



What is a deep dive?

A deep dive is diving deeper than your normal depth—usually between 20 and 50 metres. Don't forget to a trainee a dive to 20 metres is a deep dive. Gases that are normally non-toxic can become poisonous at raised partial pressure. (PP) These gases can be in diving air.

CARBON MONOXIDE (CO) can enter the diver's cylinder during the filling process. It can come from vehicle exhaust fumes or exhaust from a diesel/petrol compressor. No Smoking rule. Cylinders should be tested before use with a Dräger test unit. CO has a greater affinity with haemoglobin than oxygen does. Haemoglobin transports oxygen around the body. If CO is present—the cells take up this gas, so tissues starved of oxygen (hypoxia).

Symptoms Headache, dizziness, staggering, slurred speech, exhaustion, coma can occur, cherry-red flushing—seen at post mortem.

Treatment Remove from source into fresh air and administer oxygen if qualified to do so.

CARBON DIOXIDE CO₂ poisoning is caused by over-exertion, rapid shallow breathing and by trying to conserve air by "Skip breathing" Leads to a reduction of oxygen in the system and increases carbon dioxide levels.

Symptoms/Signs Gasping for breath, exhaustion, dizziness, disorientation, headache.

Treatment Stop what you are doing and rest, concentrate on a normal breathing pattern mentally saying "In – Out" slowly. Abort dive if symptoms persist. Increased risk of nitrogen narcosis. Breathing should be regular and relaxed, avoiding rapid, shallow breathing.

NITROGEN NARCOSIS "Rapture of the Deep" – "the NARCS"

Causes Increased partial pressure (PP) of nitrogen (N₂). Produces similar effects to those of intoxication—effects increase with depth, especially when diving deeper than 30 metres.

Symptoms/Signs The effects are very rapid and affect different divers at different depths. Symptoms similar to excessive intake of alcohol—relaxation—laughter, poor co-ordination affected judgement and reckless behaviour. Be aware of changes in your buddy's diving behaviour.

Avoidance To dive deeper a diver must build up to it progressively. Never dive below 50 metres. To dive especially deep, a diver must be fit. Defensive diving—no alcohol or drugs before a dive—must not be present in body.

Treatment If symptoms appear, ascend until clear. If necessary abort the dive

OXYGEN TOXICITY Oxygen is a gas that supports life. Approximately 20% of the gases we breathe is oxygen—at least 10 % oxygen is required to remain conscious. Oxygen breathed under high pressure is **poisonous**—no symptoms or signs—O₂ toxicity hits very quickly—causes convulsions and unconsciousness. Diver must be brought to surface as quickly as possible and immediate medical assistance sought. Compressed air—not pure oxygen—in your SCUBA cylinder.

Nitrox Air is a natural form of Nitrox which at atmospheric pressure is called Normoxic Nitrox. It is a relatively simple process to produce a varied mix of oxygen and nitrogen, "Nitrox" to reduce both nitrogen narcosis and decompression burdens of a diver. Increasing the oxygen content of a breathing mixture reduces the depth at which pulmonary and Central Nervous System (CNS) oxygen toxicity occurs, but with additional training this is not a problem. Nitrox is a shallow diving gas but bottom times can be substantially improved. The **SAA** approves of the use of Nitrox by trained divers. Training is provided in the safe use of Nitrox through the **SAA** Nitrox Course and the **SAA** also recognises the training given by other organisations, currently IANTD and TDI.

SAA LECTURE No C1

DIVING AIR AND DEEP DIVING



PHYS. CONSIDERATIONS Deep diving requires more and heavier equipment-therefore greater physical ability. Body will chill after prolonged exposure, choose good thermal protection-cold contributes to narcoses, DCI, fatigue, reduced mental ability and reduced performance.

Vision important factor-corrective lenses/contact lenses. Divers should always return to anchor/decompression rope for controlled ascent. Darkness can increase fear, narcosis etc. Dehydration critical factor in susceptibility towards DCI, avoid caffeine, coffee and alcohol-fresh water is recommended.

Simple urine check-clear, light straw coloured-OK-dark and smaller volume-probably dehydrated-DON'T DIVE

Physical performance – proper sleep and little or no stress. No late nights. Do not take drugs to aid sleep and then dive the following day.

Large breakfasts or difficult to digest foods increase risk of narcoses. Eat a light breakfast-eat well post dive.

Deep diving is a demanding physical exercise. Regular exercise/swimming-should be able to cope in all situations, seen and unseen.

Alcohol-smoking-drugs do not mix with diving and could be fatal-affects reaction times, reasoning ability and gas exchange in the lungs.

Medical history should also be considered before diving deep-scar tissue, burns, surgery, previous DCI or arterial gas embolism (AGE) incidents should be cleared by a diving doctor.

Mental Considerations Common cause of accidents and fatalities in divers is panic-not being able to cope in a stressful situation. Anyone who suffers from anxiety attacks, fainting, hyperventilation, claustrophobia etc. should not dive deep.

Coercion/peer pressure-individuals must be genuinely motivated to want to dive-they should not respond to unwelcome pressures from others. Other individuals can be normally headstrong-this type of personality tends not to follow directions, can be selfish-and therefore cannot be relied on

EQUIPMENT Pony cylinder, decompression line, lift bag with line, line reel. Jon line (attaches to decompression line)

SAA Buhlmann Tables/computers

Emergency breathing systems, thermal protection

Extra vigilance required when preparing/maintaining equipment

Risks of depth The deeper you dive the greater the risk of DCI-greater absorption of gases, limited bottom times. Air consumption increased not only by breathing at depth but cold and anxiety. Rescue from depth is made even more difficult-air-distance-ascents-buddy breathing. Many incidents involve inadequate air supply. Buoyancy should be maintained during descent-not once you've reached target depth.

Dive Planning Should be meticulous to involve the whole dive group

Buddy checks should be thorough

Plan the dive – dive the plan