

## Diving & Life Support Services

### Equipment Testing and Validation

QinetiQ provides unmanned and manned testing services to define and assess the safe performance of diving systems.

#### Breathing Equipment Testing

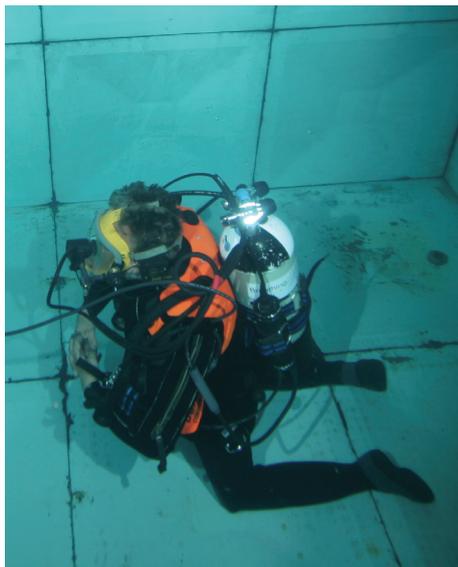
Specialists have utilised the QinetiQ Life Support Systems Laboratory (LSSL) for more than 20 years for the evaluation of a wide variety of commercial, military and recreational diving and life support equipment.

With gas heating and humidification, oxygen consumption and carbon dioxide injection, the dual hyperbaric breathing machines can achieve full metabolic simulation, to test equipment across a wide range of ventilation rates. All parameters of the equipment from the breathing performance to the gas composition can be monitored in real time.

QinetiQ hyperbaric chambers and environmentally controlled facilities can replicate a wide range of environments and operational conditions, from deep sea and arctic cold to tropical heat, both in and out of water. Equipment can be mounted and manipulated through a full range of diver orientations.

Equipment is evaluated for compliance to current standards, such as BS EN 250, BS EN 145, EN 14143 and NORSOK/U101 guidelines, and QinetiQ has worked closely with leading manufacturers to provide independent assessments and help them gain CE marking for their equipment.

Following on from unmanned testing QinetiQ can also conduct manned trials to assess the performance of diving and life support equipment. We offer a complete service from the creation of ethical protocols, supervision and operation of trials (including the provision of diving support), real time monitoring of a full range of physiological and equipment parameters and the interpretation of



Head mounted display trial

data and generation of reports. QinetiQ provides diving facilities and collaborates with a variety of military and commercial organisations to provide access to specialised hyperbaric environments.

#### Ancillary Equipment Testing

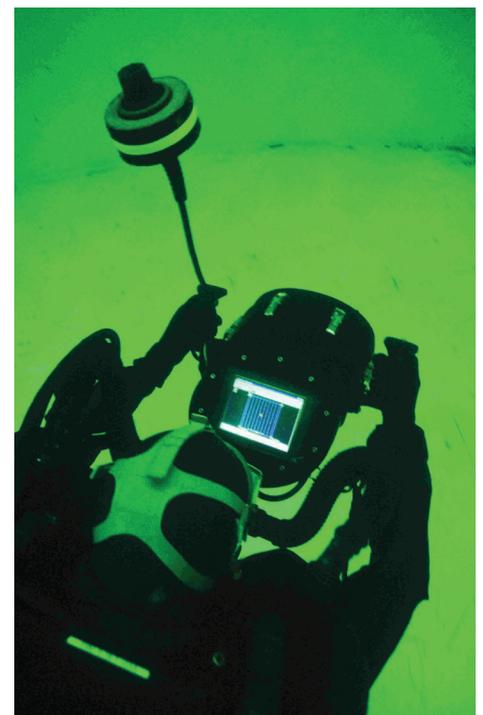
The combination of QinetiQ's team of expert scientists and engineers and the range of specialist facilities available, enable us to undertake performance measurement of many types of ancillary diving equipment, large and small. Our facilities include large test tanks and hyperbaric chambers. Tests can be performed to measure speed, pressure, flow, temperature, endurance and many other aspects of performance.

The clear water in the test tanks allows QinetiQ's in-house photographic team to capture high quality underwater still and video footage (including high speed). This footage can be used either for measuring performance or promotional material.

Recent trials include the workup of a new Remotely Operated Vehicle (ROV) prior to field use. In addition, specific test rigs were designed and developed to measure the kink resistance of diving umbilicals, mask field of vision and the thermal performance of drysuits.

Other items that have been tested include:

- Diver Propulsion Vehicles (DPV)
- Buoyancy Control Devices
- Suit inflation
- Enclosed Mine Lifting Bag
- Handheld sonar devices
- Diving fins
- Diver navigation equipment



Diver Reconnaissance System under trial

## Acoustic & Communications Testing

QinetiQ has a dedicated underwater anechoic facility for acoustic testing of diving equipment. This facility provides a background noise level of less than sea state zero. Equipment can be tested using our team of HSE qualified divers or unmanned tested by using a breathing simulator. A wide range of acoustic measurements can be made, such as:

- Measuring the noise signatures of mine countermeasures equipment
- Measuring the internal noise level inside diving helmets
- Testing the speech intelligibility of divers' communications systems
- Testing of long range acoustic systems can also be achieved in the facility by using attenuating materials to provide the expected acoustic transmission losses.
- Noise measurements of larger items can be performed in the Ocean Basin facility located at QinetiQ, Gosport, UK.

## Gas & Absorbent Analysis

Through our UKAS accredited Environmental Sciences Laboratory (ESL) QinetiQ offers the analysis of compressed gases, using state-of-the-art techniques.

These include:

- The identification and quantification of routine contaminants, for example; carbon dioxide, carbon monoxide, nitrous oxide and other organic infrared absorbing chemicals
- Quantification of water content
- Quantification of oxygen content
- Quantification of particulate content

QinetiQ reports to a range of European and International Standards such as BS 8478, BS EN 12021, Defence Standard 68-284/3 and NATO STANAG 1458.

### QinetiQ

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QinetiQ also offers:

- The identification and quantification of bulk components and inert gases
- Quantification of hydrogen content
- Further identification and quantification of other contaminants, for example solvents, refrigerants and hydrocarbons

The ESL also offers analysis of soda lime and other carbon dioxide absorbents to STANAG 1411 and a range of other bespoke analyses to provide customers with a full range of information.

## Thermal Equipment Testing

We test all aspects of thermal protection for divers, ranging from measuring the insulation of diving suit materials (test rig in accordance with BS EN 14225), through testing complete clothing ensembles on mannequins, to manned trials.

We have the facilities and expertise to conduct manned trials on passive or active heating or cooling systems over the full design temperature and endurance envelope, using a wide range

of physiological monitoring techniques. This encompasses trial design, production of ethical protocols, management of trials and analysis and presentation of data.

## Magnetic Assessment and Testing of Diving Equipment

QinetiQ has the capability and dedicated facility to test Explosive Ordnance Disposal (EOD) equipment, including diving equipment and tools, to STANAG 2897 and AEODP-7 Standards and to BR8622 (1).

QinetiQ magnetic services include:

- EOD equipment inspection/ health checks
- Certification to NM-A and NM-B standard
- Calculation & Certification of NM-C safe distance
- Identification of equipment failures and failure reports
- Magnetic signature analysis and advice on equipment defects
- Training for users, managers and manufacturers

## About QinetiQ Diving & Life Support Services

QinetiQ has unrivalled knowledge in the field of diving and life support. Over the last 30 years we have delivered diving and life support services to the UK Royal Navy, NATO, UK Health and Safety Executive and commercial diving organisations such as Technip.

We are a long-term partner for diving and life support research, testing and evaluation for the UK Royal Navy.

QinetiQ is one of the world's leading research organisations into hyperbaric physiological effects in diving and other environments, and regularly provides rapid response provision of forensic testing services for the investigation of diving incidents.

Our independence from suppliers is important to us and ensures that the advice we provide is totally impartial.

Our Diving & Life Support Services are supported by an extensive range of unique world class facilities in the Diving and Hyperbaric Test Centre at QinetiQ, Gosport, UK.

QinetiQ Diving & Life Support Services include:

- Equipment Testing and Validation – providing unmanned and manned testing services to define the safe performance of diving systems.
- Incident Investigation – rapid response forensic service for investigating diving equipment involved in serious incidents including the provision of expert witness.
- Diver Performance Optimisation, Testing & Advice – providing assessment of gas toxicity, decompression profiles, effects of sound and thermal protection for optimal diver performance.
- Diving Safety and Assessment – development of standards for diving equipment and systems, building safe optimised diving procedures and technical support to equipment safety cases.
- Diving Medical Support – medical support to diving operations including the provision of hyperbaric oxygen therapies at St Richard's Hospital, Chichester, along with the capability to perform diving medicals.

Delivering world class Diving & Life Support Services to customers around the world