

DuPont™ Vespel® SP-21

POLYIMIDE ISOSTATIC SHAPES

Typical ISO Properties

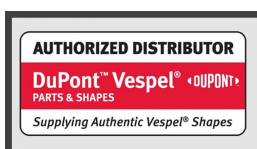
DuPont™ Vespel® SP-21 parts and shapes provide low wear and friction for bearing, thrust washers, and dynamic seals. SP-21 is a graphite-filled polymer.

Some data presented below are based on limited production runs and are subject to revision as new knowledge and experience become available.

Mechanical Property	Temperature	ASTM	Units	Typical Values
Tensile Strength	23 °C (73 °F) 260 °C (500 °F)	D-1708 or E8 [†]	MPa (kpsi)	65.5 (9.5) 37.9 (5.5)
Strain at Break	23 °C (73 °F) 260 °C (500 °F)	D-1708 or E8 [†]	%	4.5 3.0
Flexural Strength	23 °C (73 °F) 260 °C (500 °F)	D-790	MPa (kpsi)	110.3 (16.0) 62.0 (9.0)
Flexural Modulus	23 °C (73 °F) 260 °C (500 °F)	D-790	MPa (kpsi)	3792 (550) 2551 (370)
Compressive Stress at 1% strain at 10% strain at 0.1% strain	23 °C (73 °F) 23 °C (73 °F) 23 °C (73 °F)	D-695	MPa (kpsi)	29.0 (4.2) 133.1 (19.3) 45.5 (6.6)
Compressive Modulus	23 °C (73 °F)	D-695	MPa (kpsi)	2895 (420)
Axial Fatigue, Endurance Limit at 10 ³ cycles at 10 ⁷ cycles	23 °C (73 °F) 260 °C (500 °F) 23 °C (73 °F) 260 °C (500 °F)	—	MPa (kpsi)	46.2 (6.7) 22.8 (3.3) 32.4 (4.7) 16.5 (2.4)
Flexural Fatigue, Endurance Limit at 10 ³ cycles at 10 ⁷ cycles	23 °C (73 °F) 23 °C (73 °F)	—	MPa (kpsi)	65.5 (9.5) 44.8 (6.5)
Shear Strength	23 °C (73 °F)	D-732	MPa (kpsi)	77.2 (11.2)
Izod Notched Impact Strength	23 °C (73 °F)	D-256	J/m	42.7
Izod Unnotched Impact Strength	23 °C (73 °F)	D-256	J/m	320
Poisson's Ratio	23 °C (73 °F)	—	—	0.41
Wear and Friction				
Wear Rate ^{††}	—	—	m/s x 10 ⁻¹⁰	6.30
Friction Coefficient ^{**} PV = 0.875 MPa·m/s PV = 3.5 MPa·m/s	—	—	—	0.24 0.12
In Vacuum	—	—	—	—
Static in Air	—	—	—	0.30



The miracles of science™



DuPont™ Vespel® SP-21 Typical ISO Properties (continued)

Thermal Property	Temperature	ASTM	Units	Typical Values
Coefficient of Linear Expansion	23 °C (73 °F) to 260 °C (500 °F) -62 to +23 (-80 to 73 °F)	D-696	µm/m/°C (in/in/°F)	49 (27) 34 (19)
Thermal Conductivity	40 °C (104 °F)	—	W/m·°C	0.87
Specific Heat	—	—	J/kg/°C	—
Deformation Under 14 MPa Load	50 °C (122 °F)	D-621	%	0.10
Deflection Temperature at 2 MPa	—	D-648	°C	~360
Electrical Property				
Dielectric Constant at 10 ² Hz at 10 ⁴ Hz at 10 ⁶ Hz	23 °C (73 °F)	D150	—	13.53 13.28 13.41
Dissipation Factor at 10 ² Hz at 10 ⁴ Hz at 10 ⁶ Hz	23 °C (73 °F)	D150	—	0.0053 0.0067 0.0106
Dielectric Strength, Short Time 2 mm Thick	23 °C (73 °F)	D149	MV/m	9.84 (1.4)
Volume Resistivity	23 °C (73 °F)	D257	Ω·m	10 ¹² –10 ¹³
Surface Resistivity	23 °C (73 °F)	D257	Ω	—
Other Properties				
Water Absorption 24 h 48 h Equilibrium, 50% RH	23 °C (73 °F) 50 °C (122 °F)	D570	%	0.19 0.57 0.8–1.1
Specific Gravity	—	D792	—	1.51
Oxygen Index	—	D2863	%	49

† Machined isostatic tensile specimens made per D1708

†† Unlubricated in air (PV 0.875 MPa·m/s).

** Steady state, unlubricated in air.

Contact DuPont at the following regional locations:

North America

800-222-8377

Latin America

+0800 17 17 15

Greater China

+86-400-8851-888

ASEAN

+65-6586-3688

The information set forth herein is furnished free of charge and is based on technical data that DuPont believes to be reliable and falls within the normal range of properties. It is intended for use by persons having technical skill, at their own discretion and risk. This data should not be used to establish specification limits nor used alone as the basis of design. Handling precaution information is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any product, evaluation under end-use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate or a recommendation to infringe on patents.

Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, discuss with your DuPont customer service representative and read Medical Caution Statement H-50103-3.

Copyright © 2010 DuPont. The DuPont Oval Logo, DuPont™, The miracles of science™, Kalrez®, and Vespel® are trademarks or registered trademarks of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

(09/10) Reference No. VPE-A10863-00-A0910



The miracles of science™

