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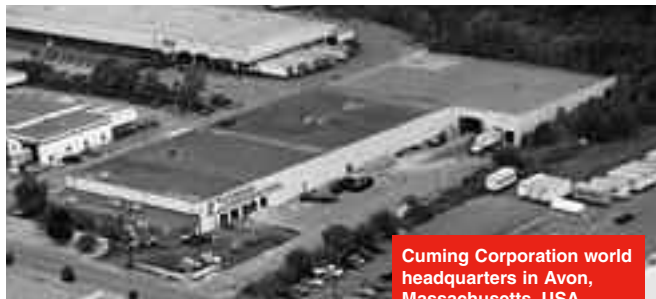
NEWS UPDATE AND USEFUL PRODUCT INFORMATION

TECHNICAL NEWS BULLETIN 01

C-FLOAT Riser Buoyancy Modules: Superior Quality, Performance, Durability, and Service

INTRODUCTION

Cuming Corporation's C-FLOAT syntactic foam riser buoyancy modules are market leaders in the offshore oil industry. Solidly based on over thirty years of experience in the field, C-FLOAT products have always set the standard for quality and durability. Now a major factory expansion and a series of ambitious facility upgrade programs have led to dramatic new initiatives to further improve the entire C-FLOAT line and bring even higher levels of performance and service to our customers.



Cuming Corporation world headquarters in Avon, Massachusetts, USA

WORLD-CLASS QUALITY

Quality assurance of syntactic foam deepsea buoyancy starts with hydrostatic testing, and Cuming Corporation leads the way with the largest and most sophisticated test facility in the world. Our modern new factory houses three large pressure vessels, capable of testing full-size modules at maximum depth. The giant vessels are used routinely to test production units and ensure top performance. A host of smaller vessels are used for process control, quality assurance, and R&D purposes.

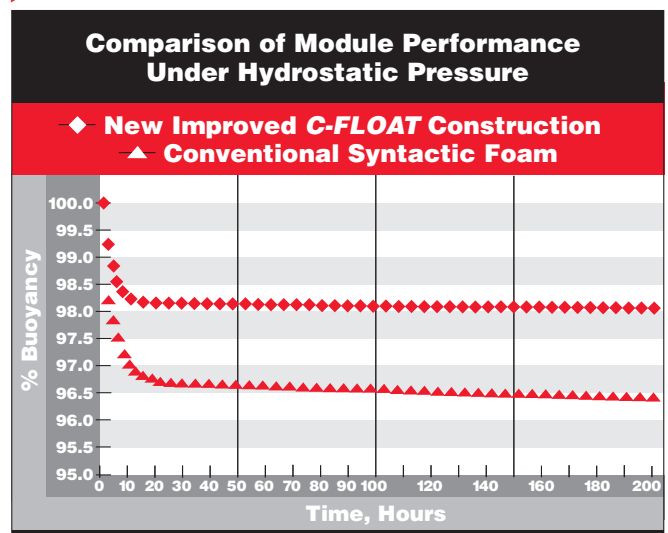
BETTER PERFORMANCE

Years of development effort and equipment refinements have yielded steady improvement in the performance of C-FLOAT products. Today's riser buoyancy modules are twice as good as those available only a few years ago, in terms of resistance to water absorption and hydrostatic compression. This is a proven fact, as evidenced by a vast amount of thorough and extensive testing. The result of all this work is that our customers are assured of products that function reliably for their full design service life.



Hydrostatic pressure vessels used to test C-FLOAT products at full rated depth

▶ CHART 1



Instrument record of C-FLOAT pressure test

▶ CONTINUED INSIDE

LOWER DENSITY

C-FLOAT products have always been the most efficient riser buoyancy modules, with lower density for a given depth rating. Now improved materials offer even lower densities, increasing the amount of buoyancy per unit volume. Smaller and lighter modules are easier to handle and save money in the long run. The chart below compares conventional syntactic foam with Cuming Corporation's new *Ultralight* products.

CHART 2

Comparative Densities of C-FLOAT Modules
lbs/cu. ft (kg/m³)

Rated Service Depth, ft (m)	Conventional Syntactic Foam	C-FLOAT Ultralight Products	C-FLOAT Super-Ultralight
2,000 (600)	26.0 (417)	22.0 (353)	20.0 (320)
4,000 (1200)	30.0 (481)	26.0 (417)	24.0 (385)
6,000 (1800)	32.0 (513)	28.0 (449)	26.0 (417)
8,000 (2400)	34.0 (545)	30.0 (481)	28.0 (449)
10,000 (3000)	36.0 (577)	32.0 (513)	30.0 (481)

Comparison of conventional syntactic foam density vs. new C-FLOAT Ultralight

GREATER STRENGTH

Advanced composite materials technology has enabled Cuming Corporation to make its riser buoyancy modules stronger and more durable. Offshore drilling records clearly show C-FLOAT modules historically suffer much less breakage and impact damage than do competing brands. As shown at right, the addition of extra reinforcement in critical areas can further improve strength. Cuming Corporation engineers are working constantly to make C-FLOAT modules tougher and stronger, verifying performance with apparatus such as the bend tester illustrated in the following photographs.



Proper application of fiberglass reinforcement adds strength to C-FLOAT modules



Testing the bending strength of a C-FLOAT syntactic foam buoyancy module

MORE FEATURES

Cuming Corporation pioneered many design features that today contribute to the safety and convenience of buoyant riser operations. The unique *Integrastrap* feature not only results in a low-profile module fastening system that avoids snagging or hanging up, but also reinforces the modules at their most critical points. Built-in shoring and anti-rolling flats ensure safety on board. Molded-in flexure lugs protect against bending loads. Thrust collars, cable clamps, and other accessories are custom engineered for each application. And a rugged and indelible marking and coding system identifies modules by both serial number and depth rating, even after years of rigorous service.



The unique *Integrastrap* internal fastening system adds strength and avoids damage

LATEST PRODUCTION METHODS

Cuming Corporation has invested millions of dollars in installing the latest equipment and processes in its new factories. Vacuum mixing and casting are used in making all C-FLOAT products to ensure freedom from entrained air. Closed-loop epoxy resin piping and dispensing systems, along with computerized measuring equipment, guarantee consistent proportions without risk of contamination, and are backed up at every step by quality control checks.



Vacuum mixing and casting ensure consistently high product quality

DAMAGE RESISTANCE

The offshore environment is a rough one, and *C-FLOAT* buoyancy modules are designed to take abuse and keep working. Every surface is covered with a thick layer of fiberglass, with additional reinforcing layers added where needed. The internal syntactic structure shrugs off water, even when the outer surface is damaged. Epoxy resin formulas are specially engineered for maximum toughness and impact strength. The outstanding damage resistance of *C-FLOAT* modules has been amply proven in the field as well as in the laboratory.

RUGGEDIZED CONSTRUCTION

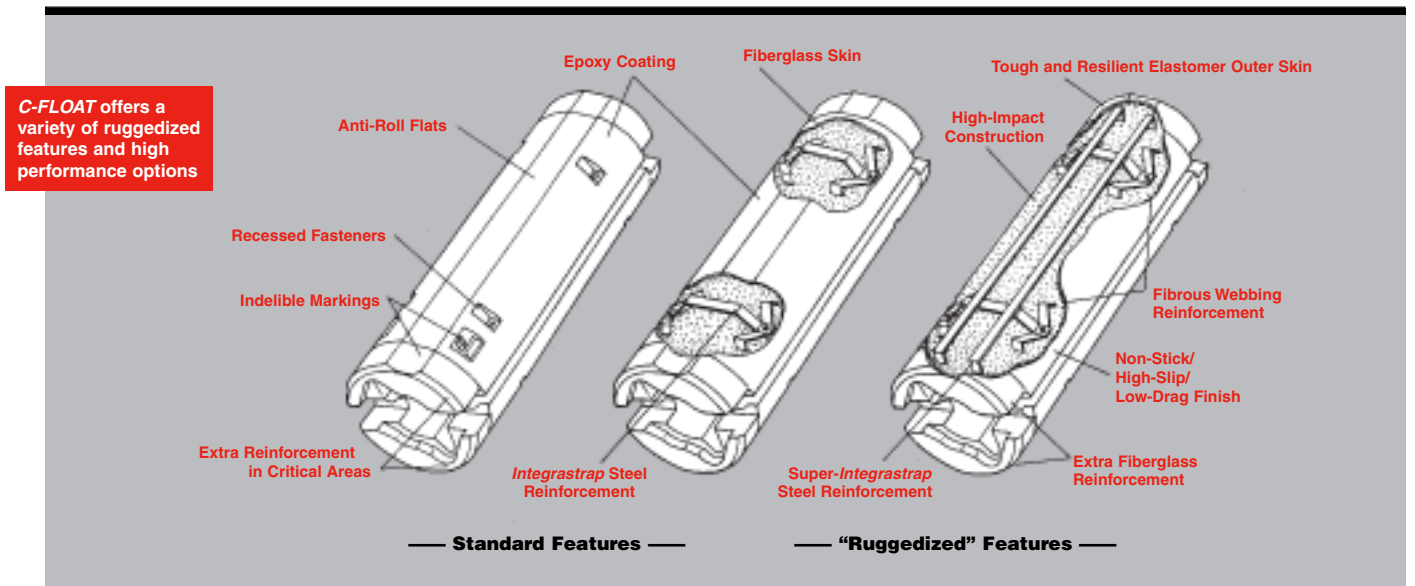
In addition to the natural strength and durability that are standard features of all *C-FLOAT* modules, Cumming Corporation leads the way in special “ruggedized” features that enhance the damage resistance of modules in severe service. Thicker fiberglass skin, integral web reinforcement, stiffeners and rebar, and resilient outer coatings of polyurethane rubber, polyethylene, or flexiblized high-impact epoxy prevent damage and greatly extend service life.



Tough outer skin of *C-FLOAT* module resists impact damage under severest service

A COMMITMENT TO SERVICE

Cumming Corporation’s reputation in the offshore industry is second to none for integrity, reliability, and an unwavering commitment to serving its customers. We stand behind our products. We have been in this business for a long time, and we intend to stay in it. Customers who experience any kind of problem with *C-FLOAT* modules, whether it be a warranty issue, repair of normal wear and tear, rework, or refurbishment, can depend on Cumming



Corporation for prompt and courteous service, now and in the future. From initial contact through engineering and procurement, delivery and installation, to field service and maintenance, our aim is to ensure your complete satisfaction with our products and our services.



Cuming Corporation's factory in New Iberia, Louisiana, serves the Gulf of Mexico region

WORLDWIDE SERVICE CENTERS

Cuming Corporation operates three principal service centers for the support of its customers: Avon, Massachusetts; New Iberia, Louisiana; and Macae, Brasil. In addition, engineering sales representatives are located in Houston, Texas, Frankfurt, Germany, and Tokyo, Japan. Addresses and contact information are given below. Any of these locations are prepared to provide immediate technical advice and assistance. The Avon, New Iberia,



Cuming Corporation service centers have complete repair and rework capabilities

and Macae facilities have the specialized equipment and trained personnel to undertake all kinds of inspection, rework, or repairs, and return C-FLOAT modules to like-new condition.

RESEARCH AND DEVELOPMENT

The scientists and engineers of Cuming Corporation are always at work to improve the quality, performance, and durability of C-FLOAT products. We hold more patents and have introduced more innovations in this field than anyone else. We specialize in custom designs and new products for unusual applications, and we will publicize them in future news bulletins like this one. In the meantime, if you need better buoyancy, contact us.



Research is always under way to create stronger and better C-FLOAT products

MORE INFORMATION

Reflecting its unmatched track record, Cuming Corporation has the largest selection of syntactic foam technical literature and product information in the industry. Acoustic behavior, thermal properties, strength versus density, buoy design techniques, and ocean current drag/VIV reduction are a few of the many topics covered. Feel free to request more information from any of the offices listed below.



MANUFACTURING LOCATIONS	Avon, Massachusetts USA	New Iberia, Louisiana USA	
SERVICE CENTERS	Avon, Massachusetts USA	New Iberia, Louisiana USA	Macae, RJ Brasil
ENGINEERING SALES OFFICES	Avon, Massachusetts USA New Iberia, Louisiana USA	Houston, Texas USA Frankfurt, Germany	Macae, RJ Brasil Tokyo, Japan
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