



**CALL 1.800.227.7963**  
**and ASK FOR AUTHENTIC VESPEL®**  
CURBELL PLASTICS, YOUR  
AUTHORIZED VESPEL® SUPPLIER

**Authentic DuPont™ Vespel® Polyimide Shapes**  
*High Performance Parts for Machine Shops,  
Semiconductor Manufacturing, and Aerospace*

Authentic Vespel® SP polyimide is a high performance engineering plastic manufactured by DuPont. Components fabricated from Vespel® polyimide shapes meet stringent requirements for weight reduction, long service life, chemical exposure and/or extreme temperatures. With the combined physical properties of metals, ceramics, and plastics, Vespel® SP polyimide shapes offer a combination of properties that allow it to perform where other materials can't.

## PRODUCT OVERVIEW

### Vespel® S Line - Highly Durable, Versatile Polyimides

Vespel® shapes are available in **five compositions of SP polyimide resin** including an unfilled grade, Vespel® SP-1, and several low wear bearing grades: Vespel® SP-21, SP-22, SP-211, and SP-3.

Together, the Vespel® S Line provides a range of properties that outperform other high performance materials. Components fabricated from Vespel® S shapes are particularly adapted to applications simultaneously requiring thermal stability, electrical properties, and wear and friction behaviors in load-bearing mechanical components.

### Vespel® Applications

Typical applications that use Vespel® SP polyimide shapes include:

#### Semiconductor Machinery Parts

- Integrated chip (IC) test sockets
- Wafer clamping rings
- Wafer handling parts

#### Aerospace Components

- Flanged bearings
- Spline couplings
- Seals
- Thrust washers
- Locknut inserts

### **Other High Performance Applications**

- High performance bearings and bushings
- Valve seats
- Gaskets
- Seals
- Piston rings
- Welding tip nozzles
- Wear strips
- Check valve balls
- Thermal and electrical insulators

### **Vespel ® Polyimide Shapes Availability**

Vespel ® shapes, made by DuPont from high-performance SP polyimide resins, are available as rods, plaques, tubes, bars, rings and disks, and balls. Some materials are offered in additional shapes and sizes. please call 1.800.227.7963 for availability.

**Find out how Authentic Vespel ® polyimide shapes can make the difference in your high performance components.**

Contact Curbell Plastics, an authorized supplier of Authentic Vespel ® polyimide shapes, at 1.800.227.7963 or use our online Vespel ® quote form.

## **MACHINE SHOP**

### **Precision Machined DuPont™ Vespel ® Polyimide Shapes**

*for Semiconductor, Aerospace, Automotive and Other High Performance Applications*

Are you a machine shop or job shop specializing in:

- Precision machining
- CNC drilling
- Milling
- Routing
- Tight tolerances or
- Cut to size

Then consider Vespel ® shapes, fabricated from a very tough yet compliant polyimide material.

### **Easy to Machine and Hold Tight Tolerances**

Vespel ® polyimide shapes are relatively easy to machine because of their inherent mechanical strength, stiffness, and dimensional stability at machining temperatures. In addition, Vespel ® shapes can be machined with standard metalworking equipment to produce parts to tolerances once considered too close for plastic materials. In most cases, the techniques used in machining metals are directly applicable.

Vespel ® shapes are suitable for machining prototype, low volume, or parts with complex geometry.

## Features and Benefits

Vespel ® polyimide shapes:

- Easily machine to tight tolerances
- Provide high temperature resistance
- Weigh less than metal parts
- Have a low coefficient of friction
- Resist corrosion
- Provide a more reliable seal than many other sealing systems
- May often reduce manufacturing costs, such as expensive hand lapping or secondary grinding
- Have resistance to fatigue
- Resist deformation from repetitive impact (peening)

## High Performance Applications Use Vespel ® Polyimide Shapes

Vespel ® polyimide shapes are used to fabricate precision plastic components for a diverse range of industries or applications including:

- Scientific instrumentation
- Electrical and electronic
- Automotive and off-road transportation
- Aerospace
- Industrial and specialty valve
- Semiconductor manufacturing
- Special industries where high performance parts are critical

### DuPont™ Vespel ® S Series

*A Range of Polyimide Grades Available*

Vespel ® polyimide shapes are available in five compositions of SP polyimide resin. Select the Vespel ® polyimide that meets your needs for your specific high performance application.

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## SEMICONDUCTOR

### DuPont™ Vespel ® Polyimide Shapes in Semiconductor Manufacturing

Components fabricated from Vespel ® SP Polyimide shapes are highly valued in semiconductor manufacturing processes for their:

- High purity
- Low friction

- Low wear and low particle generation
- High temperature resistance and
- Good dimensional stability

### **Vespel® Polyimide Shapes Have a Record of Reliability and Durability**

Vespel® polyimide shapes can help reduce ownership costs by providing longer life and extended maintenance intervals for applications in:

- Wafer handling
- Wafer processing
- IC handling
- IC testing and
- Other semiconductor manufacturing operations

In critical, clean semiconductor applications, semiconductor manufacturers often find that low out-gassing Vespel® SP-1 reduces the risk of contamination in a high vacuum environment.

### **Features and Benefits**

- High purity to improve die yields
- Strength and toughness to resist damage
- Withstands high temperatures
- Low wear and friction
- Holds tight tolerances
- Resists chemical attack
- First-class electrical insulators

### **Vespel® Polyimide Shapes for Semiconductor Applications**

#### **Wafer Processing Parts**

- Wafer clamping rings
- Focus and shield rings
- Thermal and electrical insulators
- Retaining rings for polishing
- Various chamber hardware

#### **Wafer Handling Parts**

- Wafer guides
- Wafer lift pins and wear pads
- Vacuum pickup strips and vacuum wands or vacuum tweezers
- Wafer carriers

## **Integrated Circuits (IC) Handling and Testing Components**

- Die pickup collets
- Test sockets
- Insulators and wear strips
- Probe card insulators

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## **AEROSPACE**

### **Vespel® Polyimide Shapes for Aerospace Components**

What non-metallic material offers the following attributes for high performance aerospace components:

- High temperature resistance
- Low out-gassing
- Light weight
- Reduced wear and friction in dry and vacuum environments

#### **It's Vespel® polyimide shapes.**

DuPont™ Vespel® shapes allow designers the freedom to reduce weight by either directly replacing heavier components made from aluminum or metallic alloys, or indirectly by reducing friction and allowing for simplified, lower-weight actuators. With today's critical applications, Vespel® shapes offer high performance features which make it possible for aerospace components to operate within demanding environments. In fact, a variety of components fabricated from Vespel® shapes are flying in most jet engines made in the Western world.

### **Vespel® Shapes, SP Polyimide Properties Make the Difference**

Vespel® polyimide shapes, available from five SP polyimide resin compositions, offer an outstanding combination of properties:

- Resistance to extreme heat
- Mechanical strength
- Chemical resistance
- Low coefficient of friction (low CTE)
- Dielectric strength
- Dimensional stability
- Wear resistance
- Compressive strength
- Radiation resistance
- Low out-gassing for vacuum applications
- Toughness

## Choose Vespel® SP-3 for Performance in Vacuum and Dry Environments

Working in a vacuum or dry environment has its own challenges. Aerospace engineers have to worry about extra difficulties like out-gassing. But Vespel® SP-3 shapes offer proven performance in aerospace applications, largely due to their low out-gassing.

*Vacuum and dry environment applications include:*

- Aerospace locknuts with non-metallic inserts
- Bearings
- Bushings
- Fastening screws
- Gears
- Piston rings
- Seal rings
- Seals
- Splines
- Thrust washers

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