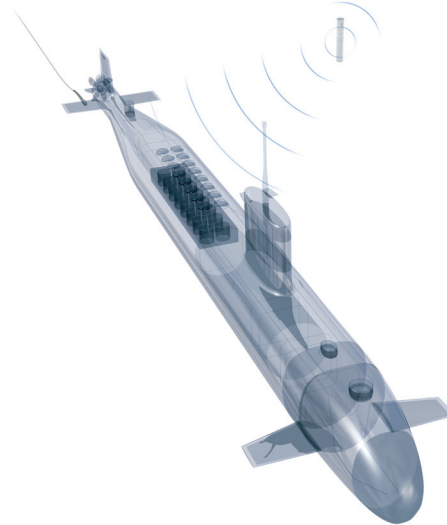


Protection Solutions

Advanced composite materials

Images: Courtesy of BAE Systems

Trelleborg has been actively involved in the development of innovative products and solutions for over 60 years. We have provided numerous innovative solutions from concept through to design and manufacture for air transport, ships, subsea vessels and land vehicles.



Today, Eccospheres®, high-performance hollow glass microspheres, and Eccofoam®, a syntactic foam series from Trelleborg, are helping to reduce weight in aircraft, increase buoyancy in submarines and remotely operated vehicles (ROV), insulate undersea pipes ...and more.

We manufacture a range of high performance, low density syntactic foams for undersea buoyancy applications that can be readily shaped to conform to hull contours and outfitted for installation in the forward and aft free-flood areas of subsea vessels.

Our epoxy tooling boards are specially made for CNC machining of high-accuracy models and patterns, prepreg layup molds and other high-temperature applications.

Trelleborg researchers are currently developing advanced processes for the production of innovative “binary” combinations of large and small glass spheres and the use of novel reinforcing materials and coatings to alter mechanical, acoustic and thermal properties of syntactic foams.

Subsea Vessels

Lightweight panels built using hollow glass microspheres are preferred throughout the world for reliable deep-sea buoyancy solutions. Eccospheres® from Trelleborg feature a consistent strength-to-weight ratio to maximize buoyancy. The Eccospheres® also produce syntactic foams with excellent water absorption resistance, transparency to sound and high collapse pressures. Trelleborg composite materials are used throughout the world for:

- **Buoyancy** - balance and trimming panels
- **Fire protection** - low flame/smoke/toxicity panels
- **Deck and structures**
- **Buoys**
- **Seals**
- **Acoustics** - sound absorbent coatings
- **Deep sea applications** - including manned and unmanned submersibles
- **Towed arrays/sonar**
- **Signature management**

Ships and Barriers

Trelleborg Eccospheres® and Eccofloat® combine lightweight and high-strength with good resistance to seawater incursion and energy absorption to support the fabrication of durable composite panels for use in ships and marine barriers.

The low thermal conductivity and dielectric strength that characterize glass based syntactic also make the products ideal for use in electronic signal potting systems. Key applications include:

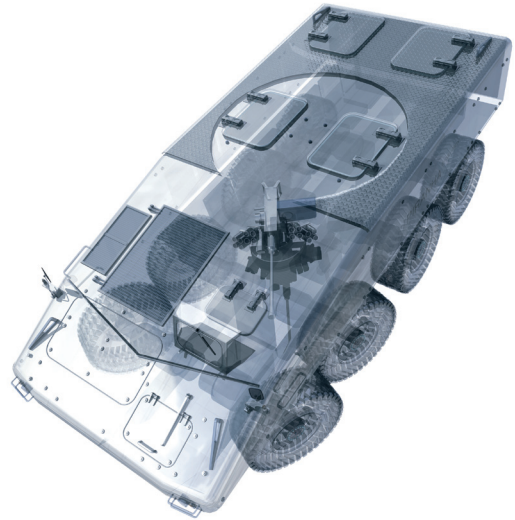
- **Moisture-resistant** - volume void fillers for panels, linings and doors
- **Collision protection**
- **Fire protection** - low flame/smoke/toxicity panels
- **Double hull lining systems**
- **Buoyancy**
- **Deck and structures**
- **Barriers**
- **Signature management**
- **Fluid and electrical system protection**
- **Seals**

Aircraft

Trelleborg supplies a broad range of aerospace grade, high purity glass and ceramic microspheres to the aerospace industry. The lightweight spheres are manufactured with densities ranging from 0.16 g/cc to 0.380 g/cc with uniform wall thicknesses and consistent sized distributions that can be tailored to requirements.

New-generation microspheres are being manufactured to improve flame retardation in composite compounds, reduce the detectability of aircraft by radar, protect delicate electronic components, decrease vibration in jet engines and reduce paint weight. Key applications include:

- **Fire protection** - low flame/smoke/toxicity panels
- **Stealth coatings**
- **Thermal insulation and heat shields**
- **Sealing and potting**
- **Weight reduction**
- **Signature management**



Personnel carriers

Trelleborg provides a wide range of innovative solutions focused on protection within vehicles.

We are currently exploring flame and smoke-retardant formulations featuring varied combinations of densities, strength, stiffness, failure strain and energy of fracture. The goal is production of thinner, lighter weight products for applications including:

- **Protective vehicle panels**
- **Vehicles**
- **Structures**
- **Personnel equipment**
- **Device protection**
- **Lightweight composite panels**
- **Signature management**



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