Training Standards

Version 4.0 2015

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Instructor responsibility

The instructor is responsible for the student's safety during training.

It is an instructor's responsibility to abort a dive or cancel a dive completely if a student's safety is at risk.

The instructor should be completely sure that the student is aware of the risks involved in diving and the importance of continuing to practice after completing the course.

The instructor must follow the training standards established by SwedTech Diving.

It is an instructor's responsibility not to certify a student who has not fulfilled the criteria for certification. However, it is also an instructor's responsibility to do his/her best in order to create best possible conditions for the student to reach certification.

Instructor prerequisites

Prerequisites Scuba Diver Instructor

In order to become SwedTech Diving Scuba Diver Instructor, the student must:

- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Diving Scuba Diver Instructor-course
- Have logged at least 200 dives in varying environments
- Have insurance that covers him/herself and his/her students
- Paid the registration fee to SwedTech Diving

Prerequisites Extended Basic Skills Instructor

In order to become SwedTech Diving Extended Basic Skills Instructor, the student must:

- Have the level of certification corresponding to at least SwedTech Diving Technical Diver
- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Diving Extended Basic Skills Instructor-course
- Have logged at least 40 dives on Technical Diver level
- Paid the registration fee to SwedTech Diving

Prerequisites Technical Diver Instructor

In order to become SwedTech Diving Technical Diver Instructor, the student must:

- Have the level of certification corresponding to at least SwedTech Diving Extended Range Technical Diver
- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Diving Technical Diver Instructor-course
- Have logged at least 30 dives at Technical Diver level
- Have taught at least 3 Extended Basic Skills-courses
- Paid the registration fee to SwedTech Diving

Prerequisites Extended Range Technical Diver Instructor

In order to become SwedTech Diving Extended Range Technical Diver Instructor, the student must:

- Have the level of certification corresponding to at least SwedTech Diving Extended Range Technical Diver
- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Diving Extended Range Technical Diver Instructor-course
- Have logged at least 50 dives at Technical Diver level
- Have logged at least 30 dives at Extended Range Technical Diver level
- Have taught at least 3 Extended Basic Skills-courses
- Have taught at least 3 Technical Diver-courses
- Paid the registration fee to SwedTech Diving

Prerequisites Wreck Diver Instructor

In order to become SwedTech Diving Wreck Diver Instructor, the student must:

- Have the level of certification corresponding to at least SwedTech Diving Technical Diver (Extended Range Technical Diver if the depth during the course exceeds 40m) and Wreck Diver
- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Wreck Diver Instructor-course
- Have logged at least 40 dives at Wreck Diver level
- Have logged at least 20 dives at Technical Diver level
- Have logged at least 10 dives at Extended Range Technical Diver level if the depth during the course exceeds 40m
- Have taught at least 3 Extended Basic Skills-courses
- Paid the registration fee to SwedTech Diving

Prerequisites Troglodiver Instructor

In order to become SwedTech Diving Troglodiver Instructor, the student must:

- Have the level of certification corresponding to at least SwedTech Diving Extended Range Technical Diver
- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Diving Troglodiver Instructor-course
- Have logged at least 50 dives at Troglodiver level
- Have logged at least 20 dives at Extended Range Technical Diver level
- Have taught at least 3 Extended Basic Skills-courses
- Paid the registration fee to SwedTech Diving

Prerequisites Rebreather Diver Instructor

In order to become SwedTech Diving Rebreather Diver Instructor, the student must:

- Have the level of certification corresponding to at least SwedTech Diving Extended Range Technical Diver
- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Diving Rebreather Diver Instructor-course
- Have logged at least 30 dives at Technical Rebreather Diver level
- Have logged at least 20 dives at Extended Range Technical Diver level
- Have taught at least 3 Extended Basic Skills-courses
- Paid the registration fee to SwedTech Diving

Prerequisites Technical Rebreather Diver Instructor

In order to become SwedTech Diving Technical Rebreather Instructor, Diver the student must:

- Have the level of certification corresponding to at least SwedTech Diving Extended Range Technical Diver
- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Diving Technical Rebreather Diver Instructor-course
- Have logged at least 50 dives at Technical Rebreather Diver level
- Have logged at least 20 dives at Extended Range Technical Diver level
- Have taught at least 3 Extended Basic Skills-courses
- Have taught at least 3 Rebreather Diver-courses
- Paid the registration fee to SwedTech Diving

Prerequisites Good Samaritan Instructor

In order to become SwedTech Diving Good Samaritan Instructor, the student must:

- Have the level of certification corresponding to at least SwedTech Diving Scuba Diver
- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Diving Good Samaritan Instructor-course
- Paid the registration fee to SwedTech Diving

Prerequisites Mixed Gas Blender Instructor

In order to become SwedTech Diving Mixed Gas Blender Instructor, the student must:

- Have the level of certification corresponding to at least SwedTech Diving Technical Diver
- Be at least 20 years old
- Be in excellent health
- Successfully completed a SwedTech Diving Mixed Gas Blender Instructor-course
- Paid the registration fee to SwedTech Diving

Scuba Diver

Goal with the course

Scuba Diver is a course in recreational diving where the goal is to give the student the ability to plan and execute dives in open water to a maximum depth of 30m using air or Nitrox as breathing gas.

After passing the course, the student is able to:

- On his own, be able to assemble, adjust and configure his equipment
- On the surface, together with his team, be able to perform the drills included in a safety drill before the dive
- Be able to clear water from their mask
- Be able to, lay still in horizontal position without varying more than +/- 1m in depth, using the bottom floor as visual reference or in an ascent with a shot line as visual reference
- Master frogkick with various power
- Master flutterkick with various power
- Master helicopter turn
- Master backwards swimming at least 2 meters
- Perform descents and ascents in such a way that the student can get attention from the other divers in the team with ease
- Be able to pause or stop entirely a descent without touching the bottom floor or other reference
- Be able to pause or stop entirely an ascent within 2 meters without touching any kind of reference
- Understand and use the standardized hand, light and touch signals appropriately
- Be able to solve a free flowing drysuit inflator
- Be able to solve a free flowing wing inflator
- Be able to solve a free flowing regulator
- Understand how to calculate your gas usage by doing a gas usage dive
- Be able to calculate the minimum gas needed for a dive including reserves and pay attention to gas usage

- Understand the need for reserve gas and be able to calculate the minimum gas pressure
- Follow the procedures for gas sharing while swimming at least 25 meters following a line as reference, both as receiver and donor. Without varying more than +/- 1 meter in depth
- During ascent, perform gas sharing with a safety stop, both as receiver and donor
- Perform an ascent with at least two stops, without varying more than +/- 1 meter in depth during the stops, keep run times and recommended ascent rate
- Be able to deploy an SMB within 5 minutes
- Rescue a simulated unconscious diver from 6 meters depth and tow them 25 meters
- Analyse the breathing gas before use and calculate the maximum operating depth
- With a compass be able to take a bearing, swim 25 meters, take the reverse bearing and be able to return to the stating position without deviating more than 5 meters
- Be able to understand and use the benefits of diving in a well functioning team
- Swim 15 meters with no mask with the help of touch contacts from another diver
- Master at least two ways to entry the water
- At the surface be able to remove and put on the scuba gear

Course outlines

- The student should have at least 10 hours of dive training in a pool or in pool like environment
- The student should have at least 10 hours of theory and briefings
- The student should have at least a total of 4 hours of dive time in open water. Two of these should be to a depth of at least 20 meters and maximum 30 meters

Course limits

- Maximum depth during the course is 30 meters
- Maximum PO2 during the course is 1.4 bar

- No diving is undertaken in an overhead environment
- Maximum three students per instructor during the practical training in the water

Prerequisites

- The student must be at least 18 years old
- The student must have completed a written SwedTech Diving health declaration
- The student must be able to swim at least 200m without interruption

See appendix for Scuba Diver, Equipment configuration, theory and practical skills.

Extended Basic Skills

Goal with the course

The main goal of the SwedTech Diving Extended Basic Skills course is to prepare the students for technical diving. The course creates very good ground for the student to enter and pass a course in technical diving.

This course also offers an opportunity for divers, who want to gain a deeper knowledge and understanding of diving theory, diving skills and equipment configuration. By completing the course they will improve diving safety, level of insight and their own confidence.

After passing the course, the student is able to:

- Configure and use equipment for technical diving according to SwedTech Diving equipment configuration
- Handle and use an extra stage cylinder with bottom gas
- Plan and execute dives with Nitrox as a bottom mix
- Plan dives that require Nitrox or Oxygen for accelerated decompression
- Plan dives that require helium-based bottom mixes for lower equivalent narcotic depth
- Understand and plan overhead dives, both in physical overhead environments and with decompression stops which create an artificial ceiling
- Solve the common equipment problems which can arise when diving with technical diving equipment
- Solve a problem of gas loss and prevent a serious gas loss
- Use several different swimming techniques to manoeuvre forward, backward and during turns
- Show excellent buoyancy control, both during the bottom phase of the dives and during the ascent
- Understand and use the advantages of diving in a well-balanced team

Course outlines

The course consist of four parts, withthe deep dive as an extra.

- Theory

- Problem solving and team diving
- Handling a stage cylinder
- Deep dive

The course can be divided in to four separate parts or be taught as one course. To reach certification for Extended Basic Skills all parts except the deep dive must be finished. If all four parts, including the deep dive, the student will be certified as Extended Basic Skills +.

The course can be done using single cylinder, twinset or rebreather.

The student should have at least 10 hours of practical dive training in the water.

The student should have at least 10 hours of theory and briefings.

The course can be taught in ocean, sea or sea like environment.

Limits

- Maximum depth during dive two and three is 30 meters
- Maximum depth during dive four is 40 meters
- Maximum PO2 is 1.4 bar
- Maximum END 30 meters
- No physical overhead diving
- Maximum three students per instructor during the practical training in the water

Prerequisites

- The student must be at least 18 years old
- The student must be certified as SwedTech Scuba Diver or equivalent
- The student must have proof of at least 50 dives
- The student must be in excellent health

See appendix for equipment configuration and practical exercises.

Technical Diver

Goal with the course

Technical Diver course gives the students an opportunity to reach targets outside of the scope of traditional recreational diving. Here, the skills that the students have learned in the Extended Basic Skills course will be used in realistic training scenarios.

The students learn how to plan and conduct dives with helium-based bottom mixes and accelerated decompression using Nitrox or Oxygen.

After passing the course, the student is able to:

- Configure and use equipment for technical diving according to SwedTech Diving equipment configuration
- Plan and conduct dives that require Trimix, Nitrox or Oxygen for accelerated decompression
- Plan and conduct dives that require normoxic helium-based bottom mixes for lower equivalent narcotic depth
- Understand and plan overhead dives, both in physical overhead environment and with decompression stops which create artificial ceilings
- Solve multiple equipment problems which can occur when diving with technical diving equipment
- Solve problems during diving using backup plans
- Solve a problem of gas loss and prevent a serious gas loss
- Simultaneously use several different swimming techniques to manoeuvre forward, backward and during turns
- Show excellent buoyancy control, both during the bottom phase of the dives and during the ascent
- Understand and use the advantages of diving in a well-balanced team
- The use of more than two stage cylinders

Course outlines

- The student should have at least 12 hours of dive training in the water

- The course can be taught in ocean, sea or sea like environment
- At least two of the dives should be to a depth of between 45-60 meters
- The student should have at least 10 hours of theory and briefings

Limits

- Maximum PO2 for bottom gases is 1.4 bar
- Maximum PO2 for decompression gases are 1.6 bar
- Maximum Equivalent Narcotic Depth (END) during the course is 30 meters
- Maximum depth during the course is 60 meters
- Maximum three students per instructor during the practical training in the water

Prerequisites

- The student must be at least 18 years old
- The student must be in excellent health
- Have passed the Extended Basic Skills course
- Have a proof of at least 100 dives in various environments, at least 20 of them should be to around 30 meters
- Have made at least 50 dives with the equipment used on the course (excl. the deco cylinder)
- Use several different swimming techniques to manoeuvre forward, backward and during turns
- Show excellent buoyancy control, both during the bottom phase of the dives and during the ascents. Be able to hold a stop for at least 20 minutes without deviating with more than one meter from the target depth

See appendix for equipment configuration and practical exercises.

Extended Range Technical Diver

Goal with the course

Extended Range Technical Diver gives the student the ability to reach the dive sites that requires you to go deeper or require longer bottom times than those who are within the limits of Technical Diver.

After passing the course, the student is able to:

- Configure and use equipment for technical diving according to SwedTech Diving equipment configuration
- Plan and conduct dives that require Trimix, Nitrox or Oxygen for accelerated decompression
- Plan and conduct dives that require hypoxic helium-based bottom mixes for lower equivalent narcotic depth
- Understand and plan overhead dives, both in physical overhead environment and with decompression stops which create artificial ceilings
- Solve multiple equipment problems which can occur when diving with technical diving equipment
- Solve problems during diving using backup plans
- Solve a problem of gas loss and prevent a serious gas loss
- Simultaneously use several different swimming techniques to manoeuvre forward, backward and during turns
- Understand and use the advantages of diving in a well-balanced team

Course outlines

- The student should have at least 10 hours of dive training in the water
- The course can be taught in ocean, sea or sea like environment
- At least two of the dives should be to a depth of between 70-90 meters
- The student should have at least 10 hours of theory and briefings

Limits

- Maximum PO2 for bottom gases is 1.4 bar
- Maximum PO2 for decompression gases are 1.6 bar
- Maximum Equivalent Narcotic Depth (END) during the course is 30 meters
- Maximum depth during the course is 90 meters
- Maximum three students per instructor during the practical training in the water

Prerequisites

- The student must be at least 20 years old
- The student must be in excellent health
- Have passed the Technical Diver course or equivalent with other organisation
- Have proof of at least 30 dives at Technical Diver level

See appendix for equipment configuration and practical exercises.

Wreck Diver

Goal with the course

Swimming techniques and buoyancy will be improved during the course. Mastering of buoyancy and swimming techniques is a prerequisite to dive and penetrate wrecks. The students improve their knowledge in the use of lights and light signals, laying line and communicating without a reference as well as equipment configuration and streamlining of equipment.

The course will be adapted to the student's previous education level

After passing the course, the student is able to:

- Configure and use equipment for technical diving according to SwedTech Diving equipment configuration
- Plan and conduct non-decompression penetration dives with air or nitrox as bottom gases
- Understand and plan overhead dives, both in physical overhead environment and with decompression stops which create artificial ceilings
- Solve multiple equipment problems which can come up when diving with technical diving equipment
- Solve problems during diving using back-up plans
- Solve a problem of gas loss and prevent a serious gas loss
- Solve problems without having a reference such as in a total darkness or silt-out situation
- Simultaneously use several different swimming techniques to manoeuvre forward, backward and during turns
- Show excellent buoyancy control, both during the bottom phase of the dives and during the ascent
- Understand and use the advantages of diving in a well-balanced team
- Orientation on a wreck

Course outlines

- The student should have at least 10 hours of dive training in the water

- The course must be taught on wrecks in an ocean or sea
- The student should have at least 10 hours of theory and briefings
- the course could be taught using single cylinder, twinset or rebreather

Limits

- Maximum PO2 for bottom gases is 1.4 bar
- Maximum PO2 for decompression gases are 1.6 bar
- Maximum Equivalent Narcotic Depth (END) during the course is 30 meters
- Maximum three students per instructor during the practical training in the water

Prerequisites

- The student must be at least 18 years old
- The student must be in excellent health
- Have passed the Extended Basic Skills course or equivalent with other organisation
- Have a proof of at least 100 dives in various environments, at least 20 of them should be to around 30 meters
- Have made at least 50 dives with the equipment used on the course (excl. the deco cylinder)
- Use several different swimming techniques to manoeuvre forward, backward and during turns
- Show excellent buoyancy control, both during the bottom phase of the dives and during the ascents

See appendix for equipment configuration and practical exercises.

Rebreather Diver

Goal with the course

Rebreather Diver gives the student the basic knowledge and understanding in diving with a closed circuit rebreather.

Here you will use the skills you've gained on you Extended Basic Skills course or higher in realistic training scenarios made for closed circuit rebreather.

The student will learn how to plan and perform dives within no decompression limits using air as diluent gas.

After passing the course, the student is able to:

- Configure and use equipment for diving using a closed circuit rebreather according to SwedTech Diving equipment configuration
- Plan and conduct non-decompression dives to a maximum of 30m using air as diluent gas
- Using one bailout stage cylinder with air or Nitrox
- Understand and plan for the risks of diving with a closed circuit rebreather
- Solve equipment problems which can come up when diving with a closed circuit rebreather
- Solve problems during diving using back-up plans
- Solve a problem of gas loss and prevent a serious gas loss
- Simultaneously use several different swimming techniques to manoeuvre forward, backward and during turns
- Show excellent buoyancy control, both during the bottom phase of the dives and during the ascent
- Understand and use the advantages of diving in a well-balanced team

Course outlines

- The student should have at least 12 hours of dive training in the water
- The course can be taught in ocean, sea or sea like environment

- At least four of the dives should be to a depth of between 20-30 meters
- The student should have at least 10 hours of theory and briefings

Limits

- Maximum PO2 during the dive on the course is 1.4 bar, recommended PO2 is 1.2 bar. Maximum PO2 at 6 meters is 1.6 bar.
- Maximum Equivalent Narcotic Depth (END) during the course is 30 meters
- Maximum depth during the course is 30 meters
- Maximum three students per instructor during the practical training in the water

Prerequisites

- The student must be at least 20 years old
- The student must be in excellent health
- Have passed the Extended Basic Skills course or equivalent with other organisation
- Have a proof of at least 200 dives in various environments.
- Use several different swimming techniques to manoeuvre forward, backward and during turns
- Show excellent buoyancy control, both during the bottom phase of the dives and during the ascents.

See appendix for rebreather equipment configuration and practical exercises.

Technical Rebreather Diver

Goal with the course

During the Technical Rebreather Diver course the student will build on and further develop his knowledge in diving with a closed circuit rebreather.

The skills are practised under realistic, scenario based training adapted to diving with a closed circuit rebreather.

The student will learn to plan and perform dives with decompression using Trimix to a depth of maximum 60 meters.

After passing the course, the student is able to:

- Configure and use equipment for diving using a closed circuit rebreather according to SwedTech Diving equipment configuration
- Plan and conduct decompression dives to a maximum of 60m using Trimix as diluent gas
- Using –2-3 bailout stage cylinders with air, Nitrox or Trimix
- Understand and plan for the risks of diving with a closed circuit rebreather
- Solve equipment problems which can come up when diving with a closed circuit rebreather
- Solve problems during diving using back-up plans
- Solve a problem of gas loss and prevent a serious gas loss
- Simultaneously use several different swimming techniques to manoeuvre forward, backward and during turns
- Show excellent buoyancy control, both during the bottom phase of the dives and during the ascent
- Understand and use the advantages of diving in a well-balanced team

Course outlines

- The student should have at least 8 hours of dive training in the water
- The course can be taught in ocean, sea or sea like environment

- At least two of the dives should be to a depth of between 45-60 meters
- The student should have at least 10 hours of theory and briefings

Limits

- Maximum PO2 during the dive on the course is 1.4 bar, recommended PO2 is 1.2 bar. Maximum PO2 at 6 meters is 1.6 bar.
- Maximum Equivalent Narcotic Depth (END) during the course is 30 meters
- Maximum depth during the course is 60 meters
- Maximum three students per instructor during the practical training in the water

Prerequisites

- The student must be at least 20 years old
- The student must be in excellent health
- Have passed the SwedTech Diving Rebreather Diver course or equivalent with other organisation
- Have proof of at least 50 dives using a closed circuit rebreather in various environments
- Use several different swimming techniques to manoeuvre forward, backward and during turns
- Show excellent buoyancy control, both during the bottom phase of the dives and during the ascents

See appendix for rebreather equipment configuration and practical exercises.

Troglodiver

Troglodyte (Latin troglodyta, from Greek τρωγλοδύτης troglodytes, 'Cave dweller, one who lives in a cave) according to Wikipedia 'a human who lives in a cave'. – A now also a well educated cave diver.

Goal with the course

This course is created to give you, the student, the ability together with your team, to be able to safely dive cave like environments such as caves and mines.

Troglodiver is developed under Scandinavian conditions where techniques and procedures from the start are adapted for cave like diving in water temperatures around 3°C with the obligatory equipment this kind of dive requires. During 12 days we build on the experience you already have from your Extended Basic Skills course. You learn how to plan and perform dives in cave like conditions with Nitrox or air as bottom gas and we dive with a bottom stage from the first day of the course.

Even though the course is created for complex cold water diving, it gives you essential knowledge to experience similar diving in warmer waters. You get the theoretical knowledge concerning cave like environments and practical experience from at least a cave or a mine.

After passing the course, the student is able to:

- Explain the importance of preserving the cave like environment
- Configure and use equipment for diving using technical diving equipment according to SwedTech Diving equipment configuration
- Prevent and solve equipment related issues such as entanglement and equipment failures
- Plan and perform dives with no decompression limits
- Solve problems regarding loss of gas and prevent greater loss of gas

- Multiple problem solving with the most common failures that can occur during a dive with equipment for technical diving
- Be able to calculate and dive using turn point on time and pressure

- Make complex navigation decisions without have a visual reference
- Be well aware of the risks concerning diving with a over head environment
- Be able to predict and prevent a dives potential risks so a real problem don't occur
- Use a stage with bottom gas as safety, gas logistics or to prolong the penetration
- Plan and perform dives consisting of; linear in and out navigation, navigation over a three way crossing and closing a jump
- Towing a paralysed diver
- Collect line data

Course outlines

- The course can be run as an intensive course or split up in smaller segments after agreement with the students and the instructor
- The course will take a minimum of 12 days with at least 15 hours in the water where as 20 dives must be in overhead condition
- The course is concluded with two dives for evaluation of theoretical and practical skills

Limits

- Maximum PO2 for bottom gases are 1.4 bar
- Maximum Equivalent Narcotic Depth (END) during the course is 30 meters
- Maximum depth during the course is 30 meters
- Maximum three students per instructor during the practical training in the water
- Maximum three navigational decisions during the course
- Minimum 2600 litres gas at the start of cave like dive

Prerequisites

- The student must be at least 20 years old
- The student must be in excellent health

- Have passed the Extended Basic Skills course or equivalent with other organisation
- Have proof of at least 75 dives at Extended Basic Skills level

See appendix for equipment configuration, practical exercises and Troglodiver.

Mixed Gas Blender

Goal with the course

After completing the course the student will have good knowledge regarding the gases characteristics, how to mix different gases and how to adapt your diving equipment for use with pure oxygen. The course allows the student to fill and mix gas on their own and to inspect and adapt their equipment for use with oxygen that they have the qualifications to service.

After passing the course, the student is able to:

- Independantly be able to assess the diving equipments suitability for use with pure oxygen
- Independantly inspect and adapt equipment for use with oxygen that they have qualifications to service
- Independantly plan and perform all types of gas fills according to the partial filling method

Theoretical skills

- Gases and gas laws
- Different breathing gases contents (Nitrox, Trimix, Heliair)
- Industry Standards and practices
- Common materials and their compatibility with oxygen
- Understand different kind of gas filling facilities
- Calculate different gas mixes

Practical skills

- Inspection and oxygen filling
- How to operate different kinds of gas filling facilities
- Filling using partial pressure, different kinds of breathing gases

Course outlines

The course is usually held over a whole day, alternatively it can be held over multiple occasions after an agreement with the instructor.
Normally the course takes 8 hours with four students, of this time about 50% is spent with practical exercises in a workshop environment,

where the students will perform oxygen filling, analysing, inspection and filling of different breathing gases.

Prerequisites

- 18 year old and diver

Good Samaritan

Goal with the course

The student should be able to handle and perform practical situations concerning L-ABC by using check lists.

The student should also able to perform CPR and to use an AED (Automatic External Defibrillator) according to AHA, ERC and ILCOR, and be able to perform the routines to clear blocked airways and stable recovery position.

After passing the course, the student is able to:

Handle an emergency according to:

- L - Life threatening situation
- A - Airways
- B - Bleeding
- C – Circulatory system / Shock

After passing the course, the student should have knowledge about:

- Laws and rules
- Health
- Diseases
- Incidents
- Maritime hazards
- Oxygen treatment
- Pressure and decompression related injuries

Prerequisites

- 15 years old

Appendix: Equipment configuration - Scuba Diver

Equipment consisting of back plate, single wing and harness without weak points. A D-ring should be mounted on both chest straps at the same height as the collar bone and one D-ring should be mounted on the left waist strap by the centre line of the body, by the hip bone. The wing should be equipped with a low pressure inflator and dump valve on the left side of the wing, lower front.

Single cylinder with a capacity of at least 2000 litres of gas.

Suit made for the current temperature conditions.

Fins with good force are recommended.

Regulator with a longhose to the primary second stage. A clip should be attached on the longhose, close to the second stage with nylon string. On the secondary second stage a bungee is attached with the same cable tie that holds the mouth piece. This makes the second stage work as a necklace. High pressure hose with SPG and clip attached with nylon string. Low pressure hose to wing inflator and dry suit (if used).

An instrument to show at least time and depth mounted on the right arm.

A compass mounted on the left arm.

Appendix:
Theory – Scuba Diver

- Gases and gas laws
- Divers physiology
- Diving physics
- Equipment knowledge
- Dive planning
- Nitrox
- Helium based gas mixes
- Decompression theories

The theory should at least be equal to the contents of the course book "The Basic Skills of Scuba Diving" by Michael Bergström.

The instructor is encouraged to add relevant theory.

Appendix: Practical skills – Scuba Diver

1. Regulator purge and switch to backup regulator

Exercise 1.1, regulator out/in

- Grab the primary first stage hose with the left hand, close to the second stage
- Take the regulator out of your mouth with the mouthpiece pointing downwards
- Put the regulator back in your mouth and drain it from water it by blowing into it
- Repeat the exercise the same way but use the purge button on the second stage to drain the water

Exercise 1.2, change regulator

- Grab the primary first stage hose with the left hand, close to the second stage
- Take the regulator out of your mouth with the mouthpiece pointing downwards
- Lift you longhose over your head and extend it forward with straight arm
- The student switches to the backup regulator and drains it from water using either method
- When the student has taken a couple of breaths from the backup regulator the primary regulator is taken back over the head and the backup regulator is switched for the primary regulator and is drained from water using either method

Exercise 1.3, stationary gas sharing

- The receiver clearly signals "out of gas"
- The second stage is donated by the donor, who grips the hose near the second stage with the right hand and "nods" so the long hose easily slips over the head and the second stage is clearly presented to the receiver

- The donor switches to his backup regulator when the receiver is breathing from the donors regulator
- The receiver clips his primary regulator on his right d-ring
- When the receiver has replied to the donors "OK"-sign, the entire long hose is extended from the canister/waist belt
- The students breathe normally until the instructor signals that the exercise is over. The receiver unclips his primary regulator from the D-ring and holds this before the donated regulator is returned to the donor
- The donor sorts his longhose and switchs back to his primary regulator

Exercise 1.4, gas sharing while swimming

- Make the team aware of the out-of-gas situation by flickering the lamp of by touch contact
- Swim up to the closest team member and make the sign for out-of-gas, "hand pulled over throat"
- The team member donating gas strectchs out his regulator by holding to the longhose (not the regulator itself), this way the receiver can purge the regulator easily
- When the gas share is initiated and the situation is calmed down, the longhose is extended to its full length and all snags are sorted. The receiver positions himself on the right side of the donor and put the longhose behind his neck
- The receiver clips his primary regulator on his left D-ring
- Abort the dive and swim towards the shot line or the point where the ascent is planned to be
- The receiver always swims ahead of the donor
- If there is bad visibility or when the receiver has no reference, the Rimbach method is used
- The team must show determination while swimming back to the shot line, not to lose any precious time

Exercise 1.5, Gas sharing during ascent

- Make the team aware of the out-of-gas situation by flickering the lamp of by touch contact
- Swim up to the closest team member and make the sign for out-of-gas, "hand pulled over throat"

- The team member donating gas stretchs out his regulator by holding to the longhose (not the regulator itself), this way the receiver can purge the regulator easily
- When the gas share is initiated and the situation is calmed down, the longhose is extended to its full length and all snags are sorted. The receiver positions himself on the right side of the donor and put the longhose behind his neck
- The receiver clips his primary regulator on his left D-ring
- When the longhose is adjusted so that the divers can position themselves in front of each other the ascent can begin
- Give the sign for ascent (which is replied) and start the ascent. The ascent is done while facing each other with at least one simulated deco/safety stop

2. Mask exercises

Clearing the mask

The fingertips or the wrist is placed on the top of the mask so that the water can escape from the bottom part of the mask.

The diver bends his head backwards and breaths out from the nose until the mask is fully cleared.

If the diver is using a hood the mask is placed "inside" the hood and the mask is cleared of water. The clearing should not be forced, with a low profile mask a light exhale from the nose is enough.

Exercise 2.1

Standing in the water so that the student has their head above the water line. The student removes the mask while breathing from his regulator with his face under water.

Exercise 2.2

The student is lying on his belly on the floor of the pool and clears a filled mask.

Exercise 2.3

Mask clearing and mask off/on while stable neutrally buoyant

Exercise 2.4

Swimming without mask. The starting point is stable neutrally buoyant.

- The student takes his mask off
- The student gives his mask to a team member or to the instructor
- A team member grab hold of the students left upper arm, just above the elbow
- The team member pilots the student by using touch contact while they swim at least 15 metres
- After the swim the student gets his mask back, puts it on and clears water from it

3. Trim, buoyancy and finning techniques

The trim and buoyancy exercises should not be seen as separate skills, the student should be encouraged to try to achieve and maintain proper trim and buoyancy control in all diving. The purpose of the following skills is to discover and to further practice proper trim and buoyancy control.

Exercise 3.1 and 3.2

The student should find a good horizontal trim and understand the changes in balance that can be achieved with different positions of the body

Exercise 3.3 to 3.6

The student should practice buoyancy control by using wing inflator, breathing and drysuit (if used).

Exercise 3.7 Flutterkick

The "usual" finning technique where the fins are moved up and down with almost straight legs.

Modified flutterkick

A smaller variant of flutterkick that sends the power up or straight back and as a result will not stir up as much silt as the normal flutterkick. The angles of the knees should be between 45-90 degrees.

Exercise 3.8 Frogkick

The frogkick is performed in horizontal position with the knees at a 90 degree angle and the fins pointing straight back. From here the legs are

extended back (not entirely straight knees) and the fins are put together with the soles of the feet towards each other.

One thing to keep in mind is to not let the knees drop below the line of the body, this decelerates the movement forward. Also try not making the frogkick too wide as this also makes it ineffective.

The strength and movement of the frogkick is made as big or small as necessary.

Exercise 3.9 Back kick

The starting position is in horizontal trim.

The swimming technique should be trained and performed with both big and small movements. The knees should never dip more than 10cm below the body horizontal line. The technique should be symmetrical. The angle of the knee should be between 45-90 degrees. The fins should not drop below the horizontal line. The angle of the ankles should be between 45-90 degrees.

To pass the Scuba Diver course the student should be able to swim backwards 3 meters without deviating more than +/- 1 meter in depth.

Exercise 3.10 Helicopter turn

The starting position is in horizontal trim.

The swimming technique should be trained and performed with both big and small movements. The swimming technique should be performed using the divers midpoint as the axle. The angle of the knee should be between 45-90 degrees. The fins should not drop below the horizontal line. The angle of the ankles should be between 45-90 degrees.

To pass the Scuba Diver course the student should be able to turn 360 degrees in both directions.

4. Descents and ascents

The first time the student descends to deeper waters (below 5 meters outside pool like conditions) they must be accompanied by an instructor/assistant.

Exercise 4.1 Descents

One student is set to lead the descent in a team of two or three.

The students start by doing an S-drill and place themselves so that they can see each other.

The leader of the dive starts the dive by giving the "thumbs down" signal, the rest of the team responds with the same sign.

The descent starts by exhaling and deflating the wing.

When the diver starts the descent he "falls forward" and goes from vertical to horizontal position.

The leader makes sure that no one is left on the surface. If this happens, the leader aborts the descent and everyone returns to the surface.

During the entire descent the divers must keep eye contact with each other and should never be more than arm's length away from each other.

The descent is stopped about one meter above the floor.

At the bottom the leader gives OK sign to the rest of the team, they respond with the same sign if everything is OK.

Exercise 4.2 Ascents

One student is set (before the dive) to lead the ascent.

The students place themselves so that everyone in the team can see everyone and the ascent reference.

The leader gives the signal for ascent (thumbs up) and the rest of the team respond with the same sign.

The ascent is started and the leader makes sure that no one is left on the bottom. If someone is left the leader aborts the ascent and the rest of the team returns to the diver at the bottom.

During the entire ascent the divers in the team keep eye contact and stays within arm's length of each other.

The ascent is stopped half way up to the surface where the students stop, while keeping trim and buoyancy, for about one minute.

A safety stop should always be practised when possible. This is done at 6 meters for at least 5 minutes.

The ascent time from 6 meters to the surface should be between 1-3 minutes.

On the surface all students must fill their wings.

5. Rescue a unconscious diver and towing a diver

Exercise 5.1 Rescuing

- The student first stabilizes his own buoyancy
- The student checks that the simulated unconscious divers regulator is in their mouth
- If a drysuit is used the exhaust valve should be fully opened
- Create neutral buoyancy for the diver by using his wing inflator
- Make sure that the head of the diver is his highest point
- Start the ascent and be prepared to adjust the divers buoyancy using his inflator
- Maximum ascent speed should be 10 meter/minute
- At the surface make sure to establish positive buoyancy for yourself and the diver

Exercise 5.2 Towing

Towing should be made by swimming at least 25 meters with a simulated unconscious diver.

The student should practice at least two different methods to tow a diver.

6. Free flowing equipment

Exercise 6.1 Free flowing regulator

- The student use light signals to get the teams attention, gives the sign for sharing gas and start the procedure (see exercise 1 for sharing gas procedures)
- The team shuts off the students valve to stop the free flow
- The students controls the depth and reference
- If the depth and the reference has changed since before the gas share the team returns to the original
- The students should keep position and reference for at least 30 seconds
- After this the team opens the students valve and he changes his regulator to his own and breaths normally
- The exercise is also made in open water, this time while swimming

Exercise 6.2 Free flowing drysuit inflator

- The student grabs the drysuit hose near the valve with the left hand
- Grabs hold of the nipple with the thumb and index finger
- Removes the hose
- The hose is thenreattached and the student checks that it is connected properly by pulling lightly

Exercise 6.3 Free flowing wing inflator

- The student angles his body slightly upwards to easier remove air from the wing
- Grab the inflator with the left hand, pull it upwards and place a finger on the dump button without pressing it
- With the right hand remove the hose from the inflator
- The hose is thenreattached and the student checks that it is on properly by pulling lightly

Exercise 6.4 Free flowing wing inflator while sharing gas

- The student angles his body slightly upwards to easier remove air from the wing
- Grab the inflator with the left hand, pull it upwards and place a finger on the dump button without pressing it
- With the finger on the dump button and the inflator as the highest point, get the teams attention
- The student give the sign for gas-share and starts sharing gas
- The team member shuts off the students valve
- The student removes the hose on the inflator with the right hand
- The students check the depth and reference
- If the depth and the reference has changed since before the gas share the team returns to the original
- The students should keep position and reference for at least 30 seconds
- The hose is then reattached and the student checks that it is on properly by pulling lightly
- After this the team opens the students valve and he changes his regulator to his own and breaths normally

7. SMB (Surface Marker Buoy) deployment

Exercise 7.1

- The student makes the sign for SMB deployment
- The SMB and a spool is taken out of the left pocket
- The line from the spool is attached to the SMB
- The SMB is unfolded to its full length and a little gas is added to it, just enough that it stands up in the water. Make sure to not have excess line out freely in the water from the spool
- The line on the spool is secured with the index finger
- The student looks towards the surface to make sure that the water column is free from obstacles, like other divers or boats on the surface
- The student now fills the SMB with enough air that it will stand on the surface with at least half the SMB visible
- The spool should be held away from the body while the spool reels out and is held lightly between the thumb and the index finger
- When the SMB reach the surface excess line is reeled in to keep the tension on the line
- The line is after that secured with the p-clip on the spool

8. Equipment off/on at the surface

The students should be able to show that they can do this exercise individually, but furthermore they should be encouraged to help each other and be good team members

Exercise 8.1 Equipment off

- The student dumps just enough gas from the wing to be able to move the arms backwards without restriction but still be able to float
- Remove the primary regulator and extend the entire longhose
- Remove the backup regulator
- Remove the drysuit hose
- Put the primary regulator back in the mouth and breath normally
- Open the waist belt and remove the couch strap

- Remove weight belt (if worn)
- Get out of the webbing with the right side first

Exercise 8.1 Equipment on

- Wear the weight belt (if used)
- Pull the arms though the webbing, right side first or both sides the same time while sitting on the rig
- Grab the crotch strap and attach it to the waist belt and fasten this tightly
- Put the backup regulator on
- Put the longhose in place
- Attach the drysuit hose
- Perform an S-drill
- The team members check that there is no entanglements or snags on the hoses or webbing

See separate instructor standards for Scuba Diver

Appendix: Equipment configuration – Technical Diver and Wreck Diver

Backplate and harness

A stainless steel backplate is recommended. A backplate made of aluminium can be used if it gives the student better balance in the water.

Harness should be made of approximately 50 mm wide webbing and contain no quick releases.

One D-ring should be placed on each side of the chest straps at collar bone level. One D-ring should be placed on the left side of the waist-strap, approximately in the middle of the body near the hipbone.

Crotch-strap should have two D-rings on it – one scooter D-ring on the forward side of the body and one D-ring mounted approximately 20 cm under the backplate.

Wing

Wing should have approximately 20 kg lift and a dump valve mounted on the left forward side.

For single cylinder a special wing made for this is used.

Manifold doubles with isolator valve

Should have a capcity of at least 4800 litres of gas. Valve knobs should be made of rubber.

Doubles should be mounted together with stainless steel bands and should not have tank feet.

Scuba Diver, Extended Basic Skills and Wreck Diver can be done with single cylinder configuration.

Primary 1st stage

Primary 1st stage should be mounted on the right valve from the point of view of the diver wearing the doubles. Primary 2nd stage should be connected to the primary 1st stage with a 210 cm long low-pressure hose. On the hose, close to the 2nd stage, there should be a bolt snap tied on with a piece of polyester/nylon line.

On the primary 1st stage there should also be a low-pressure hose for the wing which is a primary means for buoyancy and buoyancy control.

Secondary 2nd stage

Secondary 1st stage should be mounted on the left valve from the point of view of the diver wearing the doubles. Secondary 2nd stage should be connected to the primary 1st stage with a 55-60 cm long low-pressure hose.

On the secondary 2nd stage there should be a bungee cord mounted with the help of the same zip-tie that holds the mouthpiece in place. The bungee cord functions as necklace for the 2nd stage.

On the secondary 1st stage there should also be a submersible pressure gauge mounted on a 55-60 cm long high-pressure hose. There should be a bolt snap tied to the hose with a piece of polyester/nylon line close to the submersible pressure gauge.

Cylinders for decompression and bottom gas

These tanks should be made of aluminium and rigged with bolt snaps. The volume of the tanks should be 11 litres for bottom gas and minimum 5.5 litres for decompression gas. The tanks should be marked with the maximum operating depth of the gas they contain. Marking should be made with black digits on white background and the digits should be at least 70mm high. Markings should be placed on each side of the tank at 3 and 9 o'clock when the valve is pointed at the diver, right beneath the top curved part of the tank.

Regulators for tanks containing decompression and bottom gas

Should have one second stage mounted on a 90-100 cm long low-pressure hose and one submersible pressure gauge mounted on a 10-15 cm long high-pressure hose. The submersible pressure gauge should be tied on the 1st stage with a piece of nylon line.

Suit and thermals

Suit and thermals should be chosen appropriately to the temperature of the water dive will be conducted in. The suit should have a pocket on each side of the upper leg. Drysuit should not be made of compressible material. When diving with drysuit and helium-based breathing mixtures, a separate drysuit inflation tank should be used. It should be equipped with a 1st stage with over-pressure valve and a low-pressure

hose of appropriate length. The tank should be mounted on the backplate.

Primary light

The primary light should have a focused or focusable beam in order for light communication to be effective. The light head should have a loop at the back made from bungee cord or polyester/nylon line by which it should be able to be attached to a D-ring without blinding anyone. If the primary light has a separate battery canister it should be placed on the right side of the waist strap and secured with a buckle.

Depth and time instruments

The primary instrument should be mounted on the right arm. Secondary instrument should be placed in the right pocket and secured with a double-ender clip. A bottom timer is recommended, but a computer can be used if it has gauge-mode.

Compass

If the dive requires a compass, it should be mounted on the left arm.

Line spools and reels

Spools should be placed in the left pocket and secured with double-ender clips.

Line reels with side-handle are recommended. A reel should be placed either on the left hip D-ring or on the d-ring on the back of the crotch strap.

Surface marker buoys

Surfer marker buoy should be red or yellow and stored in the left pocket, secured with a double-ender clip. Two surface marker buoys should be used if a dive contains drifting decompression – colours differ for "OK" and "emergency", make sure to understand the local practise.

Cutting tools

A cutting tool (a small knife is recommended) is placed on the left side of the waist strap.

Backup lights

Backup lights should be secured with bolt snaps to the chest D-rings and to the webbing with rubber bands.

Mask and fins

The masks should have low inner volume, give broad view and be equipped with a strong mask strap. Backup mask should be placed in the right pocket and secured with a double-ender clip. Robust fins with heel straps made of rubber are recommended.

Fin blade should not be divided along its length (so called split fins).

Wetnotes

Should be placed in the right pocket and secured with a double ender clip.

Appendix: Theoretical knowledge - Extended Basic Skills, Technical Diver and Extended Range Technical Diver

- Gases and gas laws
- Nitrox
- Use of helium-based gas mixes
- Physiology
- Decompression theories
- Use of decompression gases
- Dive planning
- Decompression dive planning
- Equipment configuration

The theory should at least be equal to the contents of the course book "The Basic Skills of Technical Diving" by Michael Bergström.

The instructor is encouraged to add relevant theory.

Wreck Diver

- Gases and gas laws
- Nitrox
- Use of helium-based gas blends
- Physiology
- Decompression theories
- Use of decompression gases
- Dive planning
- Gas planning when diving wrecks
- Searching for wrecks

- How to attach decent/ascent lines to a wreck
- Navigation on wrecks
- Diving in bad visibility
- Dangers and risks associated with wreck diving
- Laws and regulations concerning wrecks and wreck diving
- Decompression dive planning
- Equipment configuration

The theory should at least be equal to the contents of the course book "The Basic Skills of Technical Diving" by Michael Bergström.

The instructor is encouraged to add relevant theory.

Appendix: Conducting practical skills – Extended Basic Skills, Technical Diver, Extended Range Technical Diver and Wreck Diver

Equipment configuration

The equipment configuration according to SwedTech Diving standards should be explained thoroughly before diving during the Extended Basic Skills course. The student must, before each dive, be able to put his/her equipment together understanding the thinking behind SwedTech Diving equipment configuration.

On the courses above the Extended Basic Skills course, the student is expected to put his equipment together according to the SwedTech Diving equipment configuration and explain its function and the thinking behind it without any help from the instructor.

S-drill/Pre-dive safety check

On the surface the drill should be conducted as follows:

- Check that the 210 cm long low-pressure hose to the primary second stage can be fully deployed, to ensure possibility for proper gas sharing. At least one other team member should verify the deployment. After the deployment, stow the longhose along the back or the front of the wing (depending on the model), under the lamp canister, up along the chest, around the neck and back in the mouth. Check that the longhose does not prevent you from being able to turn your head in both directions.
- Check that all valves are fully open. This is done by team members on each other. The drysuit inflation tank should be controlled as well if used.
- Bubble check should be conducted by team members on each other simultaneously with the valve check. Valves and first stages are immersed under the water surface so that it becomes

easier to see if any bubbles originate from the valves or the first stages. If any gas leaks are discovered, they must be fixed before continuing the dive. A dive must never start with loss of gas that leaks out. If drysuit inflation bottle is used it should also be checked for leakage.

- Check that all second stages are water-tight. Breath in all second stages under the water surface to be sure they do not deliver any water. During this check, the secondary second stage hanging in the necklace around the neck must also be verified. When extra tanks for bottom gas or decompression gas are used they should also be checked. This can be done in the boat/before the dive by inhaling hard through the second stages mounted on the tanks not pressurized with closed valves.
- Turn your light on before the descent to make sure that light communication is possible.
- S-drill/safety check in high sea can be conducted at the depth of 6-9 meters without adding to the bottom time. The procedures are the same as on the surface, but the checks are done in horizontal trim with clear reference (e.g. descent line or other). The team must have very good contact with the reference – a dive aborted because of the lost reference is not acceptable.

Swimming techniques

The basic swimming techniques that should be practised are:

Frog kick

Starting position is horizontal trim. The technique should be practised both with small and big movements. The diver's knees must not drop more than 10 cm under the horizontal trim line. The kick must be symmetrical. The working angle of the knees should be between 45 and 90 degrees. The fin tips may not drop from the horizontal line. Frog kicks should result in a good glide in the water.

Flutter kick

Starting position is horizontal trim. The technique should be practised both with small and big movements. The diver's knees must not drop more than 10 cm under the horizontal trim line. The students should practice how to direct the force backwards or upwards. The force from the kick must never be directed downwards.

Backward kick

Starting position is horizontal trim. The technique should be practised both with small and big movements. The diver's knees must not drop more than 10 cm under the horizontal trim line. The kick must be symmetrical. The working angle of the knees should be between 45 and 90 degrees. The fin tips may not drop from the horizontal line. The working angle of the ankles is between 45 and 90 degrees. To pass the Technical Diver Basic Skills course, the student must be able to swim backwards at least 3 meters.

Helicopter turn

Starting position is horizontal trim. The technique should be practised both with small and big movements. The diver's knees must not drop more than 10 cm under the horizontal trim line. The technique should be practised with the diver turning around a fixed point and spinning around their centre axis. The working angle of the knees should be between 45 and 90 degrees. The fin tips may not drop from the horizontal line. The working angle of the ankles is between 45 and 90 degrees. To pass the Extended Basic Skills course, the student must be able to turn 360 degrees in each direction.

Atcourse levels above the Extended Basic Skills course, the students should be able to using various swimming techniques depending on the circumstances during the dive. The students must be able to swim backwards at least 10 meters and use helicopter turn to turn 360 degrees in each direction without ascending or descending more than 0.5 meters.

Buoyancy techniques

To pass the SwedTech Diving Extended Basic Skills course, the students must be able to hover in horizontal position without descending or ascending more than 1 meter and with only the bottom or the ascent line as a reference. The students must be able to position themselves with their heads approximately 20 cm lower than their knees and then get back into horizontal position without using their hands.

To pass levels above Extended Basic Skills course the students must be able to position themselves with their heads approximately 50 cm lower than their knees and then get back into horizontal position without using their hands.

Controlled descents and ascents

Students must be able to conduct descents and ascents in a controlled manner, staying together so that anybody in the team can give and get attention without a delay. The control of the buoyancy should be so good that students must be able to stop at any moment during the ascent and the descent in order to solve their own problems or assist solving the problems of the other team members. The students should practice descents and ascents with only a line as a visual reference. The students are not allowed to hold on to the descent/ascent line with the exception of diving in severe current.

Diving in a team

The students must learn, understand and be able to use the advantages of team diving. They should be able to spot and solve problems in a team before they escalate into more/bigger problems. When a problem appears, the team must always be notified as soon as possible with flickering light or physical contact.

When diving in team of two, the diver with the most serious problem should be placed first during swimming problem solving.

When diving in a team of three, the diver with the most serious problem should be placed first. Another diver from the team can be behind or at the side of the diver with the most serious problem. The third diver chooses his/her position so that he/she can fast assist the other two in the most effective way.

The team should always choose a team leader and a decompression leader, but anyone in the team must be able to assume one of those roles at any time during the dive.

Hand signals

The students should be trained in understanding and using the standardized hand signals in the right way at the right time.

- Connected thumb and index finger for OK sign, both as a question and as an answer
- Thumb up to abort the dive or to change depth during the ascent/decompression
- Flickering palm of the hand to signal a problem
- Vertical palm of the hand to signal the team to stop
- Horizontal palm of the hand doing a circular movement to maintain current depth

- Index finger pointed upwards and doing a circular movement to turn the dive according to the plan
- Hand doing back-and-forth movement across the throat to indicate out-of-gas/share gas
- To show time or amount 1-5, the palm of the hand should point outwards and finger point upwards
- To show time or amount 6-10, the palm of the hand should point inwards and fingers to the side

Light signals

The students should be trained in understanding and using the standardized light signals in the right way at the right time.

- A circular movement with the light beam means OK, both as a question and as an answer
- A flickering movement of the light beams means that the person giving the signal wants to have attention
- When a team member wants to show something to the others in the team, the light beam is locked onto the object until the others see it and follow it with their own light beams. Sometimes, to maintain attention a flickering movement of the light beam is shown first.

Touch signals

The students should be trained in understanding and using the standardized touch signals in the right way at the right time.

- A pushing movement forward on an arm or a leg of a diver means "it's OK to move forward"
- A distinct squeeze of an arm or a leg means "stop"
- A pull backwards means "move backward" or "I need help"

Valve drill

To pass the Extended Basic Skills course, students are required to perform a valve drill in less than three minutes and not ascending or descending more than one meter or changing direction in the water.

To pass the Technical Diver and Wreck Diver course, students are required to perform a valve drill in less than two minutes and not ascending or descending more than half a meter or changing direction in the water.

To pass the Extended Range Technical Diver course, students are required to perform a valve drill in less than one minute and not ascending or descending more than half a meter or changing direction in the water.

- Shut the right primary tank valve
- Breathe the primary second stage empty
- Change to the secondary second stage
- Clip the primary second stage to the right chest D-ring
- Open the right primary tank valve
- Shut the isolator valve with the right hand
- Open the isolator valve with the left hand
- Shut the secondary left tank valve while unclipping the primary second stage from the D-ring
- Breathe the secondary second stage empty
- Change from the secondary second stage to the primary second stage
- Open the left secondary tank valve
- Check that all valves are fully open

Procedures for handling a free flowing primary regulator

To pass the Extended Basic Skills course, students are required to perform a free flowing primary regulator drill in less than one minute and not ascending or descending more than one meter or changing direction in the water.

To pass the course levels higher than the Extended Basic Skills course, students are required to perform a free flowing primary regulator drill in less than thirty seconds and not ascending or descending more than half a meter or changing direction in the water.

- Shut the primary right tank valve while signalling about the problem to the team
- Breathe the primary second stage empty
- Change to the secondary second stage
- Clip the primary second stage onto the right chest D-ring

After approximately one minute an attempt should be made to open the primary right tank valve to see if the free flow stopped. If that is

the case, the diver should change back to the primary second stage and make the team aware of that.

Procedures for handling a free flowing wing inflator

To pass the Extended Basic Skills course, students are required to perform a free flowing wing inflator drill in less than one minute and not ascending or descending more than one meter or changing direction in the water.

To pass the course levels higher than the Extended Basic Skills course, students are required to perform a free flowing wing inflator drill in less than thirty seconds and not ascending or descending more than half a meter or changing direction in the water.

- Take hold of the wing inflator and press the deflating button holding the inflator in such a way that the gas can escape
- Signal about the problem to the team
- Shut the primary right valve
- Breathe the regulator empty
- Keep the primary second stage in the mouth
- Unattach the low-pressure hose from the wing inflator
- Open the primary right valve

If diving with single cylinder, free flowing equipment is handled together with a team member by sharing gas

Procedures for handling out-of-gas situations

- Signal about the problem to the team
- Swim to the closest team member signalling "out-of-gas"
- The gas donor grips the hose to his/her primary second stage in the mouth right next to the second stage with the palm of the hand pointed towards the face
- The gas donor must lift the long hose over his/her head and stretch it to the out-of-gas diver
- The out-of-gas diver accepts the second stage, empties it of water and starts to breath
- The divers should now be facing each other
- Check that the team did not lose references such as the line or the depth

- If the team consists of three divers, the third diver should assist the others if needed
- The donor's 210 cm long low pressure hose should now be deployed fully
- The out-of-gas diver clips his primary second stage onto the right chest D-ring
- Since the dive now should be aborted, the diver who already is facing in the right direction keeps his position and the other diver positions him/herself so that the out-of-gas diver is in front or to the right of the gas donor
- The deployed longhose should run straight without any coiling. If coils are detected, they should be fixed by the out-of-gas diver before continuing
- Check that the team is gathered together and is ready to move
- Abort the dive and move to the point where the ascent can start

Decompression procedures

On the Extended Basic Skills course a simulated decompression with one switch of gas should be practised.

On the Technical Diver course a simulated decompression with three switches of breathing gas should be practised. On the final dives the decompression required by the circumstances of the dives but with at least two switch of gas during the ascent should be conducted.

On the Extended Range Technical Diver course the decompression procedures are done to suit the demand of the dive

Handling of the decompression gas and bottom gas stage tanks

The students must learn and understand the principles of handling extra cylinders containing air, nitrox, oxygen or trimix according to the SwedTech Diving standards.

- Extended Basic Skills: handling one extra cylinder
- Technical Diver: handling Three extra cylinders
- Extended Range Technical Diver: As many as the dive requires
- Wreck Diver: handling one to three extra cylinders

All extra cylinders are carried on the left side. Cylinder markings follow the SwedTech Diving equipment standards.

Gas switches must be conducted according to the following procedures:

The switch of breathing gas should be prepared during the stop prior to the stop where the gas switch will be conducted. If no stops are planned prior to the stop where the breathing gas will be switched, a short stop three meters deeper than the depth for the switch of gas should be included in the dive plan.

- Check that the tank intended for the switch of breathing gas is easy to reach by inspecting the tank markings
- Open the tank valve 1/4 of a turn to check the pressure and integrity
- Shut the valve
- Follow the regulator hose and check if there is anything that can interfere with its deployment

When the team is gathered together and stabilized at the depth of the breathing gas switch, the decompression leader starts to switch his breathing gas.

- Grip the second stage and deploy the regulator hose fully
- Hold the second stage with your right hand and with your left hand angle the tank so that the MOD marking is clearly visible to the team. Stretch out the regulator hose so that the team can easily see that the second stage, the hose, the first stage and the cylinder with correct MOD marking are connected
- When the team confirms with an "OK" sign, the valve may be opened. At the same time, depth reading on the instrument on the right arm should be verified
- Put the hose around your neck
- Exchange the primary second stage in your mouth with the decompression tank second stage, hold the primary second stage in your hand until the function of the decompression tank second stage is verified
- Clip the primary second stage to the right chest D-ring
- Confirm the gas switch with an "OK" sign
- Decompression leader points out the next team member to switch gas and the procedure is repeated

When everybody in the team has switched gas, the decompression time count starts again. It is recommended that everybody in the team

should breathe the new gas for at least three minutes before proceeding to the new stop depth.

If a tank containing extra bottom gas is carried, the dive starts breathing it. In that case, the gas switch is conducted on the surface or at 6-9 meters.

Handling the surface marker buoy

To pass the SwedTech Diving Extended Basic Skills course, students must be able to deploy a surface marker buoy in less than three minutes without deviating from their target depth with more than one meter.

To pass the course levels above the Extended Basic Skills course, students must conduct the exercise in less than two minutes without deviating from their target depth with more than half a meter and without changing direction in the water.

Handling the back-up mask

To pass, students must be able to signal their team, retrieve the back-up mask from their right pocket and switch to it. The other team members should assist the team member who has problem. It is important that the references, for example the ascent line, are not lost during the exercise. This is a team exercise where team members should not deviate from their target depth with more than one meter.

Handling the back-up light

The student should signal to the team that he has a problem with primary light and deploy the back-up light. The primary light is clipped onto the right chest D-ring and the light cord is tucked under the belt. The team member with malfunctioning primary light is placed in front in a team of two divers and in the middle in a team of three divers.

Handling the guideline

To pass the SwedTech Diving Extended Basic Skills course, students must be able to handle basic guide line procedures with a reel or a spool. This includes:

- Line attachment points
- How the line is kept under tension
- How the line should follow the profile of the environment
- Avoiding line traps

- How to take in the line
- How the team should follow the line

To pass the course levels above the Extended Basic Skills course, students must be able to decide themselves on how and when the guide line should be used.

On the wreck diver courses, the students should practice guide line procedures on every dive where the instructor is not deploying the line.

To follow the line without any reference together with the team

This exercise should be practised on all SwedTech Diving courses.

Students should in a team follow a guideline with blindfolds, using touch contact for communication. To pass, the whole team must together follow a line for at least 25 meters. Everybody in the team should try to be first, in the middle and last.

On the wreck courses, this exercise is first practised on the outside of a wreck. When the students show sufficient level of skill it is also practised inside the wreck.

Unconscious diver rescue

To pass the SwedTech Diving Extended Basic Skills course, students must bring up an unconscious diver (simulated) from at least 12 meters of depth and together conduct a 0.5-1 minutes long stop at the depth of 3-6 meters. After that, the unconscious diver should be towed for at least 50 meters.

To pass the course levels above the Extended Basic Skills course, students must bring up an unconscious diver (simulated) from at least 15 meters of depth and together conduct a 1 minute long stop at the depth of six meters. After that, the unconscious diver should be towed for at least 50 meters.

The team must also conduct a decompression with gas switches where one of the team members is completely dependent on the others.

Gas analysis

The student must during all courses analyse his/her breathing gases prior to diving and also calculate the maximum depth for the gases. All tanks should be marked after the analysis, according to SwedTech Diving standards for marking tank contents.

Tanks containing gas that has not been analysed must not be used!

The instructor is encouraged to exceed, when possible, the recommendations of SwedTech Diving concerning the time students spend practising skills in the water.

Appendix:
Equipment configuration – Rebreather Diver

- A complete closed circuit rebreather
- Two cylinders, one for oxygen and one for diluent
- A backplate with harness, D-rings and crotch strap
- A wing without bungee and approximately 40lbs lift
- An aluminium cylinder for bailout gas, 80cf recommended
- A regulator with SPG for to bailout cylinder
- A drysuit with two permanent leg pockets (wetsuit could be used if water temperature allows)
- A suit cylinder with first stage with over pressure valve and hose. Alternatively suit gas could be taken from bailout cylinder
- A primary torch with goodman grip and double-ender p-clip
- A bottom timer
- A spool with at least 45 meter line
- A SMB
- A cutting tool
- A backup torch
- A backup mask
- Wetnotes

Appendix:
Theoretical knowledge – Rebreather Diver and Technical Rebreather Diver

- Gases and gas laws
- Nitrox
- Use of helium-based gases
- Physiology
- Decompression theory
- Dive planning
- Planning of decompression dives
- Equipment configuration

The student's knowledge of theory after a completed course should at least be equal to the contents of the course book provided by the manufacturer of the rebreather.

It is the instructor's responsibility to see that the student has met the requirements with the help of the written exam.

Appendix:
Practical knowledge - Rebreather Diver

Please observe that the practical knowledge may differ between different rebreathers and configurations. SwedTech Diving recommends that the students use their rebreather according to the manufacturer's recommendations

Equipment configuration

The student must be able to assemble his closed circuit rebreather on his own and understand the configuration used.

Loop volume

The student must learn how to find the minimal loop volume, just before the ADV is triggered. This is performed as a start drill under calm conditions at shallow depth. During this exercise the student should also practice manually maintaining a PO_2 of 0.7 bar with the needle valve closed.

Handling of a bail out cylinder

- Switch the BOV to OC
- Signal the team
- Point to the BOV while breathing out so the team can see the bubbles and understand you have switched to OC
- Check that the bailout cylinder you want to use is available
- Check the MOD of the bailout cylinder, that it is usable at the current depth
- Open the bailout cylinder valve ¼ revolution
- Check that there's gas in the cylinder and that there is no leaks
- Close the bailout cylinder valve
- Check that the bailout cylinder hose runs freely
- Pull out the bailout cylinders second stage with your right hand and show the full length of the hose while with your left hand showing the MOD marking to the rest of the team

- The team confirms the correct MOD with an OK sign if everything is right
- Open the valve on the bailout cylinder completely while you control your depth
- Remove the BOV and keep it to your chest and switch to the bailout cylinder regulator
- If everything is good, give the team an OK sign and the sign to abort the dive, thumbs up
- Place the diver on the bailout cylinder first
- Abort the dive according to place, time and decompression

This exercise is first done at shallow depth under calm conditions. It is important that this exercise is performed correctly.

During this exercise the student also stows the bailout cylinder and switchs back to CCR. The student must make sure that the gas is breathable before going back to CCR, lowest PO_2 is 0.6 bar.

If the rebreather lacks a BOV this exercise will be modified to suit this.

Clearing of the mask

Clearing of the mask is done the first time at shallow depth under calm conditions. The student must be aware that the buoyancy is affected while clearing the mask.

Buoyancy control

The student must be able to show good buoyancy about 50 cm above the bottom. The student must train using loop volume, wing and drysuit (if used during the course). The student should strive for being so weighted and balanced that, with minimal loop volume, just a little gas in the wing and drysuit is needed to maintain good buoyancy.

Keep constant PO_2 while swimming

The student must while swimming at a depth of 6 meters, with closed needle valve, maintain a PO_2 of 0.7 bar.

Be able to vary PO_2 while swimming

The student must, while swimming at a constant depth with closed needle valve, keep a PO_2 of 0.5 bar for five minutes. The student must then switch up to a PO_2 of 0.9 bar for five more minutes, also here with

the needle valve closed. A variation of +/- 0.1 bar is allowed during this exercise.

Descent

Descents are first trained during calm conditions to a maximum depth of six meters until the student is able to stop the descent about 50 cm from the bottom.

The student must at the surface before the descent and at a depth of six meters, together with the team, be able to perform an S-drill before starting the dive.

Start the descent with a minimal loop volume and a PO_2 of 1.0 bar in the loop.

Descent can be done on the BOV if the diluent is breathable on the surface. The student should also train on descents while using the regulator from the bailout cylinder.

The student must train on manually adding O_2 to the loop during descent.

At six meters the cells are verified by checking that they read 1.6 bar. When the validation is done the student can switch to CCR. When the student has switched to CCR leak check and bubble check is made. Before descent the student must exhale from the nose to trigger the ADV to dilute the gas to 0.7 bar.

Decent should be done so everyone in the team can get attention from everyone else in the team.

Cell validation

The student must exhale gas with the nose to cause under pressure in the loop to trigger the ADV. With a long slow inhale the student must get the PO_2 to the equivalent PO_2 of the surrounding pressure.

I.e. if air is being used as diluent the cells should read 0.42 bar at 10 meters depth. It is important that the student read both cells during this validation.

This must, during the course and on all dives thereafter, be done at least three times / dive.

Remove moisture from the cells

The student must exhale gas with the nose to cause under pressure in the loop to trigger the ADV. With a quick inhalation gas flows passed the cells and removes moisture. This should be done as a stationary

exercise and then as an exercise simulating that the cells shows different PO_2.

Go off and on the DSV

If the DSV is equipped with a BOV the student should first switch to OC. The student takes the DSV out of his mouth. The student goes back to the DSV. Before switching the BOV to CCR the student must check that the gas in the loop is breathable by checking the PO_2.

If the DSV does not have a BOV the student must understand the usage of this and this must be practised before the bailout drill.

Removing water from the loop hose

The student compresses the bellow hose between the DSV and the right T-piece.

The T-piece on the right shoulder must be the highest point on the diver for this exercise. This is easiest performed using a slightly vertical position in the water. Lean your head to the right and blow the water down in the right counter lung. This may be needed to done a couple of times for the student to find the right position.

This should be done as a stationary exercise and the student should do it when needed or as the instructor added exercise.

Loop flush

Loop flush or diluting of high PO_2 is performed when a high PO_2 quickly must be lowered.

The student is striving for a position in the water where the ADV is the lowest point of the diver and the highest point the right counter lung dump valve the highest.

It very important that the student do not open the dump valve before there is a considerate over pressure in the counter lung. This is to prevent water getting in the counter lung and the rest of the rebreather.

The left hand is used to open the dump valve and the right hand alternately squeezes the loop hoses behind the T-piece.

This should be done as a stationary exercise and then as a part of an exercise simulating high PO_2.

Removing water from the loop

The loop needs to be over pressurised for water to be able to escape through the dump valve. The over pressure is either created by using the ADV or with separate bail out gas.

This exercise is done in a vertical position in the water. Empty the wing and drysuit from gas. Trigger the ADV with the purge button on top of the canister with your left hand while you pull the dump valve on the counter lung with your right hand.

If the student cannot reach the purge button on the ADV the student can draw gas from bail out, BOV or separate bail out cylinder and blow in the loop.

The student may physically hold on to an object in this exercise to prevent from losing buoyancy.

Ascent

Ascents are first being practised from shallow depths and then progressively deeper.

During the ascent it's very important that the student checks his PO_2. PO_2 should not sink below 0.7 bar during the movement during the ascent. On the safety stop the PO_2 should be at least 1.2 bar.

The wing and drysuit is emptied early during the ascent. It is better to work with a bigger loop volume during the ascent as the risk of triggering the ADV is lower which will lower the PO_2. During the ascent the expanding gas is vented through the nose.

The student must learn the relationship between exhaled gas and how much oxygen needs to be added to maintain PO_2. The student must also be trained how buoyancy is maintained during the ascent by dumping excess gas through the nose and addition of oxygen.

Ascents are also trained in bail out scenarios. Here the ascent is done on the separate bail out cylinder. The student must in this scenario remember to dump expanding gas from the loop in the same was as in the wing and drysuit. Expanding gas is dumped using the dump valve on the right counter lung. If gas is dumped from the DSV the student must make sure that the pressure in the loop must be higher than the surrounding pressure, otherwise the rebreather will be filled with water.

Simulated decompression procedure

The student must perform a simulated decompression scenario from 25-30 meters depth with stops at 21, 18, 15, 12, 9 and 6 meters. The times for the stops should be at least one minute between 21 and 12

meters, at least three minutes at 9 meters and at least five minutes at 6 meters.

On the stops between 21 and 12 meters the student must maintain a PO_2 of at least 1.1 bar.

On the stops between 9 and 6 meters the student must maintain a PO_2 of at least 1.4 bar.

Calculate metabolism

At the surface or in shallow water the student must, while swimming, maintain a PO_2 of 0.7 bar. The needle valve is adjusted until no additional oxygen needs to be added manually. Exit the water and measure the flow with a flow meter. Note the metabolism rate.

When the student enters the water the flow is slightly lowered.

Handling of the needle valve

The needle valve is adjusted so the PO_2 is slowly sinking. The student must learn how many turns the needle valve needs to be opened to give the right flow. The student must be able to operate the needle valve by touch only without having to look at it.

Handling of bail out cylinder

The student must be able to move the bailout cylinder between the default position, and nose clipping it to the hip D-ring. The student must also be able to hand over a bail out cylinder to other team member.

Valve handling

The student must be able to shut off and turn on both the oxygen and diluent cylinders on the rebreather within 60 seconds.

Diving SCR

The student must train on using the rebreather as a SCR in the case of running out of oxygen. The student must shut down the valve for the oxygen while in CCR and then swim while exhaling each second breath through the nose. It's important to monitor the PO_2 all the time.

Oxygen leakage / free flow

The student shuts off the valve to the oxygen cylinder. The needle valve is opened fully to simulate free flow. The student trains to open and close the oxygen valve to maintain a predefined PO_2 set point.

ADV leakage / free flow

The student must be able to handle a free flowing ADV. During this exercise the instructor simulate a free flowing ADV by pressing the purge button on the ADV.

The student must shut off the diluent valve. A follow up problem from this could be too high PO_2. The student should solve this by exhaling through the nose and then quickly open the diluent valve to add diluent to lower the PO_2.

Handling of an SMB

The student must be able to send up an SMB in a safe and controlled manner within two minutes. The ascent is done with the line from the SMB as a reference. The spool must be reeled in during the ascent. During the ascent the spool may be used as depth reference if locked to the depth where the current stop.

Diving in team

Understand and use the advantages of diving in a well-balanced team and to be able to see and solve problems before they escalate or generate follow up problems.

Hand signals

The student must be able to understand and use the standardised hand signals at the correct times.

Light signals

The student must be able to understand and use the standardised light signals at the correct times.

Touch signals

The student must be able to understand and use the standardised touch signals at the correct times.

Handling of free flowing wing inflator

The student must be able to shut-down and disconnect a free flowing wing inflator without varying more than 50 cm in depth.

Swimming techniques

The student must be able to use and vary the different swimming techniques according to the circumstances regarding the dive. He must be able to swim backwards 10 metres and do a helicopter turn at least 360 degrees in each direction.

Buoyancy techniques

The student must be able to lie still in a horizontal position without varying more than 50 cm in depth with the bottom as reference, or in an ascent a shot line as reference.

Rescue of paralysed diver

The student must rescue a diver from at least 15 meters depth and together perform a safety stop between 3-6 meters for one minute. After this the diver must tow the rescued 50 meters.

Before the ascent check PO_2. in the student should ensure the loop mouthpiece remains in the paralysed diver's mouth. Remember that the diver doing the rescue must take care of the buoyancy for both divers during the ascent. The student must also make sure to dump excess gas from the paralysed diver's loop.

At the surface positive buoyancy should be made and help should be called.

Analysis of gas

The student must analyse their gas and calculate the MOD before each dive.

Appendix: Equipment configuration - Troglodiver

- Drysuit or wetsuit depending of what the water conditions allow in form of exposure, and hood and gloves
- Twinset with a manifold and isolation valve, minimum gas volume of 4800 litre
- Wing with about 20kg lift, without strapped bungee
- Backplate and webbing, D-rings and crotch strap
- Small suit cylinder with first stage and hose (if drysuit is used)
- Two first stages
- Two second stages
- A 210cm long low pressure hose between the primary first and second stage regulator
- A 55-60cm long low pressure hose between the secondary (backup) first and second stage regulator
- A Submersible Pressure Gauge (SPG) with a 55-60cm long high pressure hose
- A primary torch with a canister and goodman grip on the light head
- Two aluminium cylinder (stages) for bottom gas, recommended size 11 litre (80cf)
- A regulator kit for the cylinder with extra bottom gas
- A pair of fins
- Two masks (one primary and one backup)
- Two bottom timers or computers
- A knife
- A water proof compass
- A "tail"
- Three "REM"-markers
- A "Arrow"
- Wetnotes

- Three spools with at least 25 meter line
- A reel with at least 100 meter line
- Two Backup lights
- The 210cm long hose to the primary regulator, the SPG and the "tail" should all have a p-clip attached

Appendix:
Theory - Troglodiver

- Gases and gas laws
- Nitrox
- Divers physiology
- Diving physics
- Equipment knowledge
- Dive planning
- Helium based gas mixes
- Decompression theories

The theory should at least be equal to the contents of the course book. As proof of this the student must pass a written exam.

The instructor is encouraged to add relevant theory.

Appendix: Practical skills - Troglodiver

Here follows the special drills that are practiced during the course Troglodiver.

S-drill

- The leader for the dive explains in chronological order what will be done during the planned dive
- S-drill is made in the water according to SwedTech Diving standards
- Control of the backup lights is added

Gas switch

- If a stage is being used for gas logistics or as a penetration tool a gas switch is added at 6 meters according to SwedTech Diving standards

Finning techniques

- Be able to use and vary the different swimming techniques as the circumstances of the dive demands

Stage as a tool to cover longer distances

- Decide the rule of third for the gas of the team, both in the staged and the back mounted cylinders, before starting the dive
- Always start the dive breathing from the stage cylinder. Gas switch is done at the surface or at 6 meters according to SwedTech Diving standards
- Use the calculated amount bottom gas from the stage cylinder
- Signal the team to switch to the twinset. Make sure that the stages are stowed correctly.
- Add five minutes to the dive time. The calculated dive time is the same as leaving a stage on the guide line

- Stow the stage cylinder while swimming inwards without losing contact to the team or the guide line
- At the calculated time +/- 2 minutes the stage is attached to the guide line close to a tie off with two locks around the p-clip. Diver #1 clips his cylinder first followed by diver #2 and #3
- Make sure that the valve of the cylinder you leave is properly closed and note the time when you clip the cylinder to the guide line
- The team dives on until someone in the team used the planned amount of gas in the twinset and the dive is turned. Note the time for the turn and calculate the time the team should be by the first stage cylinder
- On the way out diver #3 first reaches his stage followed by diver #2 and #1
- Staging of the stages is done during the swim out without losing contact to the team or the guide line
- After everyone in the team has picked up the stages diver #1 is signalling the team and gas switch is done following the SwedTech Diving standard
- If possible, breathe from the stage all the way out of the system

Connection to a guide line

- Make a primary time off in open water. Give room for the others in the team to verify the tie off. Wait for OK
- Make a secondary tie off approximately an arm's length away from the primary tie off. Give room for the others in the team to verify the tie off. Wait for OK
- Lay all the line to the permanent guide line with appropriate tie off's. Preferable as close to the bottom as possible
- Let the reel cross the permanent guide line within a few cm and after that lock the reel with its screw. Cross if possible the permanent line approximately 100cm into the system
- Spin the reel two laps around the permanent guide line
- Lock the reel on the laid line with two locks around the p-clip. Give room for the rest of the team to verify the connection

Turn points

- Clearly show practical application of turning a dive based on time, gas pressure or other by "thumbing" the dive
- The team confirms this by "thumbing" back
- The team exits the system

Hand signals

Hand signals are done according to SwedTech Diving standards

Valve manoeuvring

- In physical contact with the roof in a cave-like environment the student should simultaneously show a behaviour in controlling the ability to close and open all valves

"Complete" diver

- Show a simultaneous behaviour by always strive to return to be a "complete" diver as a result of the chain of i.e. stopping a free flowing regulator

Attaching a marker on the guide line

- Find the marker on the tail and remove it
- Face your team and hold the marker on the guide line to illustrate the marker as tied in
- Place the marker, if possible, on the inside of other markers on the guide line
- The team will verify the marker by signalling OK with the torch over the marker
- Tie the marker to the guide line and mark the time

Permanent three way crossings – Navigating over a permanent three way crossing

- The leader of the dive ties in a personal marker according to standards on the guide line
- Attach the marker 50cm before the centre of the three way crossing
- Mark the time when the navigation decision was made

Navigating home thought a three way crossing

- The first diver to arrive at a three way crossing determines the way out and signalling according to SwedTech Diving standards the hand signal for exit to the closest team member
- When the signal is replied the diver passes over on the outside of the tied in marker
- The procedure is repeated until the last diver in the team has verified the teams way out
- The last diver passing over the three way crossing visually verifies the rest of the team is on the right side and on the way out
- Remove the marker and put it back on its "tail" with swimming out

Place and Prioritise problems on a guide rope.

- From page 44 of the Troglodiver workbook.

Temporary three way crossing – Installing a temporary three way crossing

- The team ties a personalized marker on the inside of the existing marker on the guide line
- A spool is prepared within the team and the leader ties it to the marker
- Under supervision from the rest of the team, the leader fills the gap from the guide line the team is on to the new guide line and creating a temporary three way crossing
- The team leader prohibits the spool from unreeling by locking the spool with the p-clip 5cm after crossed guide line. The spool is after this twisted two times around the guide line and then locked with the p-clip back to the line
- Finish the installation by letting the rest of the team verifying by signalling OK over the locked spool with the torch

Uninstalling a temporary three way crossing

- The diver that first pass over a jump on the way home determines the teams way out and signals the way out according

to SwedTech Diving standard hand signals for exit to the next team member

- When the signal is answered the diver pass over the marker and turns to the last diver in the team
- The last diver in the team over the installation collects the spool
- The spool is returned to the divers left pocket
- Signal the correct way out of the system to the rest of the team. When the signal is confirmed the marker is removed from the guide line
- The removed marker is returned to its tail while swimming out

Find a lost guide line without visual reference

- Stop where you are and take out your safety spool
- Explore the floor for a suitable fastening point for a primary tie off
- Make a secondary tie off approximately 50cm from the primary tie off
- Start by swimming along the floor and search for the lost guide line from what you guess is the right direction. Observe the angle you swim in regards to the line between the primary and secondary tie off
- If the guide line is not found after reeling out the full spool, return to the secondary tie off and search in another direction
- Repeat the two previous items until guide line is found
- Prohibit the spool from unreeling by locking the spool with the p-clip 5cm after crossed guide line. The spool is after this twisted two times around the guide line and then locked with the p-clip back to the line where you came from

Lost team member

- Note time, depth and consumed gas in Bar where the separation was discovered
- Multiply the consumed gas by two and subtract this number from the actual gas pressure in the twinset. The difference is maximum pressure in Bar you can use for the search. Determine the gas pressure and time you and the rest of the team MUST start your exit, with or without the remaining team member

- Determine which way is in and out of the cave
- Turn the team outwards and start the search swimming home

Towing of a paralysed diver

- Achieve neutral buoyancy on the paralysed diver
- Clip the primary torch in the goodman grip and stow the cord under the long hose and waist strap to get the beam of light point forwards
- Signal the rest of the team to abort the dive
- Position yourself on top of the paralysed divers twinset and tow the diver by holding on to his wing
- Strive to keep the diver as neutrally buoyant as possible
- Make sure that the paralysed diver has his regulator in his mouth all the time

Repairing a broken guide line

- The diver that first discovers the broken guide line tells the team to stop
- Note the direction of which the broken guide line points
- Take a spool and attach to the broken part of the guide line
- Swim in the direction that the broken line seems to point and search for the other end on the floor
- When the other end is found this is tied together with the line from the spool to create a continuous guide line
- All this is done under the supervision from the rest of the team

Diver entangled in the guide line

- Lay still and get the rest of the teams attention
- Ask for help
- Hold on the guide line leading to the exit
- If necessary cut yourself lose after ensuring yourself that the rest of the team is behind a tie off on the way out from where you are cutting yourself lose
- Cut the guide line

- If time and gas allows, repair the cut guide line according to standards
- If time and gas allows you can continue the dive, if not the dive is aborted

Navigating without visual reference

- Stop when you feel there is a three way crossing
- Hold the line steady with one hand leading the team to the crossing
- The other hand is searching along the lines for the teams REMs that shows the way out
- When you by feeling on the found markers have identified your teams REMs, you place yourself on the outside of the marker and await touch contact from the rest of the team to continue the swim outwards

Completing a circuit

- As the leader of the team you place a REM pointing outwards on the guide line you expect to loop back on
- Note the time and consumed gas up to this point and let the team verify the tie off
- Swim over the marker into the system
- When you yet again reach the marker you previously placed, you can dive beyond it and directly home if gas and time allows

Collecting line data

- Collection of line data for a given area is started with at least three tie off's before the given route
- Note the depth for the tie off according to your depth gauge
- Note the angle between this and the next tie off compared N based on a 360° compass
- Measure the distance between the first and the secondary tie off and note this
- Repeat the items above until collecting the line data for the given route

Completing a traverse

Dive 1:

- Note time and consumed gas when the dive is finished
- The leader of the dive marks the turn point with a personal maker pointing towards home
- The team verifies the marker

Dive 2:

- Calculate the gas pressure the team the team must have to reach the last dives turn pint to complete the traverse
- Dive, if gas and time allows, until the team reach the marker from the last dive
- When the marker is reached the leader makes the rest of the team aware of this
- If gas allows and the leader agrees to, he swims over the marker to complete the traverse. If anyone in the team disagrees, the dive is ended as usual