



SwedTech Diving

Training Standards for Technical Diving

Version 1.2 2011

Translation from Swedish to English made by Dmitri Gorski

Contents

Instructor responsibility.....5

Instructor prerequisites.....5

Definition of dives.....7

SwedTech Diving equipment configuration.....8

Theory.....11

Conducting practical exercises.....12

Technical Diving Basic Skills.....21

Technical Diver 1.....25

Technical Diver 2.....29

Wreck Diver 1.....33

Wreck Diver 2.....38

Mixed Gas Blender.....43

Instructor responsibility

Instructor is responsible for 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.

Instructor should be completely sure that the student is aware of the risks involved in diving and the importance of continuing practice after completed course.

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 Technical Diving Basic Skills Instructor

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

- Have the level of certification corresponding to at least SwedTech Diving Technical Diver 2
- Be at least 20 years old
- Be in excellent health
- Successfully complete SwedTech Diving Technical Diving Basic Skills instructor course
- Have logged at least 30 dives on Technical Diver 1 level
- Have logged at least 10 dives on Technical Diver 2 level
- Have insurance that covers him/herself and his/her students
- Paid registration fee to SwedTech Diving

Prerequisites Technical Diver 1 Instructor

In order to become SwedTech Diving Instructor, Technical Diver 1, student must:

- Have the level of certification corresponding to at least SwedTech Diving Technical Diver 2
- Be at least 20 years old
- Be in excellent health
- Successfully complete SwedTech Diving Technical Diver 1 instructor course
- Have logged at least 40 dives on Technical Diver 1 level
- Have logged at least 20 dives on Technical Diver 2 level
- Have performed at least 3 Technical Diving Basic Skills courses
- Have insurance that covers him/herself and his/her students
- Paid registration fee to SwedTech Diving

Prerequisites Technical Diver 2 Instructor

In order to become SwedTech Diving Instructor, Technical Diver 2, student must:

- Have the level of certification corresponding to at least SwedTech Diving Technical Diver 2
- Be at least 20 years old
- Be in excellent health
- Successfully complete SwedTech Diving Technical Diver 2 instructor course
- Have logged at least 50 dives on Technical Diver 1 level
- Have logged at least 40 dives on Technical Diver 2 level
- Have performed at least 3 Technical Diving Basic Skills courses
- Have performed at least 3 Technical Diver 1 courses
- Have insurance that covers him/herself and his/her students
- Paid registration fee to SwedTech Diving

Prerequisites Wreck Diver 1 Instructor

In order to become SwedTech Diving Instructor, Wreck Diver 1, student must:

- Have the level of certification corresponding to at least SwedTech Diving Technical Diver 2
- Be at least 20 years old
- Be in excellent health
- Successfully complete SwedTech Diving Wreck Diver 1 instructor course
- Have logged at least 40 dives on Wreck Diver 1 level
- Have logged at least 20 dives on Technical Diver 2 level
- Have performed at least 3 Technical Diving Basic Skills courses
- Have insurance that covers him/herself and his/her students
- Paid registration fee to SwedTech Diving

Prerequisites Wreck Diver 2 Instructor

In order to become SwedTech Diving Instructor, Wreck Diver 2, student must:

- Have the level of certification corresponding to at least SwedTech Diving Technical Diver 2
- Be at least 20 years old
- Be in excellent health
- Successfully complete SwedTech Diving Wreck Diver 1 instructor course
- Have logged at least 40 dives on Wreck Diver 2 level
- Have logged at least 30 dives on Technical Diver 2 level
- Have performed at least 3 Technical Diving Basic Skills courses
- Have performed at least 3 Technical Diver 1 courses
- Have performed at least 2 Wreck Diver 1 courses
- Have insurance that covers him/herself and his/her students
- Paid registration fee to SwedTech Diving

Mixed Gas Blender Instructor

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

- For prerequisites see Technical Diving Basic Skills Instructor Course.
- Successfully complete SwedTech Diving Mixed Gas Blender instructor course

Definition of dives

Technical Diver 1 level dive

A dive to a depth of at least 40 meters with a minimum bottom time of 15 minutes (including the descent) and at least one change of breathing gas during the ascent.

Technical Diver 2 level dive

A dive to a depth of at least 60 meters with a minimum bottom time of 15 minutes (including the descent) and at least two changes of breathing gas during the ascent.

Wreck Diver 1 level dive

A wreck dive to a depth of at least 12 meters with a minimum bottom time of 25 minutes (including the descent). The dive must contain some form of penetration and start in open water.

Wreck Diver 2 level dive

A wreck dive to a depth of at least 40 meters with a minimum bottom time of 15 minutes (including the descent) and at least one change of breathing gas during the ascent. The dive must contain some form of penetration and start in open water.

SwedTech Diving Equipment Configuration

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 ca. 50 mm wide webbing and contain no quick releases. One D-ring should be placed at each chest-strap on the level of collar bone, 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 rear dump valve mounted on the left forward side.

Manifold doubles with isolator valve

Should contain a minimum of 4800 litres gas. Valve knobs should be made of rubber. Doubles should be mounted together with stainless steel bands and should not have tank feet.

Primary 1st stage

Primary 1st stage should be mounted on the right valve from the point of view of the divers who wears 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 divers who wears 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.

Tanks 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 polyester/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

Primary light should have a separate battery canister and Goodman grip. The 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. Lamp canister 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. Bottomtimer is recommended, 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 markers

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 – yellow colour indicates “ok” and red indicates “emergency”.

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 mask 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.

Theory

Technical Diving Basic Skills

Technical Diver 1

Technical Diver 2

- 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 “Technical Diving in Plain Swedish” (“Teknisk dykning på ren svenska” by Michael Bergström). The instructor is encouraged to add relevant theory.

Wreck Diver 1

Wreck Diver 2

- 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 “Technical Diving in Plain Swedish” (“Teknisk dykning på ren svenska” by Michael Bergström). The instructor is encouraged to add relevant theory.

Conducting practical exercises

Equipment configuration

The equipment configuration according to SwedTech Diving standards (page 7) should be explained thoroughly before diving during the Technical Diving 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 course levels higher than the Technical Diving 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:

1. 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.
2. 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.
3. 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.
4. Check that all second stages are water-tight. Breathe in all second stages under the water surface to be sure they do not deliver any water. During this check, the secondary 2:nd 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.
5. 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 practiced are:

Frog kick

Starting position is horizontal trim. The technique should be practiced both with small and big movements. The divers 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. Frogkicks should result in a good glide in the water.

Flutter kick

Starting position is horizontal trim. The technique should be practiced both with small and big movements. The divers 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 practiced both with small and big movements. The divers 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 practiced both with small and big movements. The divers knees must not drop more than 10 cm under the horizontal trim line. The technique should be practiced with the diver turning around a fixed point and spinning around his 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 Technical Diving Basic Skills course, the student must be able to turn 360 degrees in each direction.

At the course levels above the Technical Diving 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 Technical Diving 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 Technical Diving 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 controlled manner gathered 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 Technical Diving 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 1 and Wreck Diver 1 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 Technical Diver 2 and Wreck Diver 2 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.

1. Shut the right primary tank valve
2. Breathe the primary second stage empty
3. Change to the secondary second stage
4. Clip the primary second stage to the right chest D-ring
5. Open the right primary tank valve
6. Shut the isolator valve with the right hand
7. Open the isolator valve with the left hand
8. Shut the secondary left tank valve while unclipping the primary second stage from the D-ring
9. Breathe the secondary second stage empty
10. Change from the secondary second stage to the primary second stage

11. Open the left secondary tank valve
12. Check that all valves are fully open

Procedures for handling a free flowing primary regulator

To pass the Technical Diving 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 Technical Diver Basic Skills course, students are required to perform a freeflowing primary regulator drill in less than thirty seconds and not ascending or descending more than half a meter or changing direction in the water.

1. Shut the primary right tank valve while signalling about the problem to the team
2. Breathe the primary second stage empty
3. Change to the secondary second stage
4. 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 freeflow 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 freeflowing wing inflator

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

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

Procedures for handling out-of-gas situations

To pass the Technical Diving Basic Skills course, students are required to follow routines for solving an out-of-gas situation swimming for at least 25 meters along a reference line or making an ascent with planned stops without deviating with more than one meter from the target depth.

To pass the course levels higher than the Technical Diving Basic Skills course, students are required to follow routines for solving an out-of-gas situation swimming for at least 25 meters along a reference line or making an ascent with planned stops without deviating with more than half a meter from the target depth.

1. Signal about the problem to the team
2. Swim to the closest team member signalling “out-of-gas”
3. 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
4. The gas donor must lift the long hose over his/her head and stretch it to the out-of-gas diver
5. The out-of-gas diver accepts the second stage, empties it of water and starts to breath
6. The divers should now be facing each other
7. Check that the team did not loose references such as the line or the depth
8. If the team consists of three divers, the third diver should assist the others if needed
9. The donor’s 210 cm long low pressure hose should now be deployed fully
10. The out-of-gas diver clips his primary second stage onto the right chest D-ring
11. 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
12. 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
13. Check that the team is gathered together and is ready to move
14. Abort the dive and move to the point where the ascent can start

Decompression procedures

On the Technical Diving Basic Skills course a simulated decompression with one switch of gas should be practiced.

On the Technical Diver 1 course a simulated decompression with two switches of breathing gas should be practiced. On the final dives the decompression required by the circumstances of the dives but with at least one switch of gas during the ascent should be conducted.

On the Technical Diver 2 course a simulated decompression with three switches of breathing gas should be practiced. On the final dives the decompression required by the circumstances of the dives but with at least two switches of gas during the ascent should be conducted.

Handling of the decompression gas and bottom gas stage tanks

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

Technical Diving Basic Skills: handling one extra tank

Technical Diver 1: handling two extra tanks

Technical Diver 2: handling three extra tanks

Wreck Diver 1: handling one extra tank

Wreck Diver 2: handling one to three extra tanks depending on the dive

All extra tanks are carried on the left side. Tank 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.

1. Check that the tank intended for the switch of breathing gas is easy to reach by inspecting the tank markings
2. Open the tank valve ¼ of a turn to check the pressure and integrity
3. Shut the valve
4. Follow the regulator hose and check if there is anything that can interfere with it's 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.

1. Grip the second stage and deploy the regulator hose fully
2. 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 tank with correct MOD marking are connected
3. 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
4. Put the hose around your neck
5. 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
6. Clip the primary second stage to the right chest D-ring
7. Confirm the gas switch with an "OK" sign
8. 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 six-nine meters.

Handling the surface marker buoy

To pass the SwedTech Diving Technical Diving 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 Technical Diving 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 Technical Diving 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 Technical Diving 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 conducting the line.

To follow the line without any reference together with the team

This exercise should be practiced 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 practiced on the outside of a wreck. When the students show sufficient level of skill it is also practiced inside the wreck.

Unconscious diver rescue

To pass the SwedTech Diving Technical Diving Basic Skills course, students must bring up an unconscious diver (simulated) from at least 15 meters of depth and together conduct a 0.5-1 minutes long stop at the depth of three-six meters. After that, the unconscious diver should be towed for at least 50 meters.

To pass the course levels above the Technical Diving 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 analyze his/her breathing gases prior to diving and also calculate the maximum depth for the gases. All tanks should after the analysis be marked according to SwedTech Diving standards for marking of the tanks.

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

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

Technical Diving Basic Skills

Goal with the course

Main goal of the SwedTech Diving Technical Diving 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 to 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
- Plan and execute dives with Nitrox as 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 environment and with decompression obligation which creates overhead environment
- Solve the common equipment problems which can arise when diving with equipment for technical diving
- 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

Prerequisites

- The student must be at least 18 years old
- The student must have proof of at least 50 dives
- The student must be in excellent health

Equipment configuration

- A wing with backplate and harness
- Manifold doubles, recommended size 4800 litres of gas
- Two first stages
- Two second stages
- A 210 cm long low-pressure hose to the primary second stage
- One submersible pressure gauge
- Mask and fins
- Back-up mask
- One knife placed on the left side of the harness waist strap
- One bottom timer or wrist-mounted computer
- Wetnotes
- One spool or reel with at least 25m of line

- One surface marker buoy
- One primary light
- One back-up light
- One aluminium tank for bottom gas, recommended size 11 litres
- One regulator with submersible pressure gauge for the extra tank
- Drysuit with leg pockets or wetsuit with leg pockets if the temperature allows is

Knowledge and Theory

- Gases and gas laws
- Nitrox
- Use of helium-based gases
- Physiology
- Decompression theory
- Use of decompression gases
- 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 "Technical Diving in Plain Swedish" ("Teknisk dykning på ren svenska" by Michael Bergström). As a proof of that, the students must answer correctly at least 90% of the questions in the written exam after the Technical Diving Basic Skills course.

Practical knowledge

To pass the Technical Diving Basic Skills course, the student must:

Equipment configuration

Be able to put together and understand the thinking behind a diving rig set up according to SwedTech Diving standards.

S-drill

At the surface be able to perform an s-drill together with the team

Swimming techniques

Be able to show mastering of the swim techniques in such a way that it is obvious that the student understands and the instructor sees that the student can practice the swimming techniques by himself after the completed course. Be able to swim backwards at least three meters. Turn at least 360 degrees in each direction using the helicopter-turn.

Buoyancy techniques

Be able to lie still in horizontal position without deviating by more than one meter from the target depth with the bottom as a reference, or, when ascending, with 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.

Controlled descents and ascents

Students must be able to conduct descents and ascents in controlled manner gathered together so that anybody in the team can give and get attention without a delay.

Diving in a team

Understand and use the advantages of diving in a well-balanced team

Hand signals

Understand and at the right moment use the standard hand signals

Light signals

Understand and at the right moment use the standard light signals

Touch-contact signals

Understand and at the right moment use the standard touch-contact signals

Valve drill

Conduct a valve drill without deviating from target depth with more than half a meter and without changing direction

Handling the freeflowing equipment

Handle a freeflowing regulator or wing inflator without deviating from target depth with more than half a meter

Out-of-gas situations

Students are required to follow routines for solving an out-of-gas situation swimming for at least 25 meters along a reference line or making an ascent with planned stops without deviating with more than one meter from the target depth.

Decompression procedures

Conduct and ascent with at least four stops and one change of gas without deviating from the target depth on the stops with more than one meter.

Handling a stage/deco tank

Understand and conduct handling of one extra tank with Air/Nitrox according to the SwedTech Diving tank handling standards.

Handling of a surface marker buoy

Deploy a surface marker buoy within three minutes.

Handling a back-up mask

Retrieve the back-up mask from the right pocket and switch to it.

Handling a back-up light

Make the team aware of the problem and switch to the back-up light.

Handling a guideline

Be able to handle and understand basics of laying a guide line with a spool or a line reel.

Follow a guideline without any reference together with the team

To follow a guideline together with the team using correct touch signals (everybody wears a blindfold).

Diver rescue

Bring up an unconscious diver (simulated) from at least 15 meters of depth and together conduct a 0.5-1 minutes long stop at the depth of three-six meters.

Gas analysis

Analyze the gases to be used and calculate their maximum depth.

Limits

- Maximum depth during the course is 18 meters
- Maximum PO₂ is 1.4 bars
- No overhead diving
- Maximum 3 students per instructor during the practical training in the water

Outline

The course can be conducted in a single pass or according to a schedule agreed with the students. Normally it takes at least six days/three students.

The students must receive at least 10 hours of practical exercises in the water and 20 hours of theory and dive briefings.

The course can be started in a pool, but at least five hours must be conducted in a lake, the sea or similar environment.

Technical Diver 1

Goal with the course

Technical Diver 1 course gives the students an opportunity to reach targets outside of the scope of traditional sports diving. Here, the skills that the students have learned at Technical Diving 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 Nitrox or Oxygen for accelerated decompression
- Plan and conduct dives that require helium-based bottom mixes for lower equivalent narcotic depth
- Understand and plan overhead dives, both in physical overhead environment and with decompression obligation which creates overhead environment
- Solve multiple equipment problems which can occur when diving with equipment for technical diving
- 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

Prerequisites

- The student must be at least 18 years old
- The student must be in excellent health
- Have passed the Technical Diving Basic Skills course
- Have a proof of at least 100 dives in various environment, 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 tank)
- 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 hover for at least 20 minutes without deviating with more than one meter from the target depth

Equipment configuration

- A backplate with harness, D-rings and a crotch strap
- A wing without straps with approximately 20 kilo of lift
- 2 first stages
- 2 second stages
- A 210 cm long low-pressure hose to the primary second stage

- A 55-60 cm hose to the secondary second stage
- 1 submersible pressure gauge with 55-60 cm high-pressure hose
- Manifold doubles with isolator valve, minimum gas volume 4800 litres
- An aluminium tank for decompression gas, minimum volume 5.5 litres
- An aluminium tank for bottom gas, minimum volume 11 litres
- Two regulators with submersible pressure gauge for the decompression tank and the tank with extra bottom gas
- A dry suit with two attached leg pockets
- A tank for drysuit inflation with regulator (with over-pressure valve) and low-pressure hose
- A primary light with separate Battery canister and goodman grip
- Two bottom timers
- Two line spools with at least 45 meters of line on each of them
- A surface marker buoy
- A cutting tool
- Two back-up lights
- A back-up mask
- Wetnotes
- The 210 cm long hose to the primary second stage and the manometer hose must be equipped with a pistol clip tied with a piece of polyester line

Knowledge of theory

- Gases and gas laws
- Nitrox
- Use of helium-based gases
- Physiology
- Decompression theory
- Use of decompression gases
- 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 "Technical Diving in Plain Swedish" ("Teknisk dykning på ren svenska") by Michael Bergström. As a proof of that, the students must answer correctly at least 90% of the questions in the written exam after the Technical Diver 1 course.

Practical knowledge

To pass the Technical Diving Basic Skills course, the student must:

Equipment configuration

Be able to put together and understand the thinking behind a diving rig set up according to SwedTech Diving standards.

S-drill

At the surface and at the depth of six-nine meters be able to perform an s-drill together with the team

Swimming techniques

Use various swimming techniques depending on different situations during diving. Be able to swim backwards at least ten meters. Turn at least 360 degrees in each direction using the helicopter-turn.

Buoyancy techniques

Be able to hover in horizontal position without deviating by more than half a meter from the target depth with the bottom as a reference, or, when ascending, with the ascent line as a reference. 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 controlled manner gathered together so that anybody in the team can give and get attention without a delay.

Diving in a team

Understand and use the advantages of diving in a well-balanced team. Notice and solve problems in a team before they lead to more problems.

Hand signals

Understand and at the right moment use the standard hand signals

Light signals

Understand and at the right moment use the standard light signals

Touch-contact signals

Understand and at the right moment use the standard touch-contact signals

Valve drill

Conduct a valve drill in less than two minutes without deviating from target depth with more than half a meter and without changing direction

Handling the freeflowing equipment

Handle a freeflowing regulator or wing inflator without deviating from target depth with more than half a meter

Out-of-gas situations

Students are required to follow routines for solving an out-of-gas situation, swimming for at least 25 meters along a reference line or making an ascent with planned stops without deviating with more than half a meter from the target depth.

Decompression procedures

Conduct decompression with changes of gas.

Handling a stage/deco tank

Understand and conduct handling of two extra tanks with air/nitrox, oxygen and helium according to the SwedTech Diving tank handling standards.

Handling of a surface marker buoy

Deploy a surface marker buoy within two minutes.

Handling a back-up mask

Retrieve the back-up mask from the right pocket and switch to it.

Handling a back-up light

Make the team aware of the problem and switch to the back-up light.

Handling a guideline

Be able to lay line with a spool or a line reel.

Follow a guideline without any reference together with the team

To follow a guideline together with the team using correct touch signals (everybody wears a blindfold).

Diver rescue

Bring up an unconscious diver (simulated) from at least 15 meters of depth and together conduct a 0.5-1 minutes long stop at the depth of three-six meters. After that, the unconscious diver should be towed for at least 50 meters.

Gas analysis

Analyze the gases to be used and calculate their maximum depth.

Limits

- Maximum PO₂ for bottom mixes is 1.4 bars
- Maximum PO₂ for decompression mixes is 1.6 bars
- Equivalent narcotic depth (END) max 30 meters
- Maximum depth is 55 meters
- Maximum 3 students per instructor during the practical training in the water

Outline

The course can be conducted in a single pass or according to a schedule agreed with the students. Normally it takes at least seven days/three students.

The students must receive at least 10 hours of practical exercises in the water on top of the decompression dives at the end of the course. Training dives are conducted in the sea, a lake or similar environment. Final decompression dives are conducted in the open sea. Depth of the final dives must be 40-55 meters. Total ascent time must be at least 20 minutes. At least four final decompression dives must be conducted.

The students must receive at least 20 hours of theory and dive briefings.

Technical Diver 2

Goal with the course

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 use of at least two decompression gases during the ascent phase of the dive
- Plan and conduct dives that require helium-based bottom mixes for lower equivalent narcotic depth
- Effectively handle an extra third tank filled with either decompression gas or bottom gas to dive deeper or with longer bottom time
- Understand and plan overhead dives, both in physical overhead environment and with decompression obligation which creates overhead environment
- Solve multiple equipment problems which can come up when diving with equipment for technical diving
- Solve problems during diving using back-up plans
- Solve a problem of gas loss and prevent a serious gas loss
- Simultaneously control 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

Prerequisites

- The student must be at least 20 years old and in excellent health
- Have passed the Technical Diver 1 course
- Have a proof of at least 200 logged dives
- Have made at least 100 dives with the equipment used on the course (excl. the deco tank)
- Simultaneously master swimming techniques and buoyancy
- Be able to hover for at least 20 minutes without deviating with more than half a meter from the target depth

Equipment configuration

- A backplate with harness, D-rings and a crotch strap
- A wing without straps with approximately 20 kilo of lift capacity
- 2 first stages
- 2 second stages
- A 210 cm long low-pressure hose to the primary second stage
- A 55-60 cm hose to the secondary second stage
- 1 manometer with 55-60 cm high-pressure hose
- Manifold doubles with isolator valve, minimum gas volume 4800 litres
- Two aluminium tanks for decompression gases, minimum volume 5.5 litres
- An aluminium tank for bottom gas, minimum volume 11 litres

- Three regulators with submersible pressure gauge for the decompression tanks and the tank with extra bottom gas
- A dry suit with two attached leg pockets
- A tank for drysuit inflation with regulator (with over-pressure valve) and low-pressure hose
- A primary light with separate battery canister and goodman grip
- Two bottom timers
- Two line spools with at least 45 meters of line on each of them
- A surface marker buoy
- A cutting tool
- Two back-up lights
- A back-up mask
- Wetnotes
- The 210 cm long hose to the primary second stage and the manometer hose must be equipped with a pistol clip tied with a piece of polyester line

Knowledge of theory

- Gases and gas laws
- Nitrox
- Use of helium-based gases
- Physiology
- Decompression theory
- Use of decompression gases
- 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 "Technical Diving in Plain Swedish" ("Teknisk dykning på ren svenska") by Michael Bergström. As a proof of that, the students must answer correctly at least 90% of the questions in the written exam after the Technical Diver 2 course.

Practical knowledge

To pass the Technical Diving Basic Skills course, the student must:

Equipment configuration

Be able to put together and understand the thinking behind a diving rig set up according to SwedTech Diving standards.

S-drill

At the surface and at the depth of six-nine meters be able to perform an s-drill together with the team

Swimming techniques

Use various swimming techniques depending on different situations during diving. Be able to swim backwards at least ten meters. Turn at least 360 degrees in each direction using the helicopter-turn.

Buoyancy techniques

Be able to hover in horizontal position without deviating by more than half a meter from the target depth with the bottom as a reference, or, when ascending, with the ascent line as a reference. 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 gathered together so that anybody in the team can give and get attention without a delay.

Diving in a team

Understand and use the advantages of diving in a well-balanced team. Notice and solve problems in a team before they lead to more problems.

Hand signals

Understand and at the right moment use the standard hand signals

Light signals

Understand and at the right moment use the standard light signals

Touch-contact signals

Understand and at the right moment use the standard touch-contact signals

Valve drill

Conduct a valve drill in less than one minute without deviating from target depth with more than half a meter and without changing direction

Handling the freeflowing equipment

Handle a freeflowing regulator or wing inflator without deviating from target depth with more than half a meter

Out-of-gas situations

Students are required to follow routines for solving an out-of-gas situation, swimming for at least 25 meters along a reference line or making an ascent with planned stops without deviating with more than half a meter from the target depth.

Decompression procedures

Conduct decompression with at least two changes of gas.

Handling a stage/deco tank

Understand and conduct handling of three extra tanks with air/nitrox, oxygen and Trimix according to the SwedTech Diving tank handling standards.

Handling of a surface marker buoy

Deploy a surface marker buoy within two minutes.

Handling a back-up mask

Retrieve the back-up mask from the right pocket and switch to it.

Handling a back-up light

Make the team aware of the problem and switch to the back-up light.

Handling a guideline

Be able to lay line with a spool or a line reel.

Follow a guideline without any reference together with the team

To follow a guideline together with the team using correct touch signals (everybody wears a blindfold).

Diver rescue

Bring up an unconscious diver (simulated) from at least 15 meters of depth and together conduct a 0.5-1 minutes long stop at the depth of three-six meters. After that, the unconscious diver should be towed for at least 50 meters.

Conduct a simulated decompression where one of the team members is completely dependant on the other team members.

Gas analysis

Analyze the gases to be used and calculate their maximum depth.

Limits

- Maximum PO₂ for bottom mixes is 1.4 bars
- Maximum PO₂ for decompression mixes is 1.6 bars
- Equivalent narcotic depth (END) max 30 meters
- Maximum depth during training is 75 meters
- Maximum 3 students per instructor during the practical training in the water

Outline

The course can be conducted in a single pass or according to a schedule agreed with the students. Normally it takes at least seven days/three students.

The students must receive at least 10 hours of practical exercises in the water on top of the decompression dives at the end of the course. Training dives are conducted in the sea, a lake or similar environment. Final decompression dives are conducted in the open sea. Depth of the final dives must be 60-75 meters. At least four final decompression dives must be conducted.

The students must receive at least 20 hours of theory and dive briefings.

Wreck Diver 1

Goal with the course

This course includes everything you need to become a good, and even more important, a safe wreck diver.

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.

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 obligation which creates overhead environment
- Solve multiple equipment problems which can come up when diving with equipment for technical diving
- 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 like in a total darkness or silt-out
- 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

Prerequisites

- The student must be at least 18 years old
- The student must be in excellent health
- Have passed the Technical Diver Basic Skills course
- Have a proof of at least 100 dives in various environment, 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/stage tank)
- 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 hover for at least 20 minutes without deviating with more than one meter from the target depth

Equipment configuration

- A backplate with harness, D-rings and a crotch strap
 - A wing without straps with approximately 20 kilo of lift
 - 2 first stages
 - 2 second stages
 - A 210 cm long low-pressure hose to the primary second stage
 - A 55-60 cm hose to the secondary second stage
 - 1 manometer with 55-60 cm high-pressure hose
 - Manifold doubles with isolator valve, minimum gas volume 4800 litres
 - A dry suit with two attached leg pockets
 - A primary light with separate cattery canister and goodman grip
 - Two bottom timers
 - Two line spools with at least 45 meters of line on each of them
 - A surface marker buoy
 - A cutting tool
 - Two back-up lights
 - A back-up mask
 - Wetnotes
 - The 210 cm long hose to the primary second stage and the manometer hose must be equipped with a pistol clip tied with a piece of polyester line
- Optional can one stage tank with bottom mix be used during the course.

Knowledge of theory

- Gases and gas laws
- Nitrox
- Use of helium-based gases
- Physiology
- Decompression theory
- Use of decompression gases
- Dive planning
- Gas planning when diving wrecks
- Wreck search
- How to put a reference/mooring line on the wreck
- Navigation on wrecks
- Diving in low visibility
- Dangers and risks of wreck diving
- Laws and regulations regarding wrecks
- 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 "Technical Diving in Plain Swedish" by Michael Bergström. As a proof of that, the students must answer correctly at least 90% of the questions in the written exam after the Wreck Diver 1 course.

Practical knowledge

To pass the Technical Diving Basic Skills course, the student must:

Equipment configuration

Be able to put together and understand the thinking behind a diving rig set up according to SwedTech Diving standards.

S-drill

At the surface and at the depth of six-nine meters be able to perform an s-drill together with the team

Swimming techniques

Use various swimming techniques depending on different situations during diving. Be able to swim backwards at least ten meters. Turn at least 360 degrees in each direction using the helicopter-turn.

Buoyancy techniques

Be able to hover in horizontal position without deviating by more than half a meter from the target depth with the bottom as a reference, or, when ascending, with the ascent line as a reference. 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. Swim with head down.

Controlled descents and ascents

Students must be able to conduct descents and ascents in controlled manner gathered together so that anybody in the team can give and get attention without a delay.

Diving in a team

Understand and use the advantages of diving in a well-balanced team. Notice and solve problems in a team before they lead to more problems.

Hand signals

Understand and at the right moment use the standard hand signals

Light signals

Understand and at the right moment use the standard light signals

Touch-contact signals

Understand and at the right moment use the standard touch-contact signals

Valve drill

Conduct a valve drill in less than two minutes without deviating from target depth with more than half a meter and without changing direction

Handling the freeflowing equipment

Handle a freeflowing regulator or wing inflator without deviating from target depth with more than half a meter

Out-of-gas situations

Students are required to follow the routines for solving an out-of-gas situation, swimming for at least 25 meters along a reference line or making an ascent with planned stops without deviating with more than half a meter from the target depth.

Decompression procedures

Conduct simulated decompression.

Handling a stage/deco tank

Understand and conduct handling of one extra tank with air or nitrox according to the SwedTech Diving tank handling standards.

Handling of a surface marker buoy

Deploy a surface marker buoy within two minutes.

Handling a back-up mask

Retrieve the back-up mask from the right pocket and switch to it.

Handling a back-up light

Make the team aware of the problem and switch to the back-up light.

Handling a guideline

Be able to lay line with a spool or a line reel.

Follow a guideline without any reference together with the team

To follow a guideline together with the team using correct touch signals (everybody wears a blindfold).

Orientation

Be able to orient on a wreck and know basic ship design.

Diver rescue

Bring up an unconscious diver (simulated) from at least 15 meters of depth and together conduct a 0.5-1 minutes long stop at the depth of three-six meters. After that, the unconscious diver should be towed for at least 50 meters.

Gas analysis

Analyze the gases to be used and calculate their maximum depth.

Limits

- Maximum PO₂ for bottom mixes is 1.4 bars
- Maximum depth is 30 meters
- Maximum 3 students per instructor during the practical training in the water

Outline

The course can be conducted in a single pass or according to a schedule agreed with the students. Normally it takes at least seven days/three students.

The students must receive at least 10 hours of practical exercises in the water.

Training dives are conducted on wrecks in sea or lake.

The students must receive at least 20 hours of theory and dive briefings.

Wreck Diver 2

Goal with the course

Training during the SwedTech Diving Wreck Diver 2 course improves already good skills in wreck and decompression diving. Goal with the course is to be able to plan and execute dives with “double overhead” – physical overhead environment inside a wreck and overhead created by the decompression obligation.

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 penetration dives with that require accelerated decompression with oxygen or nitrox
- Plan and conduct dives that require helium-based bottom mixes to decrease the narcotic depth
- Understand and plan overhead dives, both in physical overhead environment and with decompression obligation creating overhead environment
- Solve multiple equipment problems which can come up when diving with equipment for technical diving
- 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 like in a total darkness or silt-out
- 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

Prerequisites

- The student must be at least 18 years old
- The student must be in excellent health
- Have passed the Technical Diver 1 and Wreck Diver 1 courses
- Have proof of at least 200 dives
- Have proof of at least 20 dives with accelerated decompression
- Have made at least 100 dives with the equipment used on the course (excl. the deco tank)
- 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 hover for at least 20 minutes without deviating with more than half a meter from the target depth

Equipment configuration

- A backplate with harness, D-rings and a crotch strap
- A wing without straps with approximately 20 kilo of lift
- 2 first stages
- 2 second stages

- A 210 cm long low-pressure hose to the primary second stage
- A 55-60 cm hose to the secondary second stage
- 1 manometer with 55-60 cm high-pressure hose
- Manifold doubles with isolator valve, minimum gas volume 4800 litres
- An aluminium tank for decompression gas, minimum volume 5.5 litres
- An aluminium tank for bottom gas, minimum volume 11 litres
- Two regulators with manometers for the decompression tank and the tank with extra bottom gas
- A dry suit with two attached leg pockets
- A tank for drysuit inflation with regulator (with over-pressure valve) and low-pressure hose
- A primary light with separate battery canister and goodman grip
- Two bottom timers
- Two line spools with at least 45 meters of line on each of them
- A surface marker buoy
- A cutting tool
- Two back-up lights
- A back-up mask
- Wetnotes
- The 210 cm long hose to the primary second stage and the manometer hose must be equipped with a pistol clip tied with a piece of polyester line

Knowledge of theory

- Gases and gas laws
- Nitrox
- Use of helium-based gases
- Physiology
- Decompression theory
- Use of decompression gases
- Dive planning
- Gas planning when diving wrecks
- Wreck search
- How to put reference/mooring line on the wreck
- Navigation on wrecks
- Diving in low visibility
- Dangers and risks of wreck diving
- Laws and regulations regarding wrecks
- 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 "Technical Diving in Simple Swedish" by Michael Bergström. As a proof of that, the students must answer correctly at least 90% of the questions in the written exam after the Wreck Diver 1 course.

Practical knowledge

To pass the Technical Diving Basic Skills course, the student must:

Equipment configuration

Be able to put together and understand the thinking behind a diving rig set up according to SwedTech Diving standards.

S-drill

At the surface and at the depth of six-nine meters be able to perform an s-drill together with the team

Swimming techniques

Use various swimming techniques depending on different situations during diving. Be able to swim backwards at least ten meters. Turn at least 360 degrees in each direction using the helicopter-turn.

Buoyancy techniques

Be able to hover in horizontal position without deviating by more than half a meter from the target depth with the bottom as a reference, or, when ascending, with the ascent line as a reference. 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 controlled manner gathered together so that anybody in the team can give and get attention without a delay.

Diving in a team

Understand and use the advantages of diving in a well-balanced team. Notice and solve problems in a team before they lead to more problems.

Hand signals

Understand and at the right moment use the standard hand signals

Light signals

Understand and at the right moment use the standard light signals

Touch-contact signals

Understand and at the right moment use the standard touch-contact signals

Valve drill

Conduct a valve drill in less than one minute without deviating from target depth with more than half a meter and without changing direction

Handling the freeflowing equipment

Handle a freeflowing regulator or wing inflator without deviating from target depth with more than half a meter

Out-of-gas situations

Students are required to follow the routines for solving an out-of-gas situation, swimming for at least 25 meters along a reference line or making an ascent with planned stops without deviating with more than half a meter from the target depth.

Decompression procedures

Conduct accelerated decompression with changes of gas.

Handling a stage/deco tank

Understand and conduct handling of two extra tanks with air, nitrox, oxygen or trimix according to the SwedTech Diving tank handling standards.

Handling of a surface marker buoy

Deploy a surface marker buoy within two minutes.

Handling a back-up mask

Retrieve the back-up mask from the right pocket and switch to it.

Handling a back-up light

Make the team aware of the problem and switch to the back-up light.

Handling a guideline

Be able to lay line with a spool or a line reel.

Follow a guideline without any reference together with the team

To follow a guideline together with the team using correct touch signals (everybody wears a blindfold).

Orientation

Be able to orient on a wreck and know basic ship design.

Diver rescue

Bring up an unconscious diver (simulated) from at least 15 meters of depth and together conduct a 0.5-1 minutes long stop at the depth of three-six meters. After that, the unconscious diver should be towed for at least 50 meters.

Gas analysis

Analyze the gases to be used and calculate their maximum depth.

Limits

- Maximum PO₂ for decompression mixes is 1.6 bars
- Maximum PO₂ for bottom mixes is 1.4 bars
- Maximum equivalent narcotic depth (END) is 30 meters

- Maximum depth during training is 55 meters
- Maximum 3 students per instructor during the practical training in the water

Outline

The course can be conducted in a single pass or according to a schedule agreed with the students. Normally it takes at least five days/three students.

The students must receive at least 10 hours of practical exercises in the water including the decompression dives. Training dives are conducted on wrecks in sea or lake. The final dives are conducted in open sea. Depth of the final dives should be between 40 and 55 meters. Total ascent time should be at least 20 minutes. At least four decompression dives should be conducted during the course.

The students must receive at least 20 hours of theory and dive briefings.

Mixed gas blender

Goal with the course

The student learns how to make the equipment, which the student is authorized to service, compatible with oxygen.

The student learns to blend Nitrox and Trimix.

Prerequisites

- 18 years old and trained diver

www.swedtechdiving.se