, the mask must:*
a. *adhere perfectly the face*
b. *include the nose*
c. *be particularly soft*

2) *How much air contains a cylinder of 15 liters filled with 220 bar:*
a. *3000 liters*
b. *3300 liters*
c. *330 liters*

3) *Cylinders may be used to store:*
a. *the gas for which are been tested*
b. *any type of gas*
c. *air only*

4) *The removal and reassembly of the valve on a cylinder is an operation:*
a. *very delicate*
b. *very simple*
c. *that does not require a*

Answers: 1b - 2b - 3a - 4a

6

BCD

As you know, the BCD is equipped with quite simple mechanisms to regulate its inflation and deflation. Every time you use the BCD, the water is in touch with the moving parts of such mechanisms; this can cause the deposition of salt and formation of oxide that can compromise the functionality of the mechanisms.

The most worn points of the BCD, are the exhaust valves and the corrugated commands

The problems occur when the discharge valves don't ensure a perfect sealing or when the inflation system flows continuously. The maintenance concept for these mechanisms depends on the type, brand and is bound to the strict application of the instruction provided by the manufacturer.

To avoid such problems, you need to wash the equipment with fresh water after every use and inspect all mechanism before giving a BCD to a customer. Inflating the BCD and leaving it inflated for a few minutes is useful to check that there are no leakages. Press the inflation button repetitively can be useful to check that the inflation mechanism don't flows continuously.

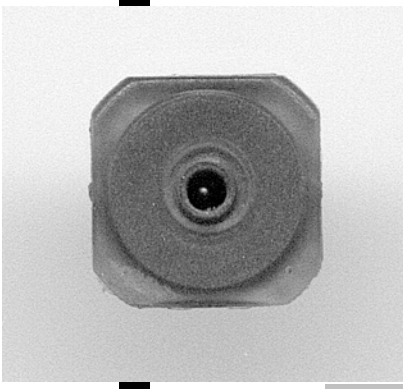
Disassembling and checking the valves is quite easy if you are trained to do it and have the needed tools; cleaning and lubricating the inflation mechanism too, even at the dive site. Check the attachment of the low pressure line to the BCD: it could unscrew causing air leakage through its threaded seat.

Regulator

You know what a regulator is since your Open Water Diver course. What you find here is a collection of information and definitions that may be useful. They are listed following a simple scheme that can be easily followed.

First stage – it is the part connected to the cylinder's valves with the DIN (screw) or INT (with a bracket) attachment. **It received the air from the cylinder reduces its pressure from a value between the cylinder pressure and the ambient pressure** (the value depends on the model and on the manufacturer). The pressure reduction in the cylinder caused by the air consumption has no effects on the air supply provided by a balanced first stage, and the diver breaths normally, without any extra efforts. Actually, it is the pressure reduction itself that opens the valve of the regulator, not the air in the cylinder. It let two divers breath at the same time and make other parts of the equipment connected to it work properly (BCG, dry suit,

etc.). It works making the air act either on a piston or on a membrane.
In an unbalanced first stage, the valve of the regulator is kept in its closed position by a calibrated spring, and is open by the pressure of the air in the cylinder. **This valve tends to close when the pressure reduces,** so an more and more increased effort is requested to the diver to breath. Unbalanced first stages are not really indicated for usage by two divers. It can be with a piston or with a membrane.
The second stage supplies air at the ambient pressure to the diver on demand. The valve of the second stage can open upstream, against the airflow (very few regulators have this kind of valve), or downstream, in the same direction of the airflow. **Every time the diver breaths in, the pressure inside the second stage reduces.** This makes membrane move toward the diver acting on a lever that open the valve. As you know, when you push the button of the second stage of the regulator, you make the same lever move and actuate the valve.



Valve of the first stage of a regulator with the worn seal: is possible to see the groove abutment too marked

Another way to make the valve open is to keep the regulator with the cap directed downward. In this case, the airflow is caused by the different pressure between the water (at higher pressure) and the air inside the regulator (at lower pressure). In some cases the opening of the valve is made easy thanks to a servo valve.
The new regulators are designed and manufactured in a failsafe way: in case of any malfunction, the air (or the gas mix) **is free to flow continuously**, making the diver ascend quite safely.
Usually, when a regulator flows continuously, it means that the valve of the first stage must be substituted. This operation is quite easy and can be done in few minutes. It is important to respect the instruction provided by the manufacturer, use the proper tools and original spares. Trying to recalibrate the valve changing the original setting is not always convenient. Other causes are foreign parts inside the second stage or the calibration screw erroneously reset.
To diagnose if the problem is due to the first or second stage, connect the BCD pressure line to a low pressure manometer; if the pressure you read is not the one established by the manufacturer but rises, then the valve is not correctly set. Otherwise, check the second stage.
Should a diver complain that he is breathing in water, check the mouthpiece of the regulator. Usually, this problem is due to a hole. In other cases it is due a malfunction of the discharge valve, a hole in the membrane, or in the latter erroneously installed in the second stage. Try to breath without having open the cylinder valve before giving it to a customer: if you can breath the diver will breath

in water. **To check the mouthpiece, put it under traction: the hole should be close to the tie-wrap that link it to the regulator.**

Take in consideration the configuration you want to have and make sure you don't miss the right threaded output every time you connect the pressure lines to the first stage; usually you there are two high pressure outputs and some low pressure outputs. It is quite unusual to connect the pressure line to the wrong output, as low and high pressure outputs have different diameter and pitch.

You don't need to tighten the pressure lines too much; remember that they are properly connected and that all the not used outputs are closed by their correct screw tops.

Check the first stage filter frequently (check where it is connected to the regulator) and make sure it is in good shape, without impurities or oxidised.

Emergency regulator

The emergency regulator is an obligatory part of the equipment. It can be a second stage added to the principal regulator (octopus configuration) or a complete regulator with first and second stage; in this case you need to use a cylinder equipped with a two ways valve. There are emergency regulators integrated in the inflation system of the BCD; should you have this type of BCD, in emergency conditions you would have to use the integrated regulator and give your principal one to the diver without air. An emergency regulator can also be connected to an auxiliary cylinder connected to the main cylinder, hanging under the boat to let technical divers complete their decompression stop, or positioned in specific places under water to be used for dives other than the recreational ones.

The emergency regulator works like the principal one, and can have the same characteristics. There are different ways of connecting and positioning the emergency regulator on the equipment, therefore, it is important that the divers check each other before diving, so that they know where the it is located and how it works.

Lucien, an expert Diveleader, prefers to connect the emergency regulator on the first stage of the principal regulator in such a way that it stays on his left side. He says that placing it this way enables him to assist a diver who run out of air better: he will keep the diver without air on his left side, and the diver will receive the regulator from his right side, making the ascend more comfortable. Furthermore, when he uses the dry suits, he can connect the related low pressure line in such a way that it gets on his front from the right side, just like the principal regulator. Therefore, should he have to

Minitest

1) *To prevent possible drawbacks, it must:*
a. *always rinse carefully the equipment*
b. *inspect equipment before deliver*
c. *a) and b) are correct*

2) *The first stage:*
a. *reduces the air pressure contained in the cylinder*
b. *increases the pressure*
c. *transforms the high pressure in environment pressure*

3) *The first stage can be:*
a. *balanced*
b. *unbalanced*
c. *a) and b) are correct*

4) *The second stage of the regulator:*
a. *provides air on demand and with environment pressure*
b. *supplies air continuously*
c. *a) and b) are correct*

Answers: 1c - 2a - 3c - 4a

remove the equipment to check that everything is ok, he can do it leaving pressure line connected to the dry suit.
There are many accessories to keep the emergency regulator well positioned and ensure that it is easily used whenever needed; check that the equipment you give to the customers have such accessories**. The diver without air must be able to take the emergency regulator with one hand and quickly, simply pulling it once.**

The nozzle with O-ring seal of a pressure gauge

Manometer
The manometer is an obligatory component of the equipment too, and you will better understand it when you supervise the divers during a dive. Being a Diveleader, you will have to check there are consumption; they will have to inform you when the have 100 BAR and 50 BAR left, but they will not always remember.
There are three types of manometers: analogical, digital and digital with radio transmitter.
The analogical manometer is a box with a bent tube (Bourdon tube) connected to the high pressure line. The tube tends to straighten when the high pressure air gets into it, activating a mechanism with gears and lever that make the pointer of the face of the manometer move along a graduated scale that shows the pressure.
A swivelling connection between manometer and pressure line makes the reading of this instrument easy. The sealing is granted by a small metallic sleeve equipped with O-rings. **Should a leakage occur, one the O-rings is probably worn.** Their substitution is easy; it is done when the regulator is not under pressure, with the correct wrench and proper spare. You can check the sealing after the substitution, by immerging the manometer in water when the regulator is under pressure. Should you still see some bubbles, it means that you didn't use proper spares.
The digital manometer measure the pressure in the high pressure line thanks to a pressure transducer that converts the pressure in an electrical signal. This signal is electronically converted to numbers on the display. Usually this type of instrument is part of a computer connected to the high pressure line. In this case, the computer, based on the air pressure reduction rate due to breathing of the diver and depth, calculates the residual duration of the cylinder. A beeper alerts the diver when such residual duration reduces to few minutes, advising the diver to ascend.
The digital manometer with radio transmitter is similar to the digital here above described. The difference is that it is not connected to the high pressure line; the diver has it on

Minitest

1) *The spare regulator must be considered:*
a. *a required component*
b. *an optional component*
c. *only for certain types of diving*

3) *The requesting diver must take the regulator:*
a. *with one hand*
b. *rapidly, with a tear*
c. *a) and b) are correct*

4) *The pressure gauge is:*
a. *a no mandatory part of the equipment*
b. *a mandatory part of the equipment*
c. *a mandatory part of the equipment but only for some kind of dive*

5) *The three main types of pressure gauge are:*
a. *analog, digital and mechanical*
b. *analog, digital and digital with radio transmitter*
c. *analog and digital with radio transmitter*

Answers: 1a - 2c - 3b - 4b

Minitest

1) *Generally, the hose are the pipes that connect the first stage to:*
a. *other equipment components*
b. *the cylinder*
c. *a) and b) are correct*

2) *The main types of hose are:*
a. *for high pressure*
b. *for low pressure*
c. *a) and b) are correct*

3) *Is useful to inspect periodically the hose, mainly:*
a. *in the junction points*
b. *when making diving in the tropics*
c. *a) and b) are correct*

Answers: 1a - 2c - 3a

his wrist. It received data sent from a radio transmitter of a gauge connected to the high pressure output of the first stage regulator. To avoid interference with other transmitters, the divers that has the same model must set-up their instrument using a specific procedure that enables the manometer/computer to receive the signals from its specific transmitter only. This procedure avoids that a diver reads the residual pressure in the cylinder of another diver.
Reading the instruction provided by the manufacturer is obligatory. **An error or misinterpretation of the data showed by the manometer can affect the safety of the diver**. For this reason, a Diveleader must always make reference to the instructions instead of giving information based on the similarity to his own instrument.

The pressure lines
The pressure lines **are divided in two categories**: high pressure (**hp**) lines, usually designed to bear a pressure of at least 300 BAR, and low pressure (**lp**) lines, that bear a pressure of 30/40 BAR.
The pressure lines are extremely important for safety and must be periodically substituted, in order to avoid air leakage during the dive or arm due to explosion or whiplash.
Usually, when a hp line breaks the danger is not extreme, as the output on the first stage is really small. Anyhow, a broken hp line moves fast and can hit the diver repeatedly causing arm.
Both hp and lp lines can explode. The explosion is really loud and can cause problems to the hears of the diver.
For this reason, **check the lines frequently to check any sign of deterioration,** specifically to the junctions with first and second stage or other parts of the equipment, such as the manometer.

The suits
You have already learned that the water conducts the heat 20 times faster than air, already during your first course; this means that is a person can resist in the air at a certain temperatures for 20 hours before shivering, it takes 1 our only in the water at the same temperature. That's way a diver wear the proper suit and there are many types of suits on the market .
For a Diveleader that spends a long time in the water, the suit is of vital importance. If you work in the Red Sea, a 3 mm thickness suit may be not enough even if the water is quite warm. Indeed, the continuous exposition to the cooling effect of the water will make you realise that you need a thicker suit or a dry one. Other than this, you must get informed about suits in order to answer all the questions the divers will ask you properly.

Due to the continuous evolution of this component of the equipment, providing detailed information is quite hard.
The ESA Open Water Diver manual provides some fundamental characteristics of the different types of suits and the workshop that you will attend with your Instructor will teach you how to fix a suit in case of urgent need.
You may think about attending the ESA Dry Diver speciality course to discover how the dry suits work.
You must think about the comfort when you give a suit to a diver for rent, for instance, during the Open Water Diver course. When the water is quite warm and the diver is a novice, a suit larger than the diver's size is better, as it avoids claustrophobia. Take care of the models: is seems to be obvious, but it happens to see men with women's suit and vice versa.

It is important that your shoes are the right size

When you work for a diving centre, try to fix a suit every time you see it is about to get broken, and provide the customers with the best suits, always. Suggest the divers to buy their own suits; it is the best thing to do to grant comfort and hygiene.
As you know, the suits can be provided with gloves, caps and boots. Usually, the divers prefer to have the cap separated from the suits: this makes them feel free. **The nape of the neck is the part of the body that lose the heat faster than any other part, therefore, suggest your customers to wear the cap**: whey will suffer less because of the cold water, and will be more difficult to get a cold.
Neck, boots and caps must be of the adequate size. Too tight necks and caps can exercise an excessive pressure on the carotid arteries that carry the blood to the brain; this may cause the diver to faint. Furthermore, a too tight cap may cause problems in equalising; should you see a diver with this kind of problems, suggest him to flood the cap; this can solve the problem, sometimes. A too loose neck makes the water leak inside the suit; it reduces the suit capability to insulate and, in a dry suit, it can cause unpleasant water infiltration. **Too loose boots can cause lesions to the feet's (blisters and abrasions) and affect the effectiveness of the flippers. The too tight ones can cause cramps, numb and cold.**
Comfort is of paramount importance for your efficiency, professionalism and your and your customers health. Thanks to the above information ,you will be able to provide them with suitable advise on the suit they will buy, and solve possible problems that may occur at the dive site.

Minitest

1) *Having to prepare the wet suits for the ESA OWD course participants, consider mainly:*
a. *comfort*
b. *the appearance and the quality*
c. *a) and b) are correct*

2) *Because the neck is one of the body points with greater thermal dispersion, suggest:*
a. *to use the hood*
b. *not to use the hood for avoid the risk of get too hot*
c. *to use the hood with a thickness of 16 mm*

3) *Neck or hood too tight can cause serious problems:*
a. *breathing*
b. *hearing*
c. *distribution oxygen to the brain*

Answers: 1c - 2a - 3c

6

Instruments

The depth gauges are essential: every diver must know depth and time spent under water. There are several types of depth gauges.

One type, **based on the law of Boyle and Mariotte is equipped with a capillary tube and measure the pressure ambient directly.** This tube, mounted on a circular or rectangular screen, us closed to an end and contains a bubble of air. The bubble gets compresses when the diver gets deeper and deeper. When the divers arrives to a depth where the pressure is double than at the surface, the bubble reduces his volume to half the original one, indicating on the screen the depth of 10 metres.

Actually, the diver could be at a difference depth that, anyhow, corresponds to doubling the ambient pressure: this happen when diving in lakes on the mountains. For instance, if a diver dives where the atmospheric pressure is 0,7 BAR, the depth gauge will indicate 10 metres when the volume of the bubble reduces to half is original value, that is, at about 7 metres.

For this reason, the capillary type depth gauge is the only one that makes dives at high altitude possible without converting the real depth in fictitious depth.

Due to the effect of the law of Boyle and Mariotte, this instrument is accurate when used in shallow water, there small depth variations cause big changes of the volume of the air bubble. Therefore, this instrument is not accurate when going deeper.

The fact that the capillary tube can obstruct and become opaque, making the reading impossible, and the more and more diffused digital depth gauges the capillary tube gauge to disappear.

The analogical depth gauge with tube of Bourdon uses the same principle of the manometer, with the difference that the bent tube tends to straighten because of the pressure of the water. It can be open or in an oil bath. In the latter case, the tube is immerged in a container filled up with oil to which the pressure is transmitted from the water oil through a little flexible membrane (rubber); **this system prevents corrosion and formation of oxide.** In the tube of the open gauge, the water flows free, therefore, salt deposit and corrosion can affect the indication of the instruments. The zero level of this instruments is set to the sea level, therefore, it is needed to calculate the fictitious depth when diving at a certain altitude, using appropriate conversion tables.

The analogical depth gauge with membrane is based on a mechanism with levers and gears activated by the pressure of the water in contact with an elastic membrane. This instruments is more accu-

rate of the those described here above and can be set to zero at any altitude.
Most of the analogical depth gauges have a pointer composed by two needles that move along a graduated scale; the two needles move together until the maximum depth is reached, then the main needle goes back and indicates the current depth, while the other remains on the maximum reached depth.
The digital depth gauges are more and more popular, offer many functions and a better accuracy. Most of them are integrated in electronic instruments that, beyond current and maximum reached depth, indicate temperature, time and include a log book of the recent dives.
Almost all the models include a beeper that alter the diver when the ascend speed is to high, in order to contribute to the safety of the divers.
The digital depth gauges measure the ambient pressure thanks to a pressure sensor and a transducer converts the pressure to electrical input for the electronic part of the instruments. The instructions provided by the manufacturers must be read carefully in order to avoid errors and misinterpretations that may affect the safety of the diver. You must be sure you know an electronic instrument well before answering questions, otherwise, the best answer you can give is the advise to study the instructions together with you. You will learn new information useful for your experience and professionalism, and the diver will be sure to use the instrument correctly.
All the depth gauges are subject to marginal errors; it is of about 15 cm for the digital ones, while for the others ranges from 1% (up to mid the scale of the screen) to 2% for higher values of the depth. For this reason, it is important to plan al dives within the limits imposed by the license, local rules and dive planners, and dive accordingly.

Computer
The above mentioned electronic instruments can all be part of another instruments more complete and used by many divers: the computer.
A computer includes all the functions of the above instruments, elaborates continuously all the dive related data and, on the base of a mathematical model, calculates the nitrogen absorption of the diver, provides the non decompression limit and, should such limit be inadvertently exceeded, indicates the obligatory decompression stops necessary to avoid the Decompression Sickness explained in the ESA Prevention & Rescue manual.
Even the most reliable computers are subject to some marginal errors, therefore, **you must always plan the dives cautiously respecting all the pre-established limits**.

Minitest

1) *In the practice of diving activity the depth gauge (Or another instrument capable of measuring the depth) are:*
a. *essential*
b. *optional*
c. *useful, but just have one for each pair of divers*

2) *The capillary depth gauge it works by using the principle of:*
a. *Boyle and Mariotte*
b. *Charles*
c. *Henry*

3) *The second needle in the analog depth gauge is used to:*
a. *indicate the maximum depth reached*
b. *the decimal*
c. *the intermediate altitudes*

Answers: 1a - 2a - 3a

Minitest

1) Practicing the underwater activity, using a computer:
a. *you can use a computer for every two divers*
b. *each diver must have their own computer*
c. *it is sufficient that only the dive guide has the computer*

2) *In a group of divers, the one _____ determines the ascent speed:*
a. *more restrictive*
b. *more permissive*
c. *indicating intermediate values*

3) *To ensure the safety, it is good _____ the indications of the Manufacturer:*
a. *read*
b. *respect*

Answers: 1b - 2a - 3c

The ESA Computer Diver speciality course describes all these characteristics and features of the computers in details. It is important to remember that:

- each diver must have his own computer; sharing a computer for two or more divers is not safe
- the instructions provided by the manufacturer must be respected
- the most conservative computer states when the ascend of the dive mates must begin
- the non decompression limits must be respected; exceeding them prevent the possibility to ascend directly in case of need
- **in case of a sudden malfunction of the computer, the dive must be interrupted; ascend to 5 metres and stay at this depth for an emergency stop as long as possible** (see the instructions provided by the manufacturer)
- it is better to put the computer in your hand luggage every time you travel by plane; this avoids problems related to the changes in the pressure
- just like all of the other instruments, the computer must be washed after every dive and stored away from the light or excessive heat

The computers have contributed to improve comfort and safety of divers, have made easier the work of the doctors who have to treat Decompression Sickness and have increased the possibility to perform decompression related scientist research.
It is desirable that every diver has his own computer. For this purpose, remember the important role you will have in promoting the interest of the divers for diving equipment and, specifically, for computers.
There are computers that can take in consideration of gas mixes such as nitrox and trimix; other rules the rebreather (closed circuit scuba) calculating and providing the best mix the diver need at the various depths. Some can measure the residual pressure inside the cylinder (see the paragraph related to manometers) and give the diver on the time he can spend under water based upon no decompression limit, available air and breathing frequency.
If you want to know more about computers, try to get informed about every computer you see, participate to courses held by the manufacturers and read the instructions.

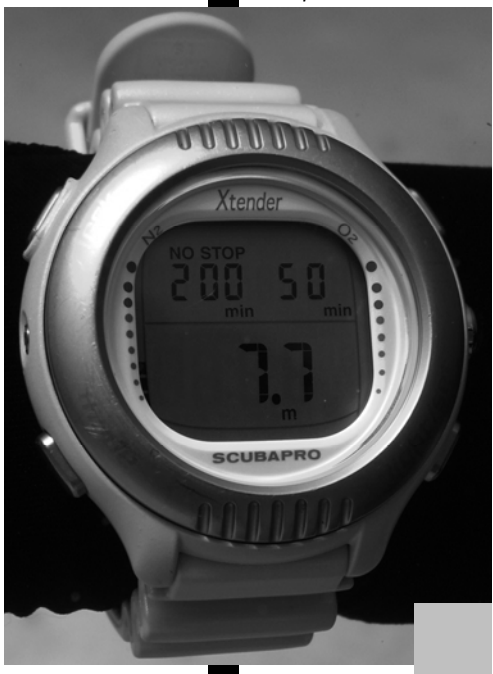
Watches

It was not too long ago when, to satisfy the need to measure the time under water, someone put a normal mechanical clock in a watertight pressure resistant glass jar. These are the two main characteristics of a watch for divers.

Furthermore, an easily readable face (also in the dark), the chance to register the time under water and the resistance to bumps are really useful.
There are many instruments to measure the time under water:

- watches with external scaled rotating ring on which you can read the time – **it is important that the ring can rotate counter-clockwise only**, so that an inadvertent rotation is in favour of safety. To make sure that the watch is used correctly, remember the diver that the ring must not be rotated when starting to ascend
- digital watches with stopwatch – with some models you must remember to register the time at which the dive starts in case of inadvertent reset of the counter
- watches with pointers and digital screen – those designed for scuba diving activity start the stopwatch as soon as the dive begins; they can have other functions such as a log book for the latest dives and a depth gauge. Some of the digital watches lets you pre-set the beepers to advise you when the maximum established depth is reached and to limit the ascend speed.

The production of new computer models continues, so you need to keep up to date, possibly by participating in seminars organized by construction companies



The compass
The compass is well explained in other manuals for the ESA courses. **A Diveleader should dive with a compass always; it is useful to find the exit point easily**, especially diving during the night or with poor visibility. Finding a specific point in a dive site can be easier if you use a compass to register the path to get to such point. The ESA Orienteering Diver speciality course was designed also to have better trained Diveleaders; indeed the ESA Orienteering Diver license is needed to access the ESA Diveleader course.

The ballast
The ballast is needed to compensate the positive trimming caused by other components of the equipment. If you want to make your students laugh, ask them to get in the water without the weight-belt and to dive: they will splash water all around but will go back to the surface just like corks.
For a Diveleader, and for anybody who works in a diving centre, knowing how important the ballast is fundamental; it will have to advise the divers and participants to courses about the correct quantity of ballast they need to use to be perfectly trimmed. Furthermore, students may need to know the different types of available ballast.

Minitest

1) *The two main characteristics, common to all watches are:*
a. *tightness and resistance*
b. *small size and metal strap*
c . *depth alarm and time*

2) *In the analog clocks, the dial must turn:*
a. *only clockwise*
b. *clockwise and anticlockwise*
c. *only counterclockwise*

3) *The underwater compass, its useful to:*
a. *find the exit point*
b. *to locate a dive point*
c. *a) and b) are correct*

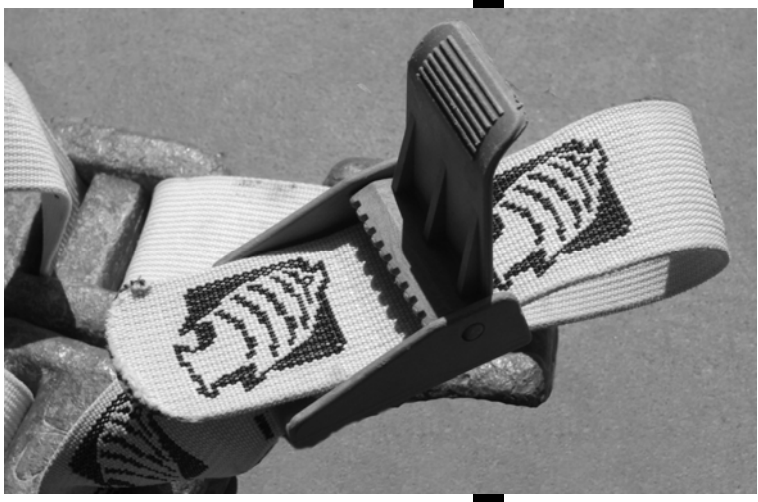
Answers: 1a - 2c - 3c

The most used one is a nylon belt with a buckle; the lead weights are inserted on the belt and can slide on it in order to arrange the weighs disposition in the best way.
Many divers consider the belt with pockets for lead weights or bags with lead shots the most comfortable type. The bags with lead shots are the most preferred ones from those divers who complains about the weights against the bones of the pelvis.
When the ballast to be used is considerably heavy (for instance, with a dry suit) the back of the diver may hurt. In this case, the best thing is to use a cartridge-pouch like belt: it is a belt with pockets and braces that distribute the weight uniformly without hurting the back, just like a rucksack.
Ankle weights are useful to better distribute the overall ballast. There are several models and weights. A Diveleader may find the ankle weight useful to demonstrate with a better accuracy some exercises under water, and can be used as auxiliary ballast to help students or divers if they cannot control the way they are trimmed (too much positively usually) at the end of the dive.
The main characteristics of each type of ballast is that it is possible to remove it easily with one hand only. Considering the different types and models available on the market, you should observe always the divers you are going to supervise in order to be sure that you know the type of ballast and how it works. You will be able to help easily a diver that is having problems and need to remove the ballast; try to imagine what could happen if you are not able to do it.
The weights can be deformed easily if the fall or hit something; this affect their ability to slide on the belt to change their arrangement. The buckles are quite delicate too and, if trampled or crushed, may not work well. **Another consideration: remember to treat the ballast with care, specifically when loading and unloading the boat, and ask your customers to do so too.**
If you want to improve your knowledge about the control of the ballast and on the trim, you can consult the ESA Hover Diver manual or decide to attend the related course.

Accessories
The A **Open Water Diver** and **ESA Prevention & Rescue** deal with accessories of the equipment and on their importance. They contribute to comfort and safety, making the diver enjoy diving.
Some accessories are really useful for the tasks a Diveleader has to accomplish everyday.
For instance, a surface marker connected to a reel can be useful for drift dives, but also to make the safety stop away from the boat in

order to give a reference to the divers (for this reason a Diveleader should always have one in the pocket of his BCD) or used to mark an interesting point discovered during a dive. In the latter case, you will have to link the reel to the place/object you want to go back during the next dives, inflate the surface marker and let it ascend.

The buckle of the ballast must be quick release



Actually, **in this case it can be more appropriate to use an uncompressible buoy** (polyurethane, cork, etc) with a stretched shape, on which the line is rolled up. A weight must be tied to one end of the line, in order to fix it to the point you want to find again. Whenever needed, all you need to do is let the buoy ascend keeping the weight in your hands.

The reel can be used to remain linked to the mooring line in case the water is not really clear and to secure the divers in case the visibility becomes poor. Remember that the divers should be specifically trained to enter wrecks and caves. The reel is also useful to follow research patterns or to measure a distance under water.

An acoustic signal should be hanged to the BCD of each Diveleader. It can be a metallic tube with spheres inside (shaker) or a beeper actuated by the low pressure air of the line of the BCD.

It is needed to call the attention of the divers during the dive, and of the rescuers, if needed, when floating on the surface. In case you use a beeper, remember that it doesn't work when the cylinder is empty, therefore a **Diveleader should have a whistle too**.

A smoke candle specifically designed for scuba diving and that you can store in the pocket of your BCD can be useful to call the attention of the rescuers in case of a dive in a remote place. Should you miss the boat at the end of a drift dive with strong current, it will be easier to be seen: this increase your and the supervised divers safety.

A resin ball on an elastic band around the cylinder can be used to make noise and call the attention of the divers during the dive. The system is quite simple and effective, although the bumping of the ball against the cylinder can ruin its paint and cause corrosion.

Unless forbidden by local rules, you should always have a knife, a pair of scissors or any other cutting tool specifically designed for dives. It can be useful to cut lines or fishing nets that may catch the divers by accident. It is important that it is really sharp, therefore, it must be treated carefully, properly lubricated, and washed after

Minitest

1) *The main purpose of the ballast is:*

a. *improve stability in water*

b. *cancel the positive push due to other components of the equipment*

c. *allow the diver to sink fast*

2) *The common feature for each ballast configuration is:*

a. *the possibility to unhook and abandon with extreme simplicity*

b. *the possibility to change buoyancy during diving by varying the weights*

c. *a flashiest coloring*

3) *To avoid possible deformation of the lead blocks, is good;*

a. *treat ballast carefully*

b. *avoid temperatures below 12 ° C*

c. *a) and b) are correct*

Answers: 1b - 2b - 3a - 4a

every dive. There are knives with ceramic blades really sharp and saltiness resistant.

Torches and lights are really useful during night dives, exploration of wrecks and to light up shaded areas, revealing an enchanting and colourful mix of creatures that provoke the divers' admiration.

A Diveleader should have his own torch always, especially if the characteristics of the specific place where he works make it necessary. The ESA Advanced Diver and the ESA Night Diver provide more or less detailed information about theses important accessories.

A board will help you in communicating under water, for instance to make the divers you supervise aware of the name of the fish or object you are showing them. There are boards that can be easily cleaned with a lever, other boards have the most common organism than can be observed under water printed on.

These are just some of the accessories that can contribute to improve your efficiency and professionalism. You have read about the proper example you have to give to the divers, on the role you have when compared with scuba diving business and on the legal implications that your actions may have; a complete and efficient equipment, completed with all the needed accessories, will enable you to live your professional experience in the best way.

Rebreather

How can a diver stay under water using small cylinders and using the gas more appropriate to the depth he intends to explore? Using a rebreather! Although they are not diffused at recreational level yet, many divers consider them interesting, therefore, you may have to answer questions that someone may ask you for information or who intends to use it during a dive planned by your diving centre.

A rebreather is an apparatus designed to breath the same gas many times; it can be equipped with a closed circuit or a semi-closed circuit. The most known example to experienced divers is the oxygen self contained underwater breathing apparatus, while some professional and military frogmen use complex models that use gas mix other than the air, and differentiate them based on the operative depth.

A diving horn device that is connected with the corrugated BCD and the low pressure hoses.

These apparatuses have all a common factor: the breathed out gas is not discharged in the ambient like all the normal regulator do, but is sent to a soda lime filter that adsorb the carbon dioxide; the gas is depurated and can be breathed again many times. The closed circuits don't release almost any quantity of gas during the dive, while the semi-closed ones do it periodically. They can be electronically controlled by a computer that shows to the diver all the dive related parameters, or mechanically with some valves and nozzles.
The rebreather must be used by specifically trained divers. The training may depend upon the model, therefore, should you have to supervise a diver with a rebreather, make sure he is trained to do it, make arrangements on your role and on the planned dive, so that there are no dangerous misunderstandings.
There apparatuses, beyond adequate training, need a accurate maintenance in order to avoid accidents.

Efficiency, comfort, cleanliness, hygiene
You are supervising a group of divers when you realise that one of them is struggling to control the BCD. Thanks to fact that you are trained and to your experience, you understand that the inflating mechanism is continuously, disconnect the lp line and suggest the diver to control his trim inflating the BCD by blowing air into hit by mouth. You realise that it was the BCD is one of the components for rent of the diving centre: what will you think about the accident? Focus your attention on what you have read in the previous chapters: safety, responsibility, customer satisfaction, proper example and so on.
Probably, you are thinking that you don't want find yourself in such a similar situation, but you know that it can occur and that there are many things that you can do to avoid it, offering a better service to customers and granting safety. How?
It is easy: **make sure that the equipment of the diving centre is periodically and properly maintained.**
When you distribute the equipment rented by the customer, verify that they are suitable for the specific customer that will use it, avoid to give a male suit to a woman or a too tight or too large one. Cleanliness and hygiene are fundamental to grant a good image for the diving centre, professionalism and prevent pathologies that may occur because of the usage of the equipment by many customers. **The equipment must be accurately washed and disinfected when it is returned by a customer**; washing suits, regulators, masks, mouthpieces and other parts a solution of water and disinfectant is advisable.

Minitest

1) The surface signal:
a. *is a useless accessory*
b. *can be very useful*
c. *it must be used only for the drift diving*

2) *When used properly, the acoustic indicator instruments may be useful for:*
a. *call for help in case of necessity*
b. *to draw the divers attention*
c. *a) and b) are correct*

3) *If it is not prohibited by local laws, the Diveleader should have availability of:*
a. *a diving knife*
b. *a cutting tools*
c. *a) and b) are correct*

Answers: 1b - 2c - 3c

Some manufacturers offer specific products specially prepared for the equipment used by the diving centres.
Wet and semidry suits and be washed in the washing machine, using a program for delicate fabric, cold water, no spin-dryer and a disinfectant product.
Once again, remember to detail your knowledge and improve your professionalism attending courses held by the manufacturers.

Minitest

1) *The rebreather is a:*
a. *equipment used for resuscitation*
b. *self-loop enclosed or partially enclosed apparatus*
c. *Self -loop apparatus, one time use*

2) *The rebreather use:*
a. *requires specific training*
b. *does not require special attention*
c. *does not require a specific training*

3) *When a customer want dive with the rebreather, the Diveleader must:*
a. *make sure that he have the necessary competence*
b. *be agree in advance about the roles*
c. *a) and b) are correct*

4) *The Diveleader work about equipment, plays an important role for:*
a. *efficiency and comfort*
b. *cleaning and hygiene*
c. *a) and b) are correct*

5) *After each rental, the equipment must be:*
a. *put it in the sun for dry*
b. *washed and disinfected*
c. *left inside a bag, so that remains wet*

Answers: 1b - 2a - 3c - 4c - 5b

Congratulation!

With the information you got in this chapter of the ESA Diveleader manual, you will deal in a more aware way with the divers that you will supervise during dives or during the ESA Training Programs.

You will be prepared to sit the ESA Diveleader exam, an essential mean to give evidence of your preparation and professionalism. Discuss with your ESA Instructor all the areas that are not really clear before the exam, get more details on all the subjects and read the other ESA manuals.

You may be satisfying all requirements needed to attend the ESA IC (ESA Instructor Course) soon, and change your role in the recreational diving substantially. Once again, all that you will study about diving will help you. If you begin the ESA IC well prepared, you will be able to concentrate on the areas related to teaching techniques and marketing strategies, instead of having to learn all the basic information all over again.

What have you learned?

This test has the purpose of reviewing the most important information of the previous chapter, to improve your knowledge, and to be ready to the next appointment with your Instructor. Answer the question choosing the correct answer among those listed below, specifying if a statement is true or false or filling the blanks. Show this test to your Instructor: should you need it, he will provide you additional information and clarification.
Good luck!

1. Pascal demonstrated that the weight of the air at the sea level is:
   a. 760 mm/hg
   b. 14,7 psi
   c. 1 bar
   d. all the above

2. The volume of a gas contained in a rigid container _____ when going deep:
   a. decrease
   b. increase
   c. does not change
   d. is halved each 10 metres

3. Archimedes established that the buoyancy depends upon:
   a. the total weight of the object only
   b. weight and volume of the object
   c. density of the liquid where the object is immerged
   d. b. and c. are correct

4. When the pressure of a gas above a solution increases:
   a. the gas solutes in the solution until the gas pressure inside and outside the solution are the same
   b. the solute gas tends to leave the liquid
   c. the has solutes in the solution until the pressure of the solute gas is half the pressure of the gas above the solution
   d. a. and c. are correct

5. Breathing out happens because different pressures when:
   a. the volume of the lungs increases
   b. the volume of the lungs reduces
   c. the diaphragm lowers
   d. the chest expands

6. True or false?

The haemoglobin contained in the red blood cells is involved in the transportation of the oxygen to all areas of the organism.

7. In the pulmonary circuit, the _____ blood is pumped by the heart through the pulmonary arteries toward the alveolus.

a. rich of oxygen
b. venous
c. rich of carbon dioxide
d. a. and c. are correct

8. Beyond the basic equipment, the divers must always be equipped with:

a. emergency regulator
b. manometer
c. instruments that can measure depth and time
d. all the above

9. True or false?

Due to his professionalism, each Diveleader is able to use a re-breather without any additional training.

10. True or false?

The Diveleader has not an important role in maintaining the rental equipment used during the ESA Training Programs, with specific reference to efficiency, comfort, cleanliness and hygiene.

I confirm that I have reviewed all my answers with the Instructor and that I have understood the clarifications the Instructor provided to the wrong ones.

Signature _____ date _____

Appendix

9 suggestions to protect the environment

Use the following suggestions, you will contribute in safeguarding the environment.

1) Be neutrally trimmed when diving, avoid to touch the seabed and the underwater organisms: you will be more careful if you dive without gloves and don't touch anything.

2) Stop to move hands and flippers when you are close to the bottom and, before moving, check that your knees and flippers don't cause any harm.

3) Avoid to pass under vaults or caves: you may hit and damage the organisms and the entrapped bubbles of air can damage the environment.

4) Don't hang on turtles, big fish, sea mammals, but swim with them. Don't chase the animals if the look disturbed.

5) Avoid to touch organisms that you don't know or that look delicate; don't touch the fish or other organisms, you may take the protective mucus that covers them and cause harm.

6) Don't collect dead or alive organisms from the bottom, archaeological finds and objects covered by weeds or animals

7) Don't buy souvenirs manufactured with materials from the sea: you will discourage people from collecting them.

8) Don't throw anything in the water (rubbish, cigarettes' ends, batteries, bottles, paper, food, etc.): use the apposite containers.

9) Continue your training, get a deep knowledge of the aquatic environment: you will discover that each place deserve a dive and that there is an extraordinary variety of organism to be discovered everywhere.

All the inhabitants of aquatic environment and occasional visitors thank you for your commitment.

9 rules for safety

1 Keep your equipment efficient.
Check it before leaving for your holidays and diving.

2 Be physically and psychologically fit
Physical training and a proper diet make you enjoy scuba diving more.
You can be psychologically fit preventing stress and anxiousness reviewing the exercised you learned during the Open Water Diver course, especially if you have not been diving for a while. Make sure you are hydrated, warm and rested enough when you dive.

3 Dive respecting your experience and training
It could happen that you dive at depth you are not used to, with strong current, or cold water or with low visibility, therefore, make sure you get properly trained before.

4 Plan your dives and respect the plan
Imagine the potential risks, how to prevent them and deal with them. Agree with your mate the maximum depth and time, direction to keep and signals to use.

5 Check you instruments and have a good safety margin
Depth, current and physical stress influence your air consumption. Be more conservative than the limits established by computers and recreational dives planners.

6 Breath continuously and deeply, relax and enjoy your dives
Should you feel tired or breathlessness, calm down and breath, everything will be all right. You may slowly ascend to the surface if needed. Stress and breathlessness increase your breath rate and can reduce the performance of your regulator.

7 Don't dive you don't feel like doing it
Being able not to dive if is an enviable quality and the best way to avoid problems that you may not feel able to solve

8 Ascend slowly and make the safety stop at 5 metres.
It is the best way to avoid the Decompression Sickness.

9 Wait for 24 hours before flying or going on a mountain after having dived.
It is useful to prevent the Decompression Sickness.

Conversion tables

Length

Metric unit of measure		British unit of measure
1 centimetre	=	0,393 inch
1 meter	=	3,280 feet
Or	=	1,093 yard
Or	=	0, 546 fathom
1 kilometre	=	0,621 statute mile
Or	=	0,539 nautical mile

British unit of measure		Metric unit of measure
1 inch	=	2,54 centimetres
1 foot	=	30,48 centimetres
1 yard	=	0,914 metres
1 pole	=	5,029 metres
1 fathom	=	1,828 metres
1 statute mile	=	1609 metres
1 nautical mile	=	1853 metres

Capacity

Metric unit of measure		British unit of measure
1 cube centimetres	=	0,061 cubic feet
1 cubic metre	=	35,314 cubic feet
Or	=	1,308 cubic yard
1 litre	=	0,035 cubic feet
Or	=	0,220 gallon
Or	=	1,760 pint

British unit of measure		Metric unit of measure
1 cubic inch	=	16,387 cubic centimetres
1 cubic foot	=	0,028 cubic metres
Or	=	28, 317 litres
1 cubic yard	=	0,764 cubic metre
1 pint	=	O,568 litre
1 gallon	=	4,546 litres

Weight

Metric unit of measure		British unit of measure
1 kilogram	=	2,205 pounds
1 ton	=	0,94 long ton
Or	=	2205 pounds

British unit of measure		Metric unit of measure
1 ounce	=	28,349 grams
1 pound	=	453,59 grams
1 long ton	=	1,016 tons
Or	=	1016 kilograms

Pressure

1 PSI (pound x square inch)	=	0,073 kg per cm2
1 kg x cm2	=	14,223 PSI
1 atmosphere	=	14,696 PSI
1 atmosphere	=	1,033 kg x cm2
1 atmosphere	=	1,013 mill bar
1 atmosphere	=	10 metre salt water
1 atmosphere	=	10,33 metre fresh water

Speed

1 kilometre x hour	=	About 5/8 mile x hour
1 metre x second	=	About 3,28 feet x second
1 knot	=	About o,51 metre x second
Or	=	About 1,7 feet x second
1 mile x hour	=	About 1,609 kilometre x hour
1 foot x second	=	About 0,33 metre x second
Or	=	About 2/3 mile x hour

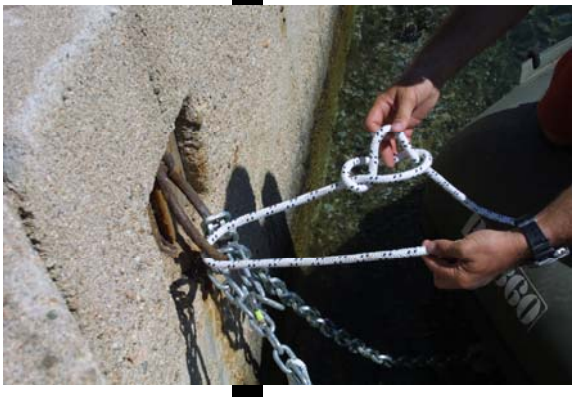
Knots

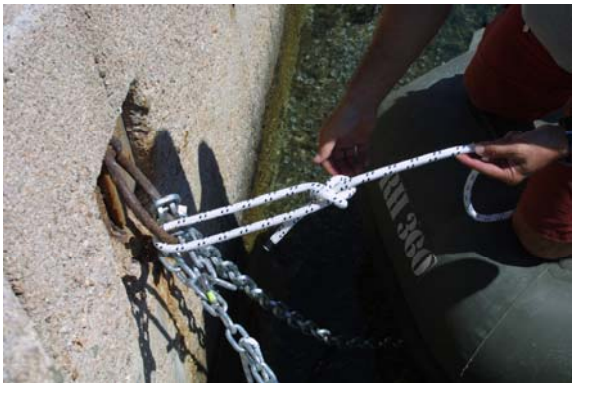
Bowline knot

This know cannot run and can be easily untied even if it was tightened hard.

Bowline knot

Another way to make the bowline knot that can be used with a tensioned line.





Clove hitch

It is a very simple knot that can be easily untied: in the picture, the clove hitch is blocked with a half hitch.

Clove hitch

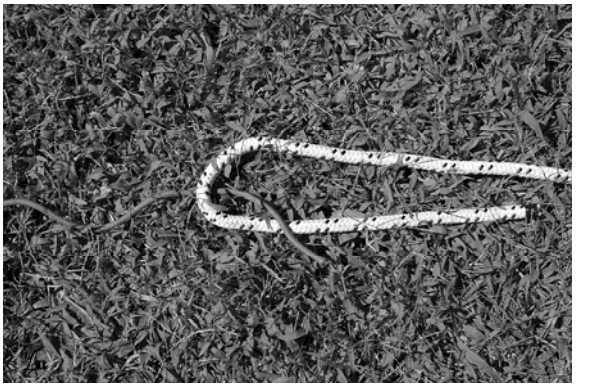
This knot is useful to secure the boat to a bollard: in this case the knot is done using another technique.

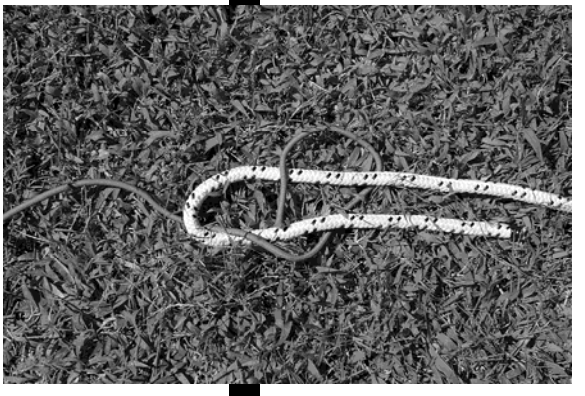
Flat knot

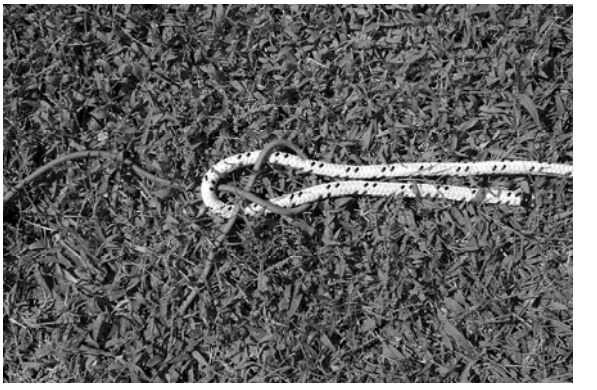
It is useful to join two lines with the same diameter: it can be easily untied after having been tightened hard.

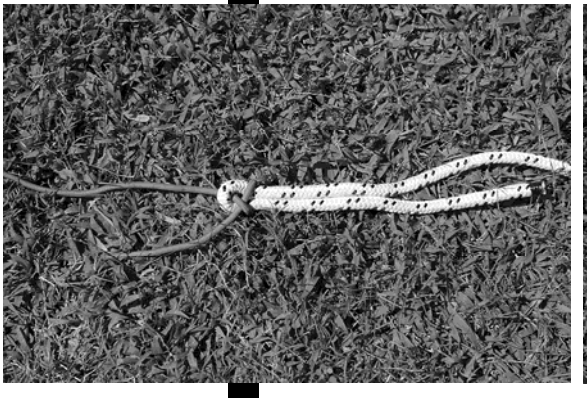
Sheet bend

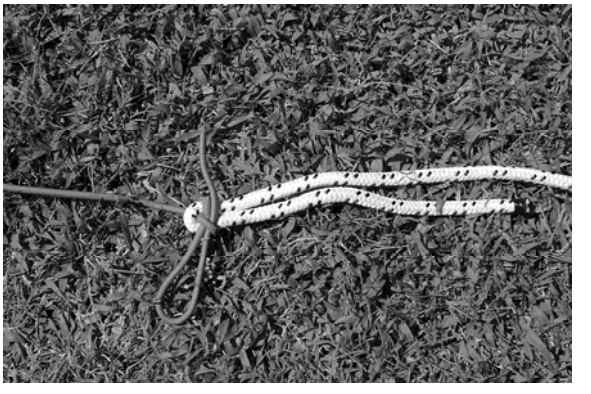
It is a know used to join two lines with different diameter:
it can be secured with a half hitch and can be untied after it was tightened hard (see the last picture)





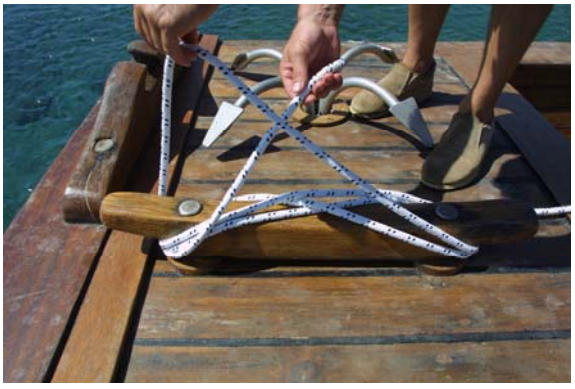






Cleat knot

It is a knot used to secure the mooring lines to cleats on the piers or, as showed in the picture, on the boats.



DIVE TABLES

No-Decompression Limits and Repetitive Group Designation Tables for No-Decompression Air Dives

TABLE 1

Depth mt	Doppler No-Decompression Limit (min.)	Pressure Group A	B	C	D	E	F	G	H	I	J	K
3		60	120	210	300							
4,5		35	70	110	160	225	350					
6		25	50	75	110	135	180	240	325			
7,5	245	20	35	55	75	100	125	160	190	245		
9	205	15	30	45	60	75	95	120	145	170	205	
10, 5	160	5	15	25	40	50	60	80	100	120	140	160
12	130	5	15	25	30	40	50	70	80	100	110	130
15	70		10	15	25	30	40	50	60	70		
18	50		10	15	20	25	30	40	50			
21	40		5	10	15	20	30	35	40			
24	30		5	10	15	20	25	30				
27	25		5	10	12	15	20	25				
30	20		5	7	10	15	20					
33	15			5	10	13	15					
36	10			5	10							
39	5			5								

Terminology of dive tables

Dive graph: schematic representation of the dive with the relevant data, useful to adequately perform the calculations

No-decompression limit: The maximum time you can spend at each depth, to ascend without decompression stops required

No-decompression limit for consecutive dive: the maximum time that you can spend at each depth, during consecutive dive, without having to make mandatory decompression stops

Bottom time: the time that elapses between the beginning of the true descent and the beginning of the true ascent

Ascent speed: maximum speed allowed to ascend on surface safely

Surface Interval: the time spent on the surface between dives

Consecutive dives: dive performed within 12 hours after the previous

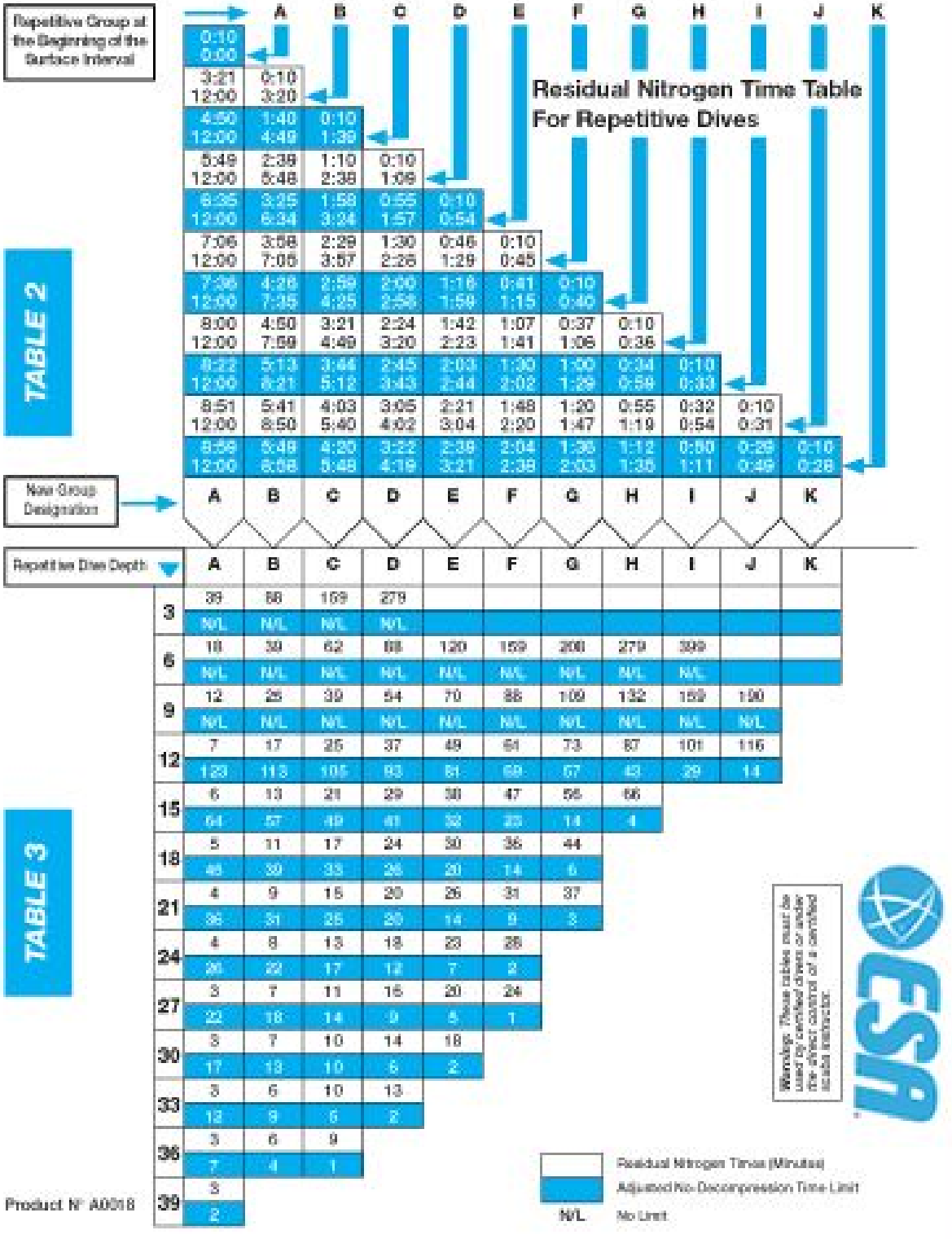
Group: letter of the alphabet that represents the amount of nitrogen present in the body even after dive and after the range of surface

Residual nitrogen in minutes: used to calculate the consecutive dive, its value must be added to the time actually spent in dive

Total time of immersion: in consecutive dives, the sum of the actual bottom time and the residual nitrogen in minutes

Safety Stop: stop 3 minutes to 5 meters deep as a precaution, it is not mandatory but recommended by all the field's experts

Mandatory decompression stops: you must make it when you exceed the limit of not decompression, depths and times are listed in the table or in the computer.


Repetitive Group at the Beginning of the Surface Interval
A B C D E F G H I J K
Residual Nitrogen Time Table For Repetitive Dives
TABLE 2
0:10 0:00
3:21 12:00 | 0:10 3:20
4:50 12:00 | 1:40 4:49 | 0:10 1:39
5:49 12:00 | 2:39 5:48 | 1:10 2:38 | 0:10 1:09
6:35 12:00 | 3:25 6:34 | 1:58 3:24 | 0:55 1:57 | 0:10 0:54
7:06 12:00 | 3:56 7:05 | 2:29 3:57 | 1:30 2:26 | 0:46 1:29 | 0:10 0:45
7:36 12:00 | 4:26 7:35 | 2:59 4:25 | 2:00 2:58 | 1:16 1:59 | 0:41 1:15 | 0:10 0:40
8:00 12:00 | 4:50 7:59 | 3:21 4:49 | 2:24 3:20 | 1:42 2:23 | 1:07 1:41 | 0:37 1:06 | 0:10 0:36
8:22 12:00 | 5:13 8:21 | 3:44 5:12 | 2:45 3:43 | 2:03 2:44 | 1:30 2:02 | 1:00 1:29 | 0:34 0:59 | 0:10 0:33
8:51 12:00 | 5:41 8:50 | 4:03 5:40 | 3:05 4:02 | 2:21 3:04 | 1:48 2:20 | 1:20 1:47 | 0:55 1:19 | 0:32 0:54 | 0:10 0:31
8:56 12:00 | 5:48 8:55 | 4:20 5:48 | 3:22 4:19 | 2:39 3:21 | 2:04 2:39 | 1:36 2:03 | 1:12 1:35 | 0:50 1:11 | 0:28 0:49 | 0:10 0:28
New Group Designation
A B C D E F G H I J K
Repetitive Dive Depth
A B C D E F G H I J K
3
39 88 109 279
N/L N/L N/L N/L
6
18 39 62 88 120 159 208 279 339
N/L N/L N/L N/L N/L N/L N/L N/L N/L
9
12 25 39 54 70 88 109 132 159 190
N/L N/L N/L N/L N/L N/L N/L N/L N/L N/L
12
7 17 25 37 49 61 73 87 101 116
123 113 105 93 81 69 57 43 29 14
15
6 13 21 29 38 47 56 66
64 57 49 41 32 23 14 4
18
5 11 17 24 30 36 44
46 39 33 26 20 14 6
21
4 9 15 20 26 31 37
36 31 25 20 14 9 3
24
4 8 13 18 23 28
26 22 17 12 7 2
27
3 7 11 16 20 24
22 18 14 9 5 1
30
3 7 10 14 18
17 13 10 6 2
33
3 6 10 13
12 9 6 2
36
3 6 9
7 4 1
39
3
2
TABLE 3
Warning: These tables must be used by certified divers or under the direct control of a certified scuba instructor.
ESA
Residual Nitrogen Times (Minutes)
Adjusted No-Decompression Time Limit
N/L No Limit
Product N° A0018

How to plan a dive

Generic planning

Dive mate
Date and time of the dive
Purpose
Chosen place
Alternative place
Route to get to the place
Appointment: place and time
Specific equipment
Check the weather forecast
Check and recharge the cylinders
Check and prepare the equipment
Tools and spare parts
Complete ballast
Bag
Means of transport
Information on the site
Emergency contacts
Information for those who remain on the shore/boat
Food and beverages
Reservations/tickets
Money

Planning at the dive site

Psychophysical conditions
Weather/sea conditions
Suitable environmental conditions
Localise and check the communication means
Decide entry point and technique
Decide exit point and technique
Dive mate
Communicating underwater
Path
Depth and time limit
Emergency procedure
Check the equipment
In case of need, please contact: _____
_____
_____
_____

Not to be left at home

Miscellaneous

- ID's
- Dive cert.
- Log Book
- Reservations/tickets
- Emergency contact numbers
- and info
- Swimming suit
- Sun screen
- Sun glasses
- Hat or cap
- Wind breaker
- Towel
- Flip flops
- Swimming cap and goggles
- Spare clothing
- Food and drinks
- Medicines

Equipment

- Kit bag
- Mask snorkel and fins
- Wet or dry suit
- Under suit
- Hood
- Gloves
- Boots
- Weight belt
- BCD
- Cylinder (filled)
- Primary DV
- Spare DV
- Content gauge
- BCD inflation hose
- Suit inflation hose
- Dive knife

Instruments

- Computer
- Integrated console
- Depth gauge
- Timer
- Compass
- Thermometer
- Dive tables

Accessories

- Dive slate
- Marine life identification cards
- Pencil
- Diver marker buoy
- Surface signalling device
- Reel
- Primary torch
- Spare torch
- Strobe light
- Chemical/fluorescent light
- Karabiners
- Anti fog spray
- Equipment lanyard

Spare gear

- O-rings
- Cylinders
- Weights
- Straps
- Tools
- Suit repair kit

Special equipment

- Underwater camera
- Lenses
- Flash
- Film
- Video camera
- Housing
- Tapes
- Video lights
- Batteries
- Battery charger
- Wiring and connectors

Notes

_____
_____
_____
_____
_____
_____
_____

DIVER DICTIONARY					
English	Italian	German	French	Spanish	Russian
scuba	A.R.A	Taucher	auto respirateur	escafandra autònoma	скуба\акваланг
diving gear	attrezzatura subacquea	Tauchausrustung	équipement de plongée	equipo de buceo	снаряжение для дайвинга
snorkel	boccaglio	Schnorchel	tuba	tubo/snorkel	трубка\сноркель
cylinder/tank	bombola	Tauchflasche	bouteille	botella	баллон
full cylinder/tank	bombola piena	Tauchflasche gefüllt	bouteille pleine	botella llena	полный баллон
empty cylinder	bombola vuota	Tauchflasche leer	bouteille vide	botella vacia	пустой баллон
weight-belt	cintura dei piombi	Bleigurt	ceinture	sistema de lastre	грузовой пояс
computer	computer	Computer	ordinateur	computador de buceo	компьютер
regulator/Demand Valve	erogatore	Atemregler	détendeur	regulador	регулятор
BCD	GAV	Tarierweste	gilet	chaleco	BCD
gloves	guanti	Handschuhe	gants	guantes	перчатки
pressure gauge	manometro	Finimeter	manomètre sous marin	manometro sumergible	манометр
mask	maschera	Maske	masque	mascara	маска
wetsuit	muta	Naßtauchanzung	combinaison	traje de buceo	костюм для дайвинга
timer	orologio	Uhr	montre	reloj	таймер
fins	pinne	Flossen	palmes	aletas	Ласты
weights	piombi	Bleigewichte	plombs	lastre	груза
first stage	primo stadio	ehrte Stufe	premier étage	primera etapa	первая ступень
depth gauge	profondimetro	Tiefenmesser	profondimètre	profundimetro	глубиномер
second stage	secondo stadio	zweite Stufe	deuxième étage	segunda etapa	вторая ступень
shore dive	immersione da terra	Tauchgang vom Land	au plongée de la plage	inmersiòn desde palya	дайвинг с берега
boat dive	immersione dalla barca	Tauchgang vom boot	plongée du bateau	inmersiòn desde barco	погружения с корабля
deep dive	immersione profonda	Tieftauchgang	plongée profonde	inmersiònprofunda	глубоководное погружение
no-deco dive	immersione in curva	Tauchgang ohne	plongée sans étape	inmersiòn sin descompresiòn	недекомпрессионный дайв
diving card	brevetto	Brevet / Tauchschein	brevet de plongée	certificatiòn	сертификат
to fill the tank	caricare le bombole	Füllen der Tauchflaschen	charger les bouteilles	cargar las botellas	заправлять баллон
air is not good	aria cattiva	verunreinigte	Luft air polluée	aire contaminado	загрязненный воздух
strong current	corrente forte	starke Strömung	courant fort	corriente fuerte	сильное течение
feeble current	corrente debole	schwache Strömung	courant faible	corriente debil	слабое течение
high tide	alta marea	Flut	marée haute	alta marea	прилив
low tide	bassa marea	Ebbe	marée basse	baja marea	отлив
waves	onde	Wellen	vagues	olas	Волны
surface	superficie	Oberflache	surface	superficie	поверхность
maximum depth	profondità massima	Maximaltiefe	profondeur maximale	profundidad maxima	максимальная глубина
mean depth	profondità media	mittlere Tiefe	profondeur moyenne	profundidad media	средняя глубина
deco stop	sosta di decompressione	Sicherheitsstop	étape de décompression	parada de descompresion	декомпрессионная остановка
ascent	risalita	Aufstieg/Auftauchen	remontée	ascenso	всплытие
visibility	visibilità	Sicht	visibilité	visibilidad	видимость
surface interval	intervallo di superficie	Oberflachenpause	intervalle de surface	intervalo de superficie	поверхностный интервал
I'm distress	sono in affanno	dich bin außer Atem	je suis en essoufflement	sufro agotamiento/jadeo	сбитое дыхание
my tank is empty	la mia bombola è vuota	meine Tauchflasche ist leer	ma bouteille est vide	mi tanque es vacio	мой баллон пуст
I'm sea sick	ho il mar di mare	ich bin seekrank	j'ai le mal de mer	tengo/sufro mareo	у меня морская болезнь
I have a cramp	ho un crampo	ich habe einen Krampf	j'ai une crampe	tengo calambre	судорога

Look ahead...

ecodiver
instructor
photo diver instructor
oxygen first aid instructor
first aid instructor
assistant instructor
open water instructor

...new adventures are expecting you!

Look ahead...

...new adventures

are expecting you!

www.esaweb.net

MD007