

DuPont™ Vespel® SF Foam for Aerospace Applications

High temperature polyimide foam improves performance and reduces fuel consumption

Applications

Vespel® SF foam products are ideal candidates for aerospace applications in which temperature resistance, weight, dampening, and sealing are of concern. Due to the unique properties of Vespel® SF, it has been used in the aerospace industry to solve an array of problems including specific applications in stator vane seals, variable bushing packing, nacelle insulation, abradable seals, and reinforced composite panels.

Challenges

- Isolating systems of varying pressures
- Insulation from temperature variations
- Environments where operating temperatures can exceed 300 °C
- Light weight
- Acoustic and dampening isolation
- Provide structural stability
- Seals/coating systems that are easily maintained in the field, thus extending MTBR and reducing cost

Solution

- Vespel® SF is a unique open-cell high performance custom densified polyimide foam which has been produced at varying densities ranging from approximately 10–35 lb/ft³ to suit the most demanding aerospace applications. (Figure 4)
- Customizable Vespel® SF densification allows for “tailoring” of mechanical properties to meet appropriate structural application needs. (Figure 3)
- Vespel® SF can be pre-formed and machined into complex geometries to suit varying customer requirements. (Figures 1 and 2)
- Vespel® SF is a durable material with a high degree of chemical stability as well as thermal and acoustic insulation
- Vespel® SF offers high temperature continuous use at 300 °C with the added benefits of being flame resistant as well as safe to handle when exposed to open flames with no off gas or release of toxic fumes
- Vespel® SF can be easily bonded to various mating surfaces thus making them suitable for field repairs

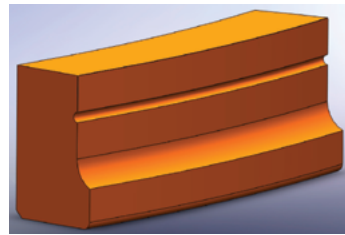


Figure 1

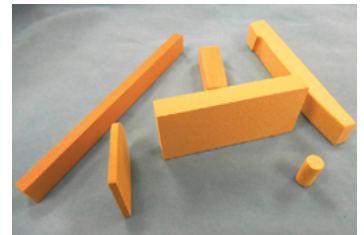


Figure 2

Features and Benefits

Sealing properties

Vespel® SF seals offer a unique balance of properties including durability, high temperature resistance, low CTE, abradable properties, and low weight (PCF) without compromising structural integrity making it a material of choice when it comes to sealing applications.

Tensile strength

Ultimate tensile strength varying from approximately 425 to more than 26,000 kPa depending on the design density.

Safety and environmental stewardship

Fire resistant by design, Vespel® SF polyimide foam emits virtually no off gas and does not release toxic fumes when exposed to open flames. Its non-fibrous composition promotes safe handling during processing and final assembly.

Design flexibility

Vespel® SF polyimide foam can be molded to match unique geometries of most complex designs. Parts can be easily bonded at initial assembly or in the field. (Figures 1 and 2)

Improves efficiency by reducing fuel consumption and increasing payload capacity

Vespel® SF polyimide foam can be manufactured to meet density requirements in the range of approximately 10–35 lb/ft³.

Solving a variety of problems

Vespel® SF has been used to solve a variety of problems. From abradable seals, stator vane seals, variable bushing packing, and nacelle insulation to composite paneling in structural applications, the versatility and durability allows you to think out of the box to solve some of the most challenging aerospace problems.

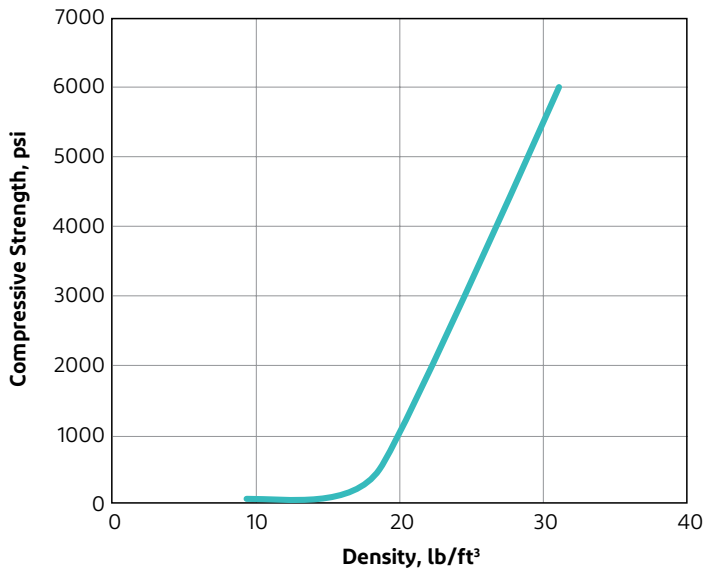


Figure 3. DuPont™ Vespel® SF Compressive Strength

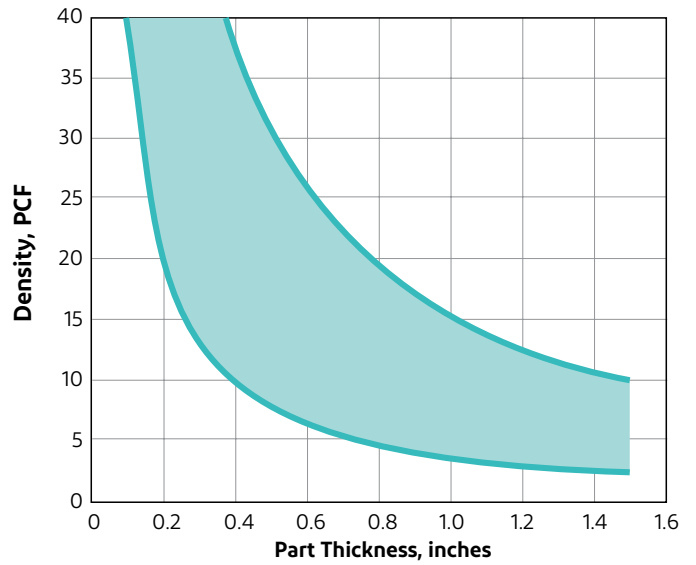


Figure 4. DuPont™ Vespel® SF Customizable Densification at Varying Part Thickness

Visit us at vespel.com

The information set forth herein is furnished free of charge, is based on technical data that DuPont believes to be reliable and represents typical values that fall within the normal range of properties. This information relates only to the specific material designated and may not be valid for such material used in combination with other materials or in other processes. It is intended for use by persons having technical skill, at their own discretion and risk. This information should not be used to establish specification limits nor used alone as the basis of design. Handling precaution information is given with the understanding that those using it will satisfy themselves that their conditions of use present no health or safety hazards and comply with applicable law. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any product, evaluation under end use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate or a recommendation to infringe on patents.

CAUTION: Do not use DuPont materials in medical applications involving implantation in the human body or contact with internal body fluids or tissues unless the material has been provided from DuPont under a written contract that is consistent with the DuPont policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your DuPont representative.

DuPont's sole warranty is that our products will meet our standard sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted. TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, DUPONT SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR NON INFRINGEMENT. DUPONT DISCLAIMS LIABILITY FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

DuPont™, the DuPont Oval Logo, and all trademarks and service marks denoted with ™, SM or ® are owned by affiliates of DuPont de Nemours, Inc. unless otherwise noted. © 2022 DuPont. All rights reserved.



dupont.com

Form No. VPE-A40046-00-A0822 CDP