
DuPont™ Vespel®
SP-1 for ball valve seats
Electronics & Industrial Kalrez® - Vespel® EMEA
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Contents

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DuPont™ Vespel® Parts Overview

What are DuPont™ Vespel® Parts and Shapes?

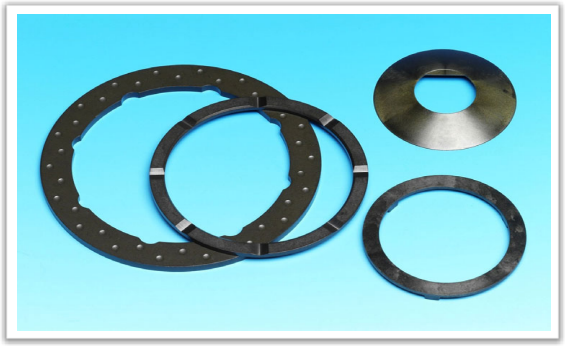
- Vespel® is the brand name for a range of high performance, mainly polyimide-based plastics.
- Vespel® SP polyimide has been developed in cooperation with NASA for the Apollo Space Project.
- Over the past 50 years, the Vespel® parts and shapes portfolio has expanded to include several different grades, each with unique performance characteristics accomplished by varying the types and levels of fillers and different manufacturing methods for parts or shapes.
- Vespel® parts and shapes are resistant to heat, creep, wear and a variety of chemicals.
- Vespel® parts and shapes are used in a wide range of applications in the industry.

DuPont™ Vespel® Offerings

High performance parts and shapes

Stock Shapes (ISO)

- Commercially available
- Different shapes and sizes
- Can be machined
- Excellent material properties
- Sold mainly through distribution



Custom Parts (DF/DF2)

- Proprietary design
- Engineering solutions by DuPont
- Technical global support
- Minimal machining steps lower costs per part
- Tight tolerances / quality assurance

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Where do Vespel® parts and shapes fit?

- Demanding applications, which require high stability along with durable, long-lasting properties
- Low wear and friction
- Extreme temperature environments
- Valve sealing, due to compliant nature of Vespel® parts compared to metals and conventional plastics
- Reduction of fugitive emissions from LNG (e.g. Methane)

Vespel® can also be machined to tight tolerances if needed

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DuPont™ Vespel® value proposition for ball valve seats

Vespel® parts and shapes – Ball valve seats and seals

Valve seats and seals made from diverse polymers and composite material systems are used to achieve bubble-tight closure in high chemical hazard and extreme temperature processes.

Typically for valves that need to seal at high temperatures and high pressures, metal seated valves are used consisting of a tungsten carbide (to 260 °C) or chromium carbide (> 260 °C) coating on the ball and seats. Because the compressive modulus of metals is very high (> 500GPa), it is much harder to make an effective seal and make the valve "bubble tight." Due to creep, many polymers become difficult to use much above their glass transition temperature at higher pressure classes.

Requirements:

- **Low coefficient of friction**
- **Wide range of temperature capabilities** from cryogenic, –320 °F (–196 °C), to 550°F (288 °C), with excursions up to 900 °F (482 °C)
- **Low coefficient of thermal expansion**
- **Broad chemical compatibility**

Incumbent solutions: chrome carbide - tungsten carbide – PCTFE

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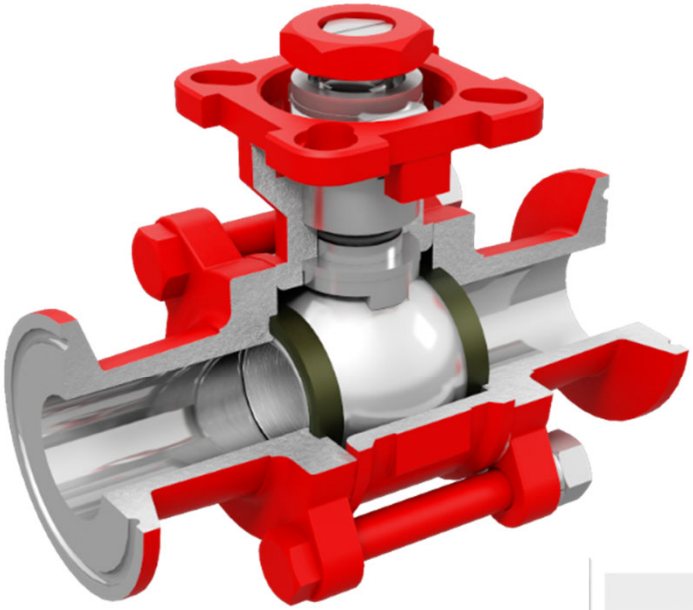
Vespel® parts and shapes – Ball valve seats and seals

❑ **Features**

- Good wear resistance
- High creep resistance
- High toughness and impact resistance
- Easy to machine to tighter tolerances
- High pressure capability up to 3000 psi (20.7 MPa)
- Wide operational temperature range, from -269ºC (-452 ºF) up to more than 300ºC (572 ºF), with short excursions up to 480 ºC (896 ºF).

❑ **Typical benefits observed using Vespel® as valve seat material can include:**

- Increased life and reliability of equipment
- Lower fugitive emissions
- Reduced operation downtime
- Less frequent maintenance
- Reduced overall operation cost
- Lower operating torque*



Ball valve with Vespel® seat

*For specific valve designs, users could observe up to a 40% reduction on the operating torque compared to metal seats.

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