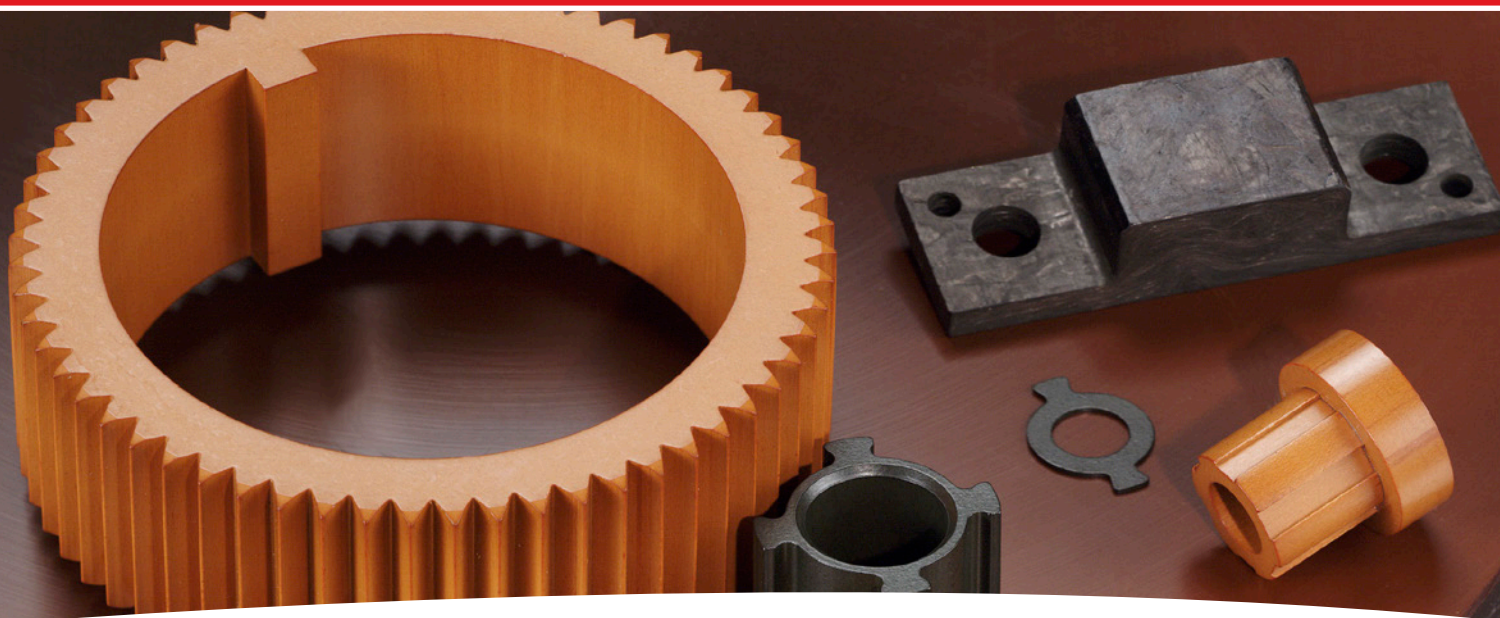


DuPont™ Vespel® Polyimide Shapes



Curbell Plastics - Authorized Supplier of Authentic DuPont™ Vespel® Polyimide Shapes

DuPont™ Vespel® Polyimide is an extremely high temperature, creep resistant plastic material used in high heat environments where thermoplastic materials lose their mechanical properties and as a lightweight metal replacement. Vespel® has long term performance at cryogenic temperatures and up to 260°C (500°F) making it a popular choice for many aerospace and industrial applications.

High performance parts made from Vespel® Polyimide Shapes

- Provide strength and toughness to resist damage
- Withstand high temperatures
- Provide low wear and friction
- Hold tight tolerances
- Are first-class electrical insulators
- Have excellent machinability
- Resist chemical attack
- Offer high purity and low out-gassing

TYPICAL APPLICATIONS:

- Wafer handling
- Seals
- Valves
- Fasteners
- Gears
- Splines
- Thrust washers
- Wear pads
- Compressor and pump parts
- Piston rings
- Bushings
- Bearings
- Hot glass handling

INDUSTRIES SERVED:

- Aerospace
- Semiconductor/electronics
- Spacecraft
- Military and defense
- Scientific instrumentation
- High temperature applications



Authorized Distributor

Curbell Plastics is the Western US Region Authorized Supplier of Authentic DuPont™ Vespel® Polyimide Shapes

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CURBELL
PLASTICS

SP-1
SP-3
SP-21
SP-211
SP-22
SP-202
SCP-5000
SCP-5009
SCP-50094
SCP-5050

Vespeℓ® SP-1 - For physical and electrical properties
SP-1 has high purity and provides physical strength, elongation and toughness, along with electrical and thermal insulation properties. Semiconductor manufacturers often find components fabricated from Vespeℓ® SP-1 shapes useful in production processes.

Vespeℓ® SP-3 - For unlubricated sealing and low wear in vacuum or dry environments
SP-3 provides lubrication for seals and bearings in vacuum or dry environments. SP-3 provides maximum wear and friction resistance in vacuum and other moisture-free environments, where graphite becomes abrasive.

Vespeℓ® SP-21 - For balanced low wear and physical properties
SP-21 is ideal for low wear and friction in applications. SP-21 has physical strength, elongation, and toughness.

Vespeℓ® SP-211 - For low coefficient of friction and unlubricated wear
SP-211 provides the lowest coefficient of friction over a wide range of operating conditions. It offers excellent wear resistance up to 300°F (149°C).

Vespeℓ® SP-22 - For low wear and dimensional stability
SP-22 provides enhanced resistance to wear and friction as well as improved dimensional and oxidative stability.

Vespeℓ® SP-202 - Conductive polymer offers electrostatic charge removal
SP-202 is a conductive plastic for high temperature substrate handling applications with surface and volume resistivity values in the range of 10⁻¹ to 10¹ (ohm, ohm-cm). It has the thermal resistance to maintain tolerances in high heat applications and through multiple thermal cycles.

Vespeℓ® SCP-5000 - For strength, hardness, and chemical resistance over a broad temperature range
SCP-5000 is ideal for demanding applications that require toughness, thermal and dimensional stability, chemical resistance, and stable dielectric performance across a broad temperature range.

Vespeℓ® SCP-5009 - For high wear and friction applications under high operating pressure and elevated temperature environments
SCP-5009 shapes have a low coefficient of thermal expansion and provide good sealing as well as outstanding mechanical properties like high compressive strength and low creep, even in extreme conditions.

Vespeℓ® SCP-50094 - For high temperature and wear resistance
SCP-50094 is a proprietary polymer designed for demanding applications that require high strength, high temperature, and wear resistance.

Vespeℓ® SCP-5050 - For high temperature, wear resistance, and exceptional coefficient of thermal expansion
SCP-5050 is a new and innovative polyimide composition. SCP-5050 has improved high temperature and wear resistance compared to conventional polyimides allowing replacement of metal and graphite in more applications. Its proprietary composition is designed to offer a coefficient of thermal expansion (CTE) close to the CTE of metals.

TYPICAL PROPERTIES OF
DUPONT™ VESPEℓ® ISOSTATIC SHAPE GRADES

			VESPEℓ® SP					VESPEℓ® SCP			
	ASTM Method	Units	SP-1 Unfilled	SP-3 Vacuum Bearing Grade	SP-21 15% Graphite	SP-211 15% Graphite & 10% Teflon®	SP-22 40% Graphite	SCP-5000 Unfilled	SCP-5009 Graphite Filled	SCP-50094 Graphite Bearing Grade- Low Fill	SCP-5050 Graphite Bearing Grade- High Fill
MECHANICAL											
Tensile strength 23°C (73°F)	D1708/D638	MPa (kpsi)	86.2 (12.5)	56.5 (8.2)	65.5 (9.5)	44.8 (6.5)	51.7 (7.5)	163 (23.6)	116 (16.9)	124 (18.0)	72 (10.5)
Tensile strength 260°C (500°F)	D1708/D638	MPa (kpsi)	41.4 (6.0)		37.9 (5.5)	24.1 (3.5)	23.4 (3.4)	62 (9)	57 (8.4)	55 (8.0)	39 (5.6)
Elongation at break 23°C (73°F)	D1708/D638	%	7.5	4.0	4.5	3.5	3.0	7.5	3.0	4.3	2.5
Elongation at break 260°C (500°F)	D1708/D638	%	6.0		3.0	3.0	2.0	49.0	9.7	13.0	5.3
Flexural modulus 23°C (73°F)	D790	MPa (kpsi)	3,100 (450)	3,280 (475)	3,790 (550)	3,100 (450)	4,830 (700)	5,760 (836)	6,231 (903)	6,360 (923)	7,790 (1130)
Flexural modulus 260°C (500°F)	D790	MPa (kpsi)	1,720 (250)	1,860 (270)	2,550 (370)	1,380 (200)	2,760 (400)	3,010 (436)	3,560 (516)	3,540 (514)	5,100 (740)
Compressive stress at 10% strain, 23°C (73°F)	D695	MPa (kpsi)	133 (19.3)	128 (18.5)	133 (19.3)	102 (14.8)	112 (16.3)	230 (33.4)	222 (32.2)	220 (31.9)	172 (25)
Deformation under 13.8 MPa (2,000 psi) load	D621	%	0.14	0.12	0.10	0.13	0.08	0.05	0.03	0.05	0.03
FRICTION											
Coefficient of friction at PV = .875 MPa m/s (25,000 psi-ft/min)*			0.29	0.25	0.24	0.12	0.20	0.26	0.22	0.25	0.12
Coefficient of friction at PV = 3.5 MPa m/s (25,000 psi-ft/min)*				0.17	0.12	0.08	0.09	0.15	0.14	0.07	0.08
Static coefficient of friction in air*			0.35		0.30	0.20	0.27				
PV limit (unlubricated)**		MPa-m/s (kpsi ft/min)			12.3 (350)	3.5 (100)	12.3 (350)		25K/0.22 100K/0.14	17.5 (500)	
OTHER PROPERTIES											
Coefficient of thermal expansion 23-300°C (73-572°F)	E831	µm/m/K (10 ⁻⁶ in/in-°F)	54 (30)	52 (29)	49 (27)	54 (30)	38 (21)	47 (26)	44 (24)	43 (24)	29 (16)
Hardness	D785	Rockwell E	45-60	40-55	25-45	1-20	5-25	95	91	91	63
Water absorption 24 hr at 23°C (73°F)	D570	%	0.24	0.23	0.19	0.21	0.14	0.08	0.14	0.06	0.04

*Versus carbon steel, steady state, unlubricated, in air, thrust bearing. **PV limits for any material vary with different combinations of pressure and velocity as well as other conditions. Typical properties for Vespeℓ® SP-202 conductive grade can be found on www.curbellplastics.com.

Standard Sizes: **PLAQUE:** 10"x10" (0.062"-2.0" thick), 5"x5" and 5"x10" (0.25"-2.0" thick) **ROD:** diameter 1/8"-6.0" (0.125"-6.0") **BALLS:** diameter 1/8"-5/8" (DuPont™ Vespeℓ® SP-1, only)

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