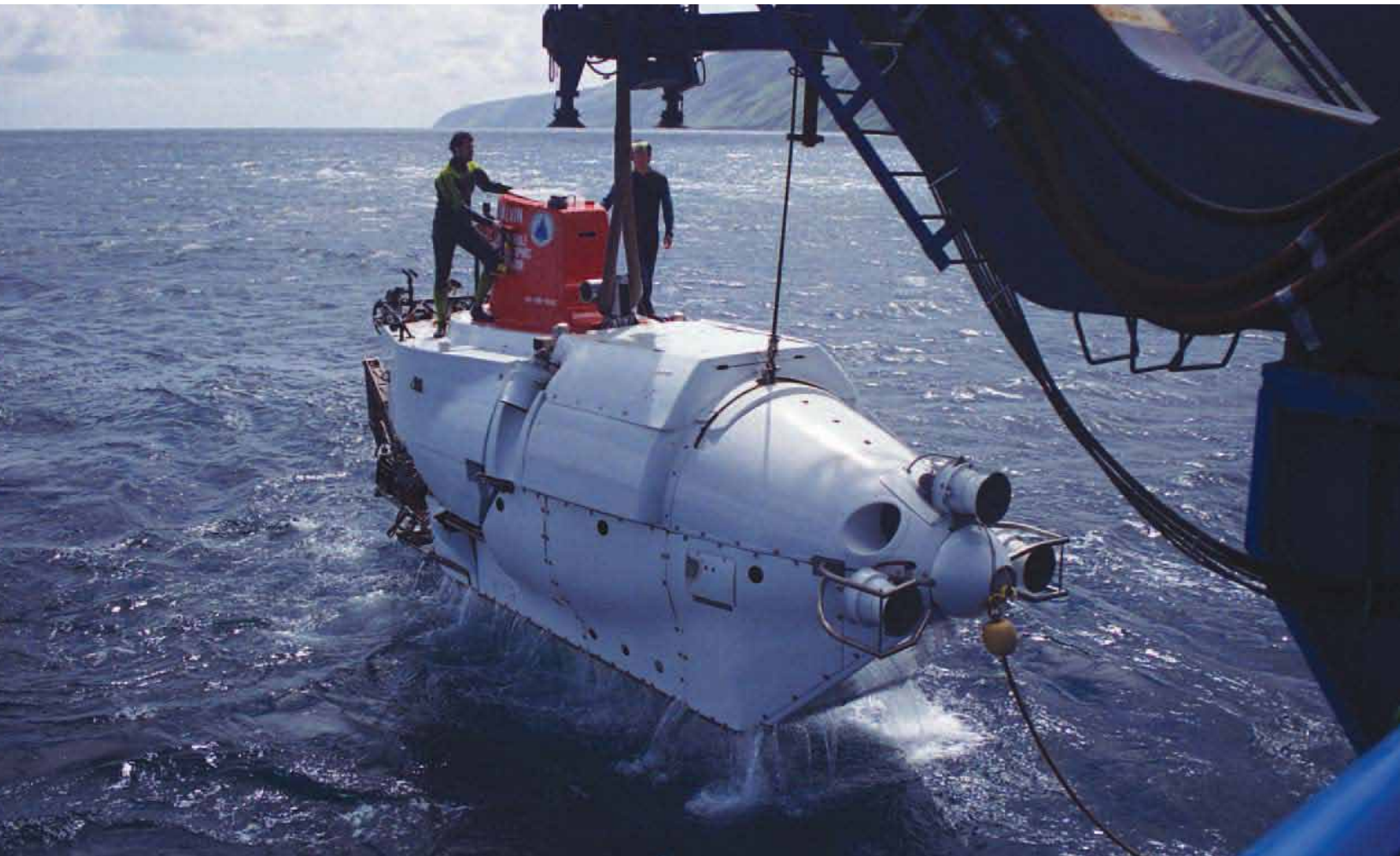
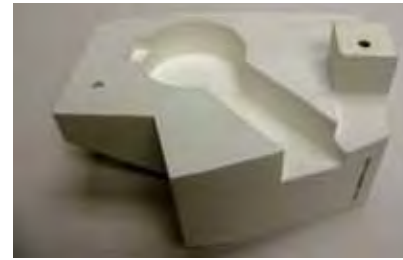
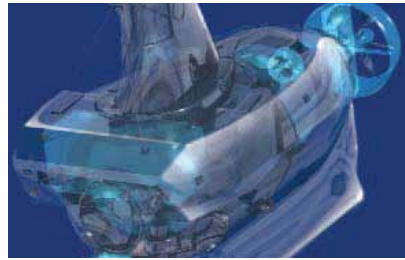


Syntactic Foams

Trelleborg Offshore



Trelleborg Offshore manufactures several different classes of syntactic foam for undersea buoyancy applications. Blocks of the foam are typically cast in 0.5 and 1.0 cubic foot sizes, which then are used to prepare large buoyancy modules that can be readily shaped to conform to hull contours and outfitted for installation in the forward and aft free-flood areas of submarines.

Oceanographers also depend on syntactic foams to suspend instrumentation in deep ocean studies. For these applications, the syntactic foam is used in either block form or custom molded shapes for installation in manned and unmanned submersibles such as the famed Alvin and Jason vehicles that were used to discover and explore the Titanic.

Characteristics of Trelleborg Offshore Microballon-based Syntactic Foams

Trelleborg Offshore produces four different types of syntactic foams to meet the broad range of requirements of its customers.

EL Grade epoxy syntactic foams have been the materials of choice for manufacturing manned and unmanned submersibles for years with their range of densities and ability to withstand exposure to diesel fuels and hydraulic fluids.

TG Grade syntactic foams are lightweight and economical for building manned and remote operating vehicles. The foams have also been used to manufacture mine neutralization systems because of their zero magnetic and sea-water comparable acoustic signatures and to fabricate eyebrows for 688 class U.S. nuclear submarines because of their buoyancy, acoustic profile

and ability to significantly improve sonar functions.

DS Grade syntactic foams combine lightweight glass micro-balloons with multifunctional epoxy resin to produce ultra-high strength-to-weight materials for high-performance, deep sea applications including unmanned submersibles rated to perform at ocean depths up to 20,000 feet as well as man-rated submersibles.

VF Grade epoxy syntactic foams combine microballoons and macrospheres for ultra-light weight applications such as filling control surfaces on 688 class U.S. nuclear submarines. The Grade A shock-qualified castable syntactic foams are sold as kits for on-site/field use.

Product*	Density, ±2 pcf	Service Pressure, psi	Service Depth, FSW
EL-30	30	3,000	6,750
EL-34	34	9,000	20,000
EL-36	36	11,000	24,000
TG-24	24	3,000	6,560
TG-26	26	4,444	10,000
TG-28	28	5,287	13,124
VF-22	22	266	600
VF-25S	26	1,000	2,252
VF-38	38	1,332	3,000
DS-28	28	5,098	11,482
DS-30	30	7,280	16,400
DS-33	31-33	8,880	20,000
DS-35	35	11,888	26,700
DS-39	38	16,872	38,000

* Most product names reflect the density of the foam used in each material.

Trelleborg Offshore
290 Forbes Blvd.
Mansfield
MA 02048
USA
Tel: +1 (774) 719 1400
Fax: +1 (774) 719 1410
Email: tec.sales@trelleborg.com
Web: www.trelleborg.com/aem

Trelleborg Offshore
24 Teed Dr.
Randolph
MA 02368
USA
Tel: +1 (781) 963 6794
Fax: +1 (781) 963 6788
Email: tec.sales@trelleborg.com
Web: www.trelleborg.com/aem

Trelleborg Offshore
1902 Rankin Road
Houston
TX 77073
USA
Tel: +1 (281) 774 2600
Fax: +1 (281) 774 2626
Email: offshore@trelleborg.com
Web: www.trelleborg.com/offshore

Trelleborg Offshore
519 N. Sam Houston Pkwy E, Ste 200
Houston
TX 77060
USA
Tel: +1 (832) 456 8300
Fax: +1 (281) 405 9746
Email: offshore@trelleborg.com
Web: www.trelleborg.com/offshore

Trelleborg Offshore
3 Peter Green Way
Barrow-in-Furness
Cumbria
LA14 2PE
UK
Tel: +44 1229 842070
Fax: +44 1229 842071
Email: offshore@trelleborg.com
Web: www.trelleborg.com/offshore

Trelleborg Offshore
Stanley Way
Skelmersdale
Lancashire
WN8 8EA
UK
Tel: +44 1695 712000
Fax: +44 1695 712111
Email: aem@trelleborg.com
Web: www.trelleborg.com/aem