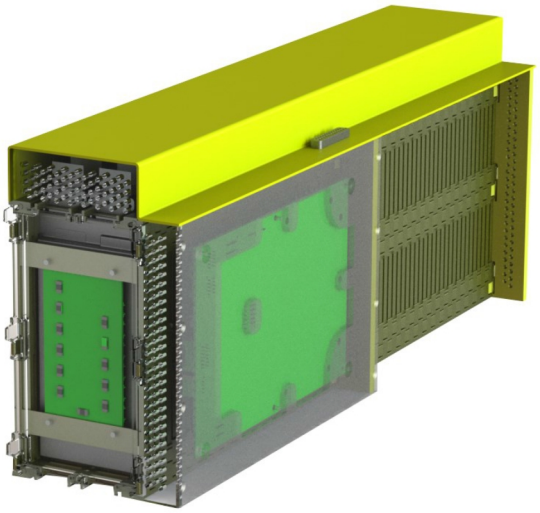
PRODUCT DATA SHEET

Pressure Tolerant Lithium Sulfur (Li-S) Battery Pack



- **Powering autonomous vehicles to ocean depths of up to 6,600m**
- **Each prototype battery pack is 24V 500 Wh**
- **Lightweight – only 5 kg**
- **Extremely safe - no acids or risk of fire**
- **Reduced environmental impact**
- **Occupying only 7L space**

Parameter	Performance
Operation Voltage	Min. 22.8 V Nom. 24 V Max. 28.8 V
Capacity	25 Ah
Weight	5 kg
Gross Volume	7.85L
Max. Continuous Discharge	40A
Peak Discharge	Limited to 100A
Dimensions [not optimized]	H = 177 mm L = 467 mm W= 85 mm [105mm with BMS]
Charge Time	5 Hours
Cycle life (80% DOD, 80% BOL)	> 80
*Operating Temperature range	0 to +30 ^{0}C

*not optimised

Description:

The two year Marine Autonomous System (MAS) project funded by Innovate UK and Dstl aims to develop a pressure tolerant Lithium Sulfur (Li-S) battery pack capable of powering autonomous vehicles to ocean depths of up to 6,600m.

The consortium led by Steatite with OXIS Energy, the National Oceanography Centre (NOC) and MSubs has made tremendous advances in battery capability through extensive design and testing.

Each prototype battery pack is 24V 500 Wh with 24 Ultra-Light 300 Wh/kg Li-S cells from OXIS arranged in 2P12S and controlled by Steatite's multi chemistry Battery Management System. The pack weighs 5 Kg and occupies a volume of around 7 litres.
During the summer of 2017, four prototype packs will be integrated into submersible systems for trials in Norway. 1 battery unit will also be tested in a pressure pot at a pressure up to 660 bars (equivalent to the depth of up to 6,600 metre) at the NOC.

Key data on the performance of the battery pack will be collected from the in-vehicle trials and pressure testing.

Following these trials, the pack design will be optimised in preparation for production. We are on target to achieve robust energy systems with improvement in gravimetric energy density for underwater applications over the most capable Li-ion batteries by a factor of between 2 and 3.

Although the focus of the project is firmly on marine, the Li-S battery packs produced by Steatite can be integrated in a range of diverse applications such as unmanned, autonomous and energy storage.