

Hathaway Advanced Materials

Amber-E™ VS000 **Melt/Fusible Ceramic Precursor**

Product Description:

Amber-E™ VS000 is a solid polysilazane that when heated becomes a free-flowing liquid. **Amber-E™ VS000** can be melt- or solvent-spun into fibers. Fibers spun from **Amber-E™ VS000** are readily shape stabilized prior to pyrolysis by various methods, including radical initiated or photolytic processes. The resulting fibers can then be pyrolyzed to silicon carbide, silicon nitride, silicon carbonitride, or silicon carboxynitride by heating to 1,000°C. The final ceramic phase is dependent upon the pyrolysis atmosphere. The ceramic yield as measured by thermal gravimetric analysis (TGA) is 84% in a nitrogen atmosphere.

Major Applications:

Ceramic matrix composites, metal matrix composites, ceramic fibers, and ceramic coatings.

Availability:

Unrestricted availability in North America; contact Hathaway Advanced Materials for availability in other regions.

Physical Properties:

Color: White to pale yellow solid.

Softening Point: 50°C to 150°C. (Can be controlled to meet user specifications.)

Density of Polysilazane Solid: 1.120

Density of Ceramic from Pyrolysis: 2.4 (Theoretical)

VOC Content: N/A

Solvents:

Amber-E™ VS000 can be diluted with dry aprotic solvents, such as alkanes, aromatic hydrocarbons, ethers, ketones, and esters. **Amber-E™ VS000** is hydrolytically sensitive and will slowly generate ammonia upon contact with moisture. The polymer will also react with other protic substances, such as acids, bases, and alcohols.

Cure/Stabilization Conditions:

Fibers can be stabilized prior to pyrolysis by thermal, chemical, oxidative and hydrolytic processes. The final ceramic form of the fiber will be dependent on the stabilization method. For example, photoinitiated curing using charge transfer agents will result in a fiber with low oxygen content.

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For composites and coatings, depending on the free radical initiator employed, cure from a solid to an infusible, insoluble solid can be accomplished in times ranging from 1 to 90 minutes over a temperature range of 90°C to 190°C. The peroxides are typically dissolved in solvent-free polymer at the 0.5wt% to 1.0wt% level, based on the weight of polymer employed. Cure without the use of a peroxide initiator can be effected by heating to 180°C–200°C. Curing may also be accomplished by addition of a photoinitiator followed by exposure to UV radiation (Molar Extinction Coefficient: 0.15 M⁻¹ cm⁻¹).

Pyrolysis Conditions:

Pyrolysis of cured **Amber-E™ VS000** results in progressive conversion of the polymer to an amorphous and ultimately crystalline ceramic phase.

Cleanup:

Clean tools immediately after use with acetone or mineral spirits. Solvent cleaning can be followed by a wash with soapy water. Cured material cannot be removed with solvent. Proper cleanup of equipment is essential.

Handling:

Storage Life: Minimum of 2 years for unopened containers. Pot Life: Usable life will be determined by the precautions taken to keep containers tightly sealed and protected from moisture. Disposal: Consult Local Regulations.

Safety:

Use safety glasses and adequate ventilation. Protect skin from exposure using gloves and appropriate clothing. Seek medical attention if ingestion or overexposure is suspected. This material is a combustible solid: keep from flame and all other ignition sources. This product is intended for professional use by persons familiar with this product data sheet, the Safety Data Sheet (SDS) that accompanies product shipments, and applicable health, safety, and environmental practices and regulations. Contact Hathaway Advanced Materials for advice concerning this product's suitability for specific applications.

Ordering:

Standard Sizes

1 pounds

8 pounds

40 pounds

Disclaimer:

Information on this product sheet is subject to change without notice as a result of experience and ongoing product development. It is the user's responsibility to verify that

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this sheet is current prior to use. The user accepts all risk associated with any use of this product for any purpose other than as recommended herein.

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