Application Profile

DuPont™ Vespel® SCP-5050 Composite Shrouds

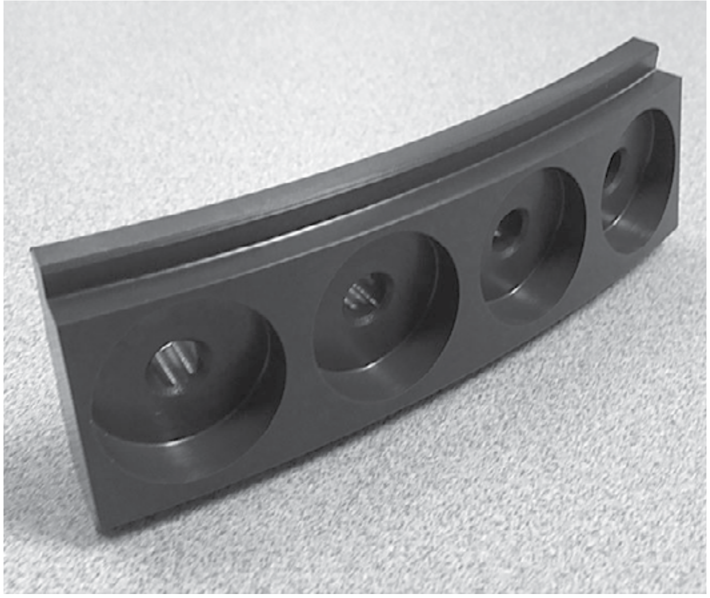

Figure 1. Composite Shroud

Application

- A shroud is a segmented ring with holes drilled radially outward for variable vane stems used inside a jet engine compressor. Some are split.
- Grooves are cut into shroud to accept metal connecting ring, frequently with an abradable seal
- Shrouds are typically aluminum, stainless steel, or titanium
- Shrouds utilize bushings to enhance wear and reduce friction for variable vane stems
- Inner shrouds typically float on the engine axis

Challenges

- Damage can occur to expensive metal components such as vanes if bushings wear out prematurely
- Components need to withstand thermal excursions for duration of expected engine life
- Shrouds need to withstand impact, loading, and maintain relative location of vanes
- Shrouds need to be designed to allow simultaneous assembly with multiple vanes

Solution

Design shrouds in light weight, high temperature, wear resistant Vespel® SCP-5050 composite material instead of metal

Features and Benefits

- High temperature material capabilities in application environments in excess of 600 °F/315 °C*
- Longer component life due to reduced wear interfaces, utilization of bearing material for entire shroud, and elimination of bushing life issues
- Proven impact resistance
- Potential weight savings of 40% over aluminum and 75% over stainless steel and titanium due to lower density of composite materials
- Fewer parts to stock and assemble through bushing elimination
- Lower system cost through part consolidation
- Provide largest subassembly possible
- Lower friction vs. metal with dynamic coefficient of 0.2 or less
- Vibration dampening properties of composites versus metals

*Actual temperature limits are dependent on specific application conditions. For more information, please contact your DuPont representative.

More Hot Wear Resistance

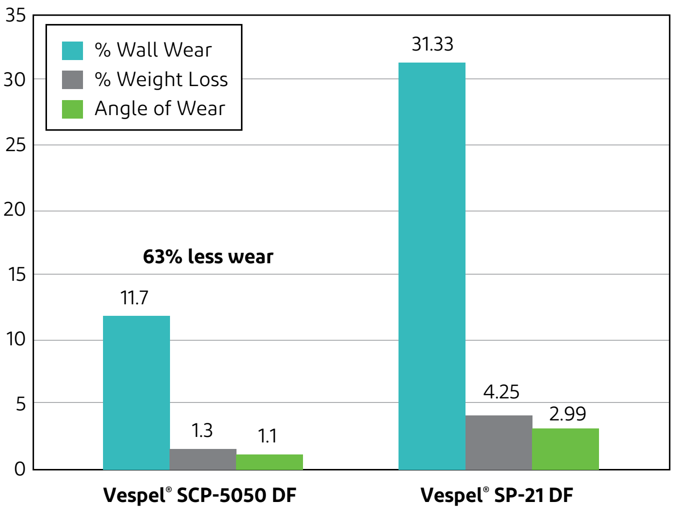

Figure 2. Wear*, 500,000 cycles at 343 °C (650 °F)

Stiff When Hot

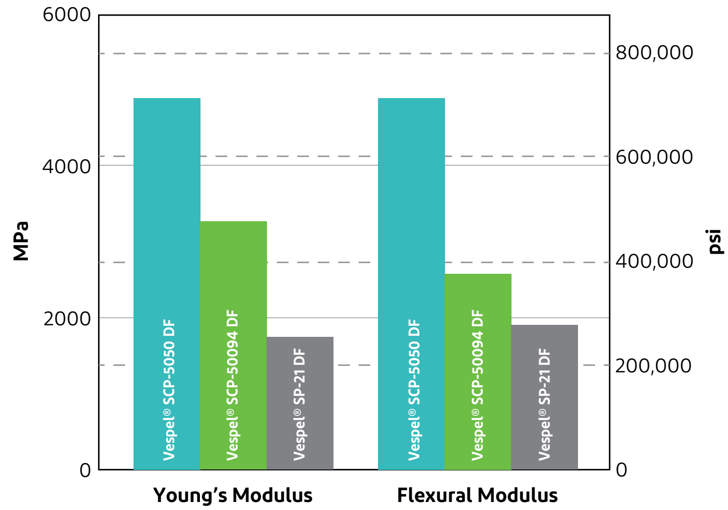

Figure 3. Young's and flexural modulus at 260 °C (500 °F)

*Oscillating wear tests of bushings with both axial and cantilevered loads

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