

## Our heritage in supporting submarines

Our facility in Portsmouth has over 60-years of technological heritage in the engineering and maritime sector, and have produced an extensive range of atmosphere control systems for submarines, including;

- H<sub>2</sub>-CO Burners
- H<sub>2</sub> Purifiers
- Reformers
- Smoke Removal Units
- CO<sub>2</sub> Scrubbers
- NBC Filters
- Oxygen Generation

We design, develop and manufacture cutting-edge air management systems for submarines and surface ships; and are a key supplier to the UK and many other submarine programmes, offering the latest advanced stealth technology.

## Developed with Micropore

The CO<sub>2</sub>RE units have been developed exclusively with market leading Micropore whose patented technology is the first major advance in CO<sub>2</sub> adsorbent technology in over 100 years - providing superior performance advantages over existing granular adsorbents.

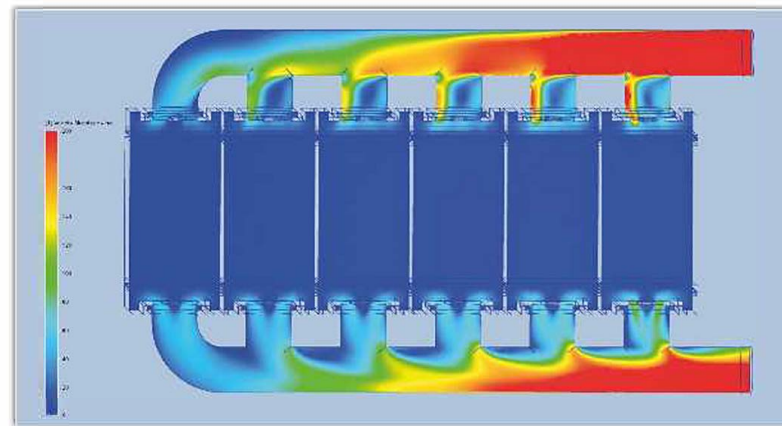
Micropore uses a CO<sub>2</sub> adsorbent powder which is formed into a cartridge to create a revolutionary CO<sub>2</sub> adsorbent system used in re-breathing and life support applications.

The company has an excellent record in supplying carbon dioxide adsorbents for use in submarines, surface combatants, CBRN enclosures, mines and aerospace platforms.



## CO<sub>2</sub>RE performance

Designed with advanced computational fluid dynamics (CFD) to optimise the performance of the CO<sub>2</sub>RE units in CO<sub>2</sub> removal. This provides an optimally balanced solution across all modules.



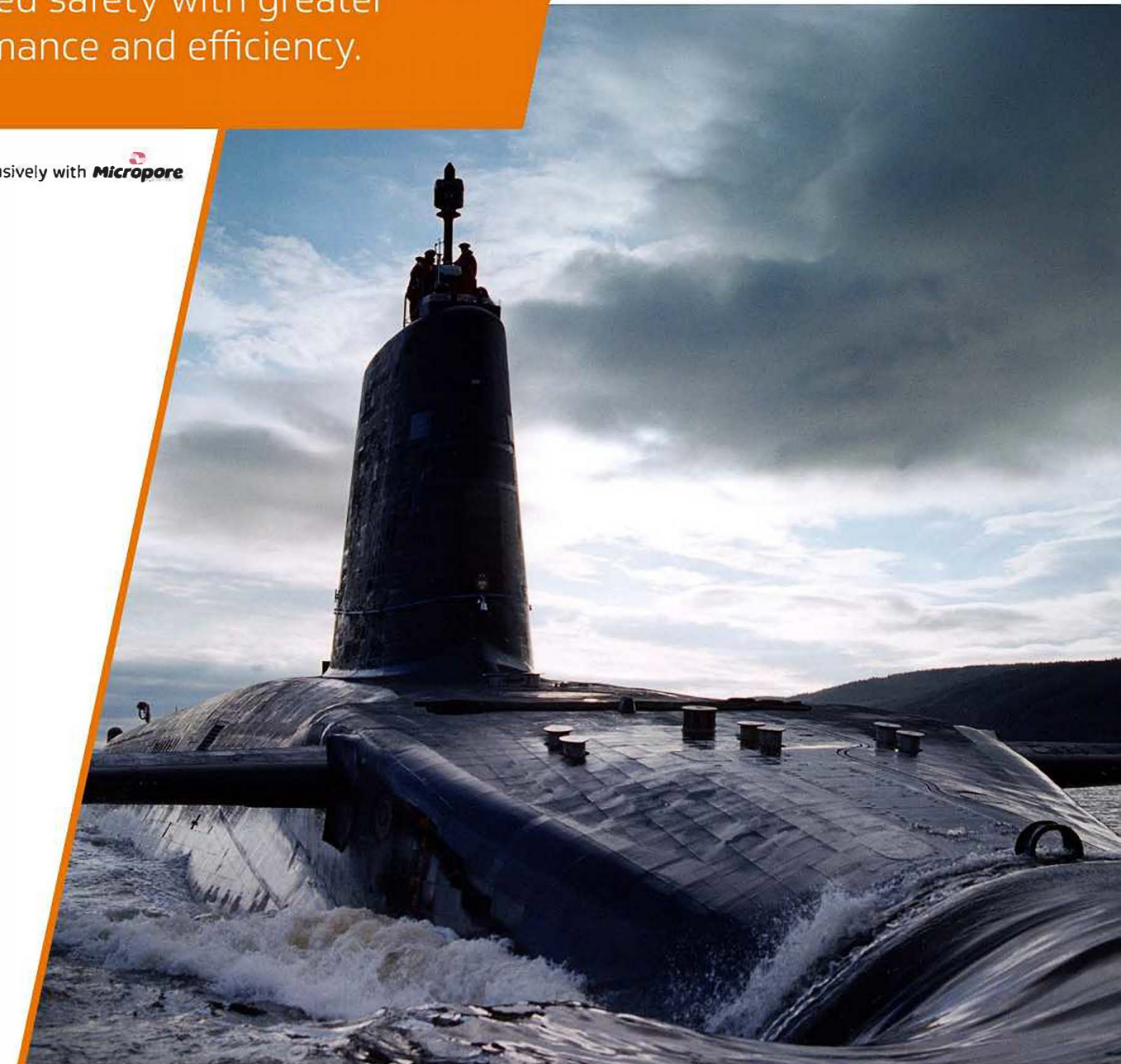
## For more information

Our teams can guide you on the best solution to meet your requirements. For more information on our innovative technology, please contact [enquiries@tpgroup.uk.com](mailto:enquiries@tpgroup.uk.com). [www.tpgroupglobal.com](http://www.tpgroupglobal.com)

## CO<sub>2</sub>RE

Our new suite of market leading CO<sub>2</sub> removal units for enclosed environments – utilising the latest in compact technology and delivering improved safety with greater performance and efficiency.

Developed exclusively with Micropore





## Supporting critical frontline delivery

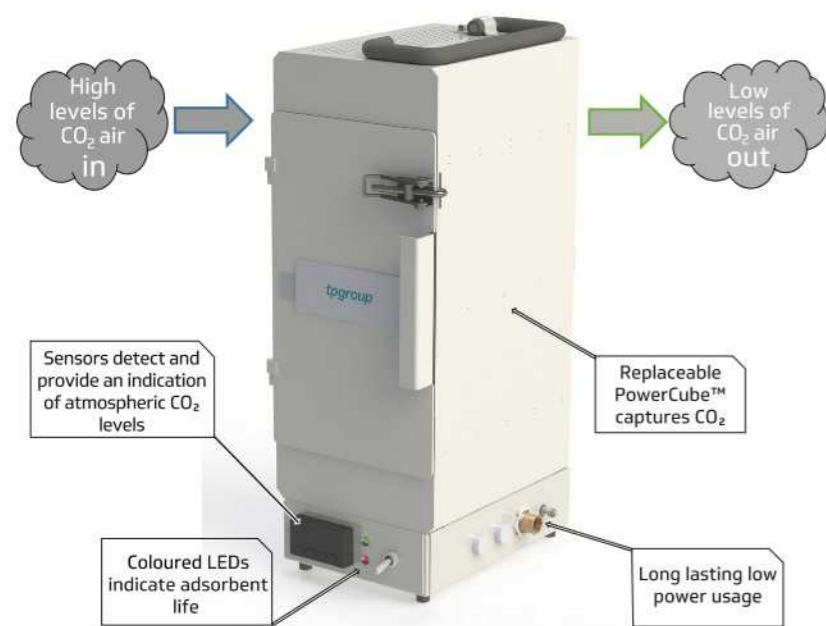
An Astute class submarine has been designed to support indefinite periods of operational delivery - hundreds of metres below the surface in some of the planet's most inhospitable environments. Supplying a continued replenishment of oxygen whilst removing air impurities is not just critical to life - it ensures that the Royal Navy's submarines can operate undetected and play a critical part in the country's defence and those it seeks to protect.

However we recognise that **air purification within confined spaces isn't just about submarines**. This requirement is **vital across application spaces on land, air and sea** - from industrial plants and aircraft through to small submersible vehicles and diving bells.

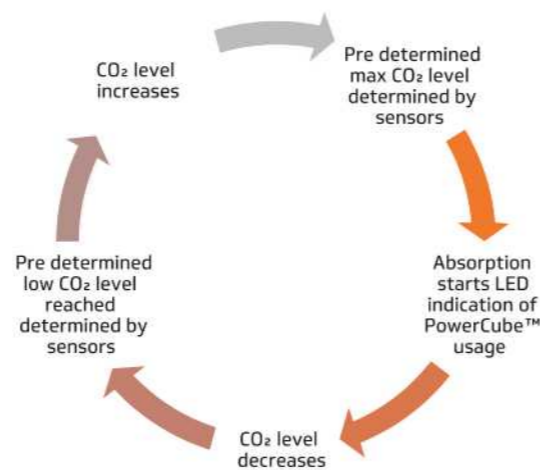
That's why we have developed a new range of CO<sub>2</sub>RE units - providing the right product for the required application space. **We offer bespoke CO<sub>2</sub>RE solutions to meet your needs.**

## Effective performance

TP Group has developed a **more efficient alternative to conventional granular soda lime CO<sub>2</sub> adsorption canisters**. Our CO<sub>2</sub> Scrubber is a calcium hydroxide or lithium hydroxide based alkaline adsorbent that encapsulates fine adsorbent powder in a polymer matrix - allowing highly efficient CO<sub>2</sub> removal over a range of 0.1 - 5.0% in air.



CO<sub>2</sub>RE Function and Features



Adsorbant System Lifecycle

## Benefits of our solution

Our smart technology delivers a number of benefits including:

- **Greater efficiency:** Our design means longer lasting, lower power
- **More compact:** Using the latest compact technology which offers smaller, quieter units
- **Easier to operate:** Sensors and LED provide quick easy to read indicators
- **Supplementing regenerative systems:** Compliments Solide Amine/MEA by managing local peaks of CO<sub>2</sub>
- **Easily retrofitted:** Provides a retrofit solution to traditional 'granual' solutions with less consumerables and saving weight

## CO<sub>2</sub>RE Solution: options available

### CO<sub>2</sub>RE portable device



The Single Core unit is built around a configurable modular chamber. A portable unit, it has been designed so that it can be configured to suit the following application spaces:

- Hypobaric chambers
- Small submersible vehicles
- Diving bells
- Small enclosed spaces - refuges etc.
- Sealed command modules

The device can incorporate sensing technology, and can be built from a number of materials to optimize packaging and weight.

### CO<sub>2</sub>RE modular solution



This solution is based around the 3 cube modules that can be configured to suit applications and is designed for conventional submarines including:

- Submarine retro fit
- Submarine new build
- Land, air or sea applications needed CO<sub>2</sub> management

The modules can be combined with other filtration media as required to produce advanced habitation modules. Sensing and control can be incorporated to produce intelligently controlled systems capable of optimizing performance and safety.

### CO<sub>2</sub>RE bespoke CO<sub>2</sub> management solution



Our bespoke solutions can be created to suit a range of application spaces as well as being designed for conventional submarines including:

- Submarine retro fit
- Submarine new build
- Land, air or sea applications needing CO<sub>2</sub> management

The modules can be combined with other filtration media as required to produce advanced habitation modules. Sensing and control can be incorporated to produce intelligently controlled systems capable of optimizing performance and safety.

This bespoke solution utilises a range of materials to optimize weight and performance.