

DuPont™ Vespel® SCP-5000 Parts Make Great Seals, Insulators and More for Hotter Environments

With even better temperature resistance, chemical compatibility and dimensional stability than traditional polyimides, new Vespel® SCP-5000 parts can extend part life and cut cost and weight in replacing metal and other materials in aerospace, semiconductor and other industrial applications.



Introducing hotter-running Vespel®

One of the latest DuPont advances in material science, the Vespel® SCP family uses a new polyimide that extends the application range of polyimide parts and shapes into even higher temperature environments. This document focuses on Vespel® SCP-5000, an unfilled grade.

Lighter, less costly seals

In applications such as seals and valve seats needing enhanced high-temperature performance, Vespel® SCP-5000 parts can save weight, reduce actuation force required and cut fabrication costs in replacing metal-to-metal seals. They can also extend part life in replacing plastics with lower thermal capabilities.

Long life in hot environments

In thermal oxidative testing in a pressurized, oxygen-rich environment at very high temperature (Figure 3), Vespel® SCP-5000 specimens exhibited 87% less weight loss than a traditional polyimide.

Figure 2 shows how well Vespel® SCP-5000 parts retain strength from 370 to 430°C in air. At 370°C, for example, they retain half of their original tensile strength more than 5 times longer than traditional polyimide. In inert environments such as nitrogen or vacuum, Vespel® SCP-5000 parts can perform at temperatures up to at least 340°C with only negligible loss of mechanical properties.

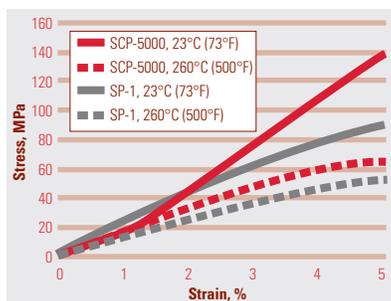
Stronger over a broader temperature range

For initial strength and stiffness and in retention of strength and stiffness in high-temperature environments, Vespel® SCP-5000 parts outperform traditional polyimides. As shown in Figure 1, their compression strength at 5% strain is about 60% higher than traditional polyimide at ambient temperature and 30% higher at 260°C.

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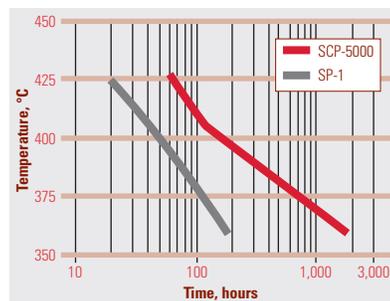
Stronger

Fig. 1: Compression stress/strain



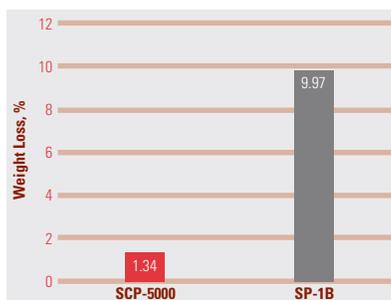
Stays stronger

Fig. 2: Time of retention of ≥50% of original tensile strength



Better heat stability

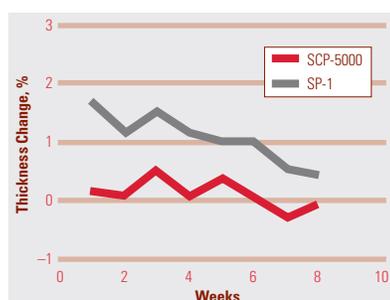
Fig. 3: Thermal oxidative stability, 100 hours at 371°C (700°F), 4.76 atm (70 psia)



Test specimen: 1/2 tensile bar

More dimensional stability

Fig. 4: Thickness change/time after exposure to 38°C (100°F), 90% RH

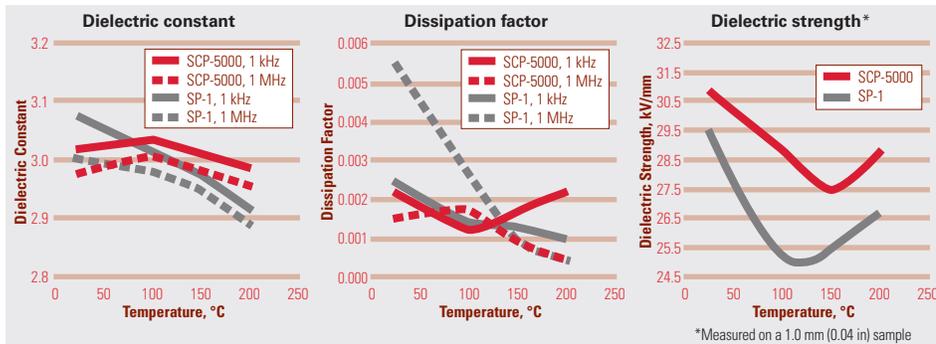


Note: Properties shown in all charts are based on isostatically molded shapes.



The miracles of science™

DuPont™ Vespel® SCP-5000 parts make higher performance insulators



Note: Properties shown in all charts are based on isostatically molded shapes.

Better insulators can work hotter

Vespel® SCP-5000 parts have outstanding dielectric properties over wide temperature and frequency ranges as shown in the charts above. Their dielectrics, in combination with high strength and excellent thermal properties, show that Vespel® SCP-5000 parts can perform very well as insulators and other electrical components in severe environments.

Improved dimensional stability

Vespel® SCP-5000 parts outperform traditional polyimide with substantially less dimensional change resulting from moisture uptake (Figure 4 on p. 1).

Chemical resistance

Vespel® SCP-5000 parts surpass the already excellent solvent resistance of traditional polyimides. They are compatible with most chemicals, but

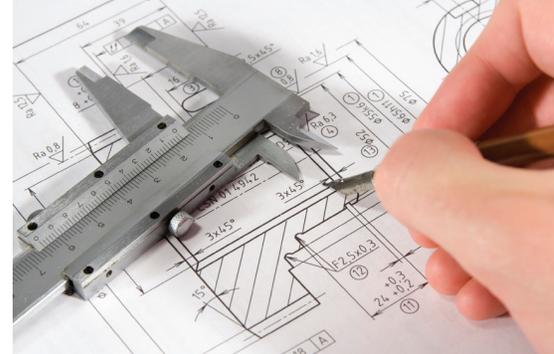
we recommend verifying compatibility with specific chemicals. Please contact the nearest location for DuPont™ Vespel®.

Need more wear resistance?

The Vespel® SCP family also includes two compositions with new filler technologies, Vespel® SCP-5050 and SCP-50094. They have enhanced friction and wear properties and a lower coefficient of thermal expansion in addition to higher-temperature performance. To learn more, please visit <http://dupont.vespel.com> or contact the nearest DuPont location.

Let's talk

We have the right materials, technology and technical resources to help you design and manufacture superior parts and systems. Please contact the nearest DuPont representative for your country.



Our application specialists stand ready to assist you in designing your part.

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