Trelleborg's New Buoyancy goes Deeper without the Extra Weight

Trelleborg's advanced engineering and materials operation has produced an innovative buoyancy system that can deliver exceptional performance anywhere in the world, without the need to increase buoyancy weight.

As part of the company's continued materials research and development processes, two new high performance, ultra-low density composite buoyancy systems have been produced in response to global project requirements.

Dave Clayton, Sales Director within Trelleborg's advanced engineering and materials operation, says: "One of our clients wanted to increase the service operating depth of a fleet of autonomous underwater vehicles (AUVs). However, the options available had a number of operational complications - the most restrictive being the density of alternative buoyancy materials.

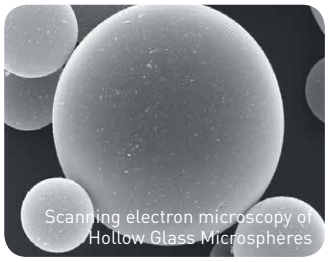
"To achieve the same payload, higher density dictates that the vehicle (buoyancy) would have to increase in displacement. This has the knock-on effect of requiring increased handling capacity as the vehicle will weigh more in the air and potentially, a larger vessel would be required to deploy the AUV. The overall cost increase brought about by current market offerings was so significant it could have stopped the project from proceeding.

"However, we were approached and asked what could be done. Our in-house chemists and materials technologists were quick to react. We like a challenge, so with the target density set, it was down to our R&D team to develop an innovative solution." Drawing on years of experience, Trelleborg's advanced engineering and materials operation knew that with some processing modifications during the manufacture of the material, improved performance could be extracted from the glass microspheres used.

Clayton continues: "Initially, the only option to go deeper was to use a significantly denser material of circa 550kg/m³. Our new TG29/5000 has a density of 468kg/m³ - a 15% density reduction - coupled with an increased depth capability from 4,000MSW to 5,000MSW. This delivered a 25% increase in depth performance."

All materials within the TG series are tested with a 1.1x amplification factor over maximum service depth. This provides an operational margin for the client and ensures that the materials are working well within their design envelope. The TG series materials offer the client the highest mechanical properties, with buoyancy loss due to water absorption and hydrostatic compression being less than 2% and a safety factor of typically 1.4 over the hydrostatic collapse start pressure; the point where the glass microspheres physically start to burst as a result of the immense sea water pressure at depth.

Trelleborg's second development, TG39/11500 has been developed to satisfy the demands of research establishments operating to full ocean depth. The material has a core density of 660kg/m³ /39lbs/ft³ and will operate to 11,500MSW. It has a hydrostatic collapse pressure greater than 20,000psi.


Scanning electron microscopy of Hollow Glass Microspheres

Sonomatic Reaches New Depths in Automated Ultrasonic Subsea Inspections

Sonomatic, a world leader in the provision of automated ultrasonic inspection subsea for more than 30 years, has successfully deployed its accurate corrosion mapping approach at a depth of 1435m, setting a new benchmark for depth with this technique.

The inspection was carried out using the ROV-iT, an ROV-deployed ultrasonic inspection tool developed by the company. Sonomatic's ROV-deployed tools carry many key benefits, among them the ability to carry out inspection work without the need for divers or a dive support vessel, and at much greater depths.

The subsea inspection was completed in early 2015. A major objective of the inspection was to validate absence of low level degradation so that a case could be made for operation without the need for an in-line inspection. Since the coverage for the subsea inspection was low, meeting this objective was dependent on providing a highly sensitive inspection with very accurate wall thickness measurements on a fine scan increment.

The inspection performance achieved at a depth of 1435m, through a three layer polypropylene coating, matched that in shallow water, demonstrating Sonomatic's capability to deliver its world leading corrosion mapping accuracy even at great depth. The results of the detailed analysis of inspection performance, as achieved in the field, were central to the integrity assessment. This was based on statistical methods developed by Sonomatic for planning and evaluation of targeted inspections on unpiggable gas pipelines. The inspection achieved allowed demonstration that the probability of degradation, with potential to threatened integrity for the line as a whole, was within acceptable limits.

Sonomatic's industry leading measurement performance was central to ensuring this objective was met and that the result was a substantial cost saving to the client, as an in-line inspection was avoided. The inspection work subsea was completed safely and within the planned schedule, with Sonomatic's equipment operating reliably throughout the campaign.

Sonomatic's ROV-deployed tools, which can operate both vertically and horizontally, have been designed for inspecting pipelines, risers, caissons and structural assets using a wide range of techniques. Key techniques among these are corrosion mapping, time-of-flight diffraction (TOFD) and pulse echo.

ROV-iT