

## **GAS BLENDER 1 - 2**

Dive gas blending for Nitrox and Trimix

non commercial use

### **Intention of this Course**

- Gas Blender 1 course – supports substantial skills for safe and effective blending of dive breathing gas for Nitrox 1 diver for private use.
- Gas Blender 2 course – supports profound and detailed skills for safe and effective blending of dive breathing gas for Nitrox 1 + 2 and Trimix diver for private use.

Gas Blender 2 course substitutes Gas Blender 1 completely. Instruction by ProTec Gas Blender Instructor.

### **Training environment**

For practise exercises any official approved gas-blending systems that fits the needs of the course requirements are suitable.

### **Prerequisites**

- Good knowledge in physics and chemistry, specially pressure acts and combustion under Oxygen.
- Diver certification or substantial knowledge for Nitrox Diver 2 or Trimix, depending on the gas mix. Reason: The Gas Blender have to know also the purpose and therefore all the standards and risks to avoid falsities.
- Minimum age 18 years.

### **Accomplishment**

#### **Gas Blender 1:**

Complete contents, but examination is reduced for the main points. Points with labelled "GB2" are for Gas Blender 2 course only. For practise exercises just one mixing system (like partial pressure method) is enough.

#### **Gas Blender 2:**

Very profound and detailed contents, same for examination. When practical training on systems, partial pressure mixing and another method e.g. by over-flow or molecular filter is obligatory. The Gas Blender 2 is the pre- stage for Gas Blender Instructor, which is for commercial use.

For GB1 and GB2 practical training how to clean dive cylinders, valves and regulators is necessary. Use also different gas analysis tools and compare the results.

The produced Gas Blender certification does not substitute any official licence, if needed.

If there is no number (1 or 2) for Gas Blender provided for registration, certification will be issued for Gas Blender 1.

### **Theoretical lessons**

- Nitrox Diver 2 and Trimix Diver knowledge will be assumed and verified.
- Partial pressure law, heating (and cooling) at pressure change
- Combustion under Oxygen – the facts, what could burn when at pure Oxygen.
- Potential of danger – the "3": Oxygen (O<sub>2</sub>) plus inflammable material + ignition spark or high temperature = reaction!
- Measures for safety – reduce the "3" to 1 (O<sub>2</sub>),
- Material science – Oxygen compatible or not – what does this mean theoretical (near all will burn with 100% O<sub>2</sub> if the temperature fits) and practical.
- Oxygen clean – what is OK – what is not. Cleaning methods and means.
- Oxygen Service – definition and status, techniques.
- Dive equipment right from the shop – what is adequate – what could be adapted – and what not and why (e.g. design of valves, 1. stage, some edges causes velocity = causes rise of temperature)
- Compressors – types and their ability to be a part of an EANx mixing system.
- Gas mixing systems – types and methods overview (partial pressure, over- flow, molecular filter)
- Mobile systems and fixed systems – use, market overview, cost benefit equation
- Pro's and con's of the different systems, search for the best method for personal needs
- Problems when filling others (foreign) Nitrox cylinders.
- Safety measures, emergency plan and official orders & laws
- (GB2 only) Commercial law and technical standards for running a breathing mixed- gas system (system technique, use, operation site, customer area)
- Nitrox selling protocols for customers and suppliers safety, warranty.

### **Practical training**

- Adopt dive equipment (cylinders, valves, hoses, regulators and gauges) and clean it for Oxygen service level.
- The proper storage for resources (Oxygen, Helium) and how to attach to the system.
- (GB2 only) Prepare the system for use and check it.
- Mix gases, fill up, quality assurance.
- Recognise problems and solve it, plan and perform service intervals (e.g. filter change)
- (GB2 only) Organisation of a continuous operation and optimise it.

### **Courseware**

Visit ProTec members area for any material / price list.

no Courseware

### **Download - Checklist**

See document: Checklist GBL 1-2 DE\_EN.pdf