

Mixed Gas Blender and Oxygen Service Technician

OVERVIEW

- This course is to provide the student with the skills and knowledge needed to safely handle high pressure gases, prepare oxygen enriched air and helium base mixes, and prepare equipment for oxygen service.

QUALIFICATIONS OF GRADUATES

- Upon successful completion of this course, graduates are considered competent to prepare Oxygen Enriched Air and Helium based breathing gases without direct supervision for use by divers- provided that the equipment used is the same or approximates that used in training. And to prepare scuba equipment for oxygen service provided that they have been authorized by the manufacturer for servicing the particular brand of equipment being placed into oxygen service.

PREREQUISITES FOR ENTERING THE COURSE

- Minimum age of 18.

COURSE POLICIES

- Classroom hours- eight are estimated
- Workbench hours- four are estimated
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EQUIPMENT

- A mixing station that meets the requirements of the mixes being blended.
- An oxygen analyzer and helium analyzer (if available)
- Equipment used to blend, dispense, contain, or use breathing gas mixtures that exceed 40% oxygen content must first be oxygen cleaned
- Oxygen compatible lubricants and soft components for use with equipment used during workbench practice
- Steam or pure, hot water from a pressurized dispenser.
- Biodegradable degreasing agents, e.g., Dawn®, Joy®
- Safety glasses
- Non-powdered rubber gloves
- Stainless steel containers to hold regulator and valve parts during cleaning
- Ultraviolet black light
- Flashlight
- Sharp wooden or plastic picks
- Stainless forceps suitable for removing parts from caustic or heated solutions
- Stiff nylon brush
- Clear, one-liter glass flask
- Plastic beaker
- pH test strips
- Scuba repair tools as recommended by manufacturer

SKILL REQUIREMENTS

- The students are to analyze the breathing gas mixtures resulting from their own breathing gas blending practice. Students shall demonstrate mastery of the breathing gas blending system used in training, i.e., each student will be able to complete a blending and cylinder filling operation without prompting by the instructor and without error. The students are to clean, verify and document one

cylinder, cylinder valve and first stage of a regulator for oxygen service with out prompting by the instructor and without error.

ACADEMIC REQUIREMENTS

- **Manufacturer Specific Information**
Instructors may support the breathing gas blending station's manufacturer's manuals and equipment guide with any materials they regard appropriate as well as manufacturer(s) scuba regulator repair manuals for scuba equipment that is to be oxygen cleaned during the workbench practical session.
- **Applied Sciences**
This is to cover the relevant mathematics and calculations of gas blending, including partial pressure, continuous flow, and gravimetric blending, and nitrogen separation-injection. Physics, physiology, and medical aspects as applied to Oxygen Enriched Air and Helium-based mixed gas diving with special emphasis on, oxygen toxicity (whole body otu's/uptd's and CNS otl's), hypoxia, inert gas narcosis, tissue inert gas tensions, inspired inert as tension, carbon dioxide toxicity, gas perfusion, and diffusion rates (remediation of specific subject knowledge as needed).
- **General Information**
Instructors may use information from manufacturers and government agencies, i.e., Bauer, Ingersol Rand, NOAA, OSHA, CGA, etc., on compressor system designs, compressed air standards, gas contamination limits, oxygen cleaning techniques and requirements, periodic inspection requirements, hazardous material (HAZMAT) training regarding handling of compressed gases, hyperfiltration systems, the theory and problems presented by gas stratification, fire risks regarding fuel and ignition sources, equipment servicing and maintenance.