



## LIGHTWEIGHT SYNTACTIC FOAM OVERVIEW

RoHS  
Compliant

### TECHNICAL BULLETIN 370-1

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#### **Cyanate Ester Syntactic Foam 350° F Cure**

Cuming Microwave Corporation manufactures toughened cyanate ester syntactic foam suitable for 350 °F curing operations. This material in its uncured state is the consistency of wet snow. The material is ideal for encapsulating components, due to its low weight and controlled dielectric constant. Materials are available in both low loss versions as well as controlled loss versions. Typical insertion loss values for lossy versions are from 1 dB per inch to 15 dB per inch.

Typical out time is 3-4 weeks depending on ambient temperature. Typical 0° F storage is 6 months. A non-slump paste is also available for bonding operations of multiple blocks of foam. This material is effective in preventing resin flow into already cured blocks. Typical density range for the foam is 12-20 lbs. per cubic foot depending on application.

#### **Cyanate Ester Syntactic Foam 250° F Cure**

Cuming Microwave Corporation manufactures toughened cyanate ester syntactic foam suitable for 250°F curing operations. This material in its uncured state is the consistency of wet snow. The material is ideal for encapsulating components due to its low thermal shrinkage. Because the material is cured much lower in temperature than conventional 350° F cured materials many problems associated with CTE of

dissimilar materials can be eliminated. Typical density range for the foam is 12-20 lbs. per cubic foot.

Typical room temperature out time is 2-3 weeks depending on ambient temperature. Typical 0° F storage is 6 months. A non-slump paste is also available for bonding operations of multiple blocks of foam. This material is effective in preventing resin flow into already cured blocks.

This material can be provided as a low loss base foam for electrically transparent applications or can be provided with a variety of lossy fillers for antenna pattern shaping, specular attenuation, or insertion loss applications.

#### **Epoxy Syntactic Foam 250° F Cure**

Cuming Microwave Corporation manufactures toughened epoxy based syntactic foam suitable for 250° F cure. This system is a low cost alternative to the Cyanate Ester syntactic foam. The material is ideal for encapsulating components due to its low thermal shrinkage. Because the material is cured much lower in temperature than conventional 350° F cured materials many problems associated with CTE of dissimilar materials can be eliminated. Typical density range for the foam is 12-20 lbs. per cubic foot.

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Document Control No. N-10-000-501904-2  
06/15/07 Page 1 of 2

Three different cure systems are available which provide differences in out time. The first system has a one-week out time, the second has a 4-6 week out time, and the third has an in-definite room temperature out time. Cures are developed quicker at temperature with the faster system. Typically if out time is an issue the latter two formulas are preferred.

This material can be provided as a relatively low loss base foam for electrically transparent applications or can be provided with a variety of lossy fillers for antenna pattern shaping, specular attenuation, or insertion loss applications.

### **Room Temperature Cure Epoxy Syntactic Foam**

Cuming Microwave Corporation manufactures room temperature curable epoxy syntactic foam. This material is ideal for field repair or where encapsulation of components needs to be done at room temperature to eliminate the toughest of dissimilar CTE problems associated with elevated cures of syntactic foam. This material exhibits extremely low shrinkage and has exceptional adhesion to most substrates. This material is provided as a part A and part B which are kneaded together to form a homogeneous blend. The material is then packed in place. Typical cure is 24 hours to achieve 80% cure; full properties are achieved in 7 days at room temperature. An elevated cure of 120° F to 150° F can be used to accelerate the cure with full properties being achieved in 4 to 6 hours.

This material can be provided as a relatively low loss base foam for electrically transparent applications or can be provided with a variety of lossy fillers for antenna pattern shaping, specular attenuation, or insertion loss applications.

### **Very Low Loss Syntactic Foam**

Cuming Microwave Corporation manufactures extremely low loss syntactic foam for the most stringent transparency applications

Typically this material is provided as a cured block. A variety of densities are available from 12-20 lbs. per cubic foot. A 12 lbs. per cubic foot foam typically has a dielectric constant of 1.2 with a loss tangent of 0.002. A 20 lbs. per cubic foot material will have a dielectric constant of 1.65 with a loss tangent of 0.006

The 12 lbs. per cubic foot material can have its dielectric constant artificially adjusted with low cost metallic filler or higher cost metallic filler, the higher cost filler provides a more homogeneous dielectric constant. Typical range of dielectric constants is 1.75-2.5. Typical loss tangents are 0.002 to 0.01

Contact your Cuming Microwave Corporation Representative or Cuming Microwave Corporation Customer Service regarding your application and requirements.

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