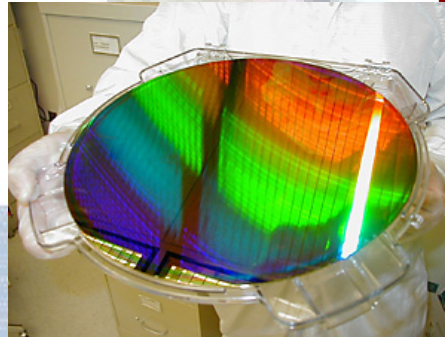
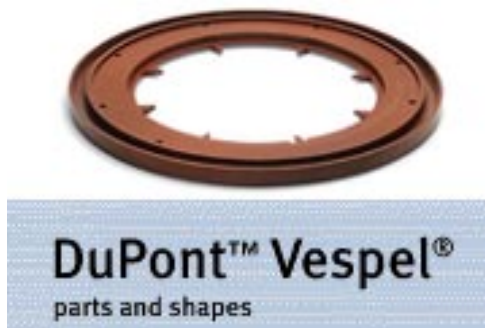


DuPont Vespel® Polyimide Shapes Proven Solutions for Semiconductor Processing



DuPont Vespel® polyimide parts have a documented record of reliability and durability in wafer handling, wafer processing, IC handling and testing and other semiconductor manufacturing processes. Vespel® offers an alternative to ceramics, quartz and unproven types of plastics while reducing ownership costs with extended life in the chamber and longer maintenance intervals. Super clean to improve die yields Vespel® gives you the cleanliness needed to deliver consistently high yields. DuPont process research and manufacturing controls have kept pace with the fab's needs for ever cleaner materials. Vespel® parts offer extremely high purity, negligible trace metal content, virtually no particulate shedding in plasma and insignificant outgassing properties. To meet ever tightening contamination requirements, DuPont is continuously improving the cleanliness of Vespel® parts. For more than 30 years, Vespel® parts have provided a unique combination of strength, toughness and low wear to withstand the rigors of repeated handling, cleaning cycles, mechanical abuse and permanent deformation. And their good compliance allows reliable sealing.

Temperature Performance

Vespel® parts serve reliably at temperatures up to 288°C (550°F) in many applications. For limited periods, they can endure temperatures of 482°C (900°F) or more. Elevated temperatures have little effect on mechanical properties such as tensile strength, elongation, flexural modulus and compressive strength.

Wear and Friction Resistance

With low friction and superior wear performance over a broad temperature range, Vespel® parts are a good choice for sliding contact and applications where interfacial temperatures are high.

Holds Close Tolerances

Compared with other polymer components, Vespel® parts provide superior dimensional stability. Vespel® has no observable softening or melting point, and its coefficient of thermal expansion is low. Creep resistance is high.

Resists Chemical Attack

Vespel® parts are compatible with most gases typically used in key semiconductor process vessels, including epitaxial reactors, photoresist developers, dry etchers and ion implanters. Most solvents, etchants, electronic chemicals, vacuum fluids and hydraulic oils have no significant effect on Vespel® parts.

First-Class Electrical Insulators

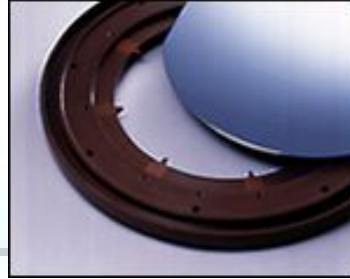
Vespel® parts provide the excellent dielectric properties required for semiconductor processing components

Wafer Processing

Wherever a wafer process requires resilient, long-wearing parts to cushion, dampen or isolate, Vespel® usually provides a viable solution. Candidate applications include crystal slicing, photoresist applications, dry etching and ion implantation.

Wafer Clamping Rings

Used in oxide etching, the Vespel® clamping ring withstands extremely aggressive conditions. It maintains strength, resilience and dimensional stability at operating temperatures of 288°C (550°F), high plasma energy, and vacuum to 10⁻⁹ torr. Service life depends on chamber conditions, including types of etchant gases.



Insulators

Vespel® parts work as both thermal and electrical insulators. The insulators separate wafers from a stainless steel pedestal during ion implantation. The use of Vespel® minimizes contamination and extends service life with high process yield and reduced downtime.

Screws & Fasteners

Vespel® screws and fasteners are used in conjunction with Vespel® Wafer Clamping rings or Vespel Confinement Rings to provide a consistent material system. Vespel® is suitable to handle the torque necessary for fastening and tightening of screws. Its stability and strength allow for easy part replacement.

Clamping Finger

These replaceable fingers are used in aftermarket wafer clamping rings to extend part life and reduce overall cost of use by allowing users to replace the fingers rather than the entire rings.



Bearings, Centering Pins, Alignment Pins

Vespel® bearings and centering pins require no lubrication and exhibit low friction as key parts for implantation of impurity atoms. The bearing retainer is a special composition of Vespel® tailored for superior wear resistance in a vacuum environment.

Vacuum Pads

Attached to robot arms, Vespel® pads hold wafers while they are removed from various processing setups.

Wafer Handling

Automated wafer handling systems require contact surfaces that are resilient, long wearing, free of particulate and dimensionally stable. Because Vespel® parts



can meet all these requirements, they are widely used in vacuum pickup systems, carrying devices and positioning assemblies.

Wafer Guides

These Vespel® guides withstand process temperatures up to 288°C (550°F) without damage or deformation. The resilience of Vespel® and its low thermal conductivity help avoid buildup of thermal stresses in wafers. And Vespel® minimizes particulate contamination.



Vacuum Pickup Strips and Tips

Vespel® parts only 1 to 3 mm thick are milled to permit air passages and bonded to stainless steel in such applications. Vespel® meets needs for strength to hold up in such thin sections and resilience to help protect wafers from handling damage.



Wafer Carriers

As wafer carriers and wafer contact surfaces in such carriers, Vespel polyimide far outperforms various other polymer components in resistance to elevated temperatures and process conditions. Vespel wafer carriers utilize intricate design features, including slots and undercuts, which are easily machined to close tolerances.



Probe Check Insulators

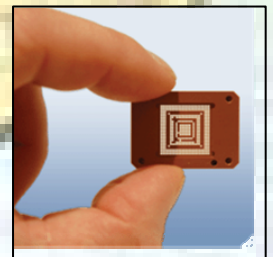
In holding wafers during testing of individual circuit chips, these Vespel® components help minimize contamination and hold the close tolerances needed for precise positioning for testing.

IC Handling and Testing

Vespel® provides the excellent dielectric performance and mechanical properties needed in apparatus for handling and testing integrated circuits in packaging operations.

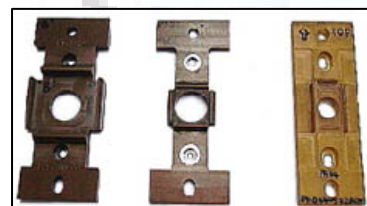
Die-Pickup Collets

For handling diced chips during packaging, Vespel® collets meet needs for resilience and cleanliness. These parts are easily machined to the precise tolerances required.



Test Sites and Holders

In these thin-walled components, Vespel® provides excellent dielectrics and outperforms ceramics in strength, toughness and resilience to protect circuits from damage during testing. In some cases, metal contacts are adhesive-bonded in place. The Vespel® parts also fill the need for dimensional stability over a wide range of test temperatures.



Insulators and Wear Strips

Used during testing and packaging steps, these Vespel® parts resist wear and have low friction against components made of other materials. Their configuration attests to the feasibility of machining Vespel® with high precision.

For more information on Vespel® or other high-performance plastics used in the semiconductor industry, please contact Professional Plastics, Inc.

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