

# CUMMING

## **TECHNICAL BULLETIN 610-2**

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## **C-THERM CSF REELABLE SYNTACTIC FOAM INSULATION**

### **INTRODUCTION**

Cuming Corporation's **C-THERM** product line of epoxy/glass syntactic foam thermal insulation offers superior performance for deepsea oil and gas production. See Technical Note 600-1 for an overview of the entire product line. The CSF cast-on-pipe version has exceptional flexibility permitting the insulated pipe to be reeled for rapid and economical deployment.

### **SYNTACTIC FOAM**

The basis of any **C-THERM** product is syntactic foam, an advanced composite material of glass microspheres cast into a binder of epoxy plastic resin. The outstanding chemical and thermal properties of **C-THERM** materials are adaptable to almost all offshore operating conditions.

### **EXCEPTIONAL FLEXIBILITY**

Years of polymer development and testing have resulted in **C-THERM** CSF insulation combining the excellent properties of a rigid epoxy matrix with the high-elongation flexibility more typical of rubber, polyurethane, and polypropylene. The key is a blend of elastomeric fillers with Cuming Third Generation ("3G") high elongation epoxy/glass materials. The new technology is protected under existing patent (U.S. 6,827,110) as well as patents pending.

### **OPERATING LIMITS**

**C-THERM** CSF-STD temperature ratings start at 212° F (100° C) continuous service at depths to 10,000 feet (3000m). A variety of grades are available. Successful pipe bending tests have been conducted on a drum diameter of 28 feet (8.5m) in ambient conditions from 32° F (0° C) to 90° F (32° C). Request a data sheet on the CSF grade that is right for your application.

### **THERMAL PERFORMANCE**

With a nominal density of approx. 60 pcf (962 kg/m<sup>3</sup>), **C-THERM** CSF exhibits thermal conductivity of 0.10 Btu/ft-hr-°F (0.171 W/m-°K) and a specific heat of 0.40 Btu/lb-oF (1.63 J/g-°C). These properties have been

**C-THERM**  
CSF syntactic  
foam insulation  
can be reeled  
for rapid  
deepwater  
pipelaying



verified through standard industry testing, including 28 days of simulated service vessel (SSV) testing.

### **OPTIONS AVAILABLE**

**C-THERM** CSF is made available in a variety of constructions to suit special requirements. The outer surface of the insulation may be sheathed in high density polyethylene (HDPE) or coated with polyurethane for flexibility. Optional fiber overwrap can be added for abrasion resistance. The materials are compatible with conventional pipe corrosion coatings.

### **MANUFACTURING**

Cuming Corporation pipeline insulation products are made in our New Iberia LA factory, close to the Gulf of Mexico. The factory is equipped for high-volume application of cast-on-pipe material by our patented (U.S. 6,058,979) process. Pipe sizes up to 24" (600mm) x 80' (24m) long can be handled, and a range of services are offered.

### **SALES AND SUPPORT**

Cuming Corporation sales engineers are experts in the design of subsea insulation systems and will be glad to work with customers with special requirements. In Houston, call 281-591-1001, or contact World Headquarters at 800-432-6464. Our website [www.cumingcorp.com](http://www.cumingcorp.com) provides much helpful information.

Sales Offices Worldwide

See our website  
[www.cumingcorp.com](http://www.cumingcorp.com)  
for the office nearest you.

