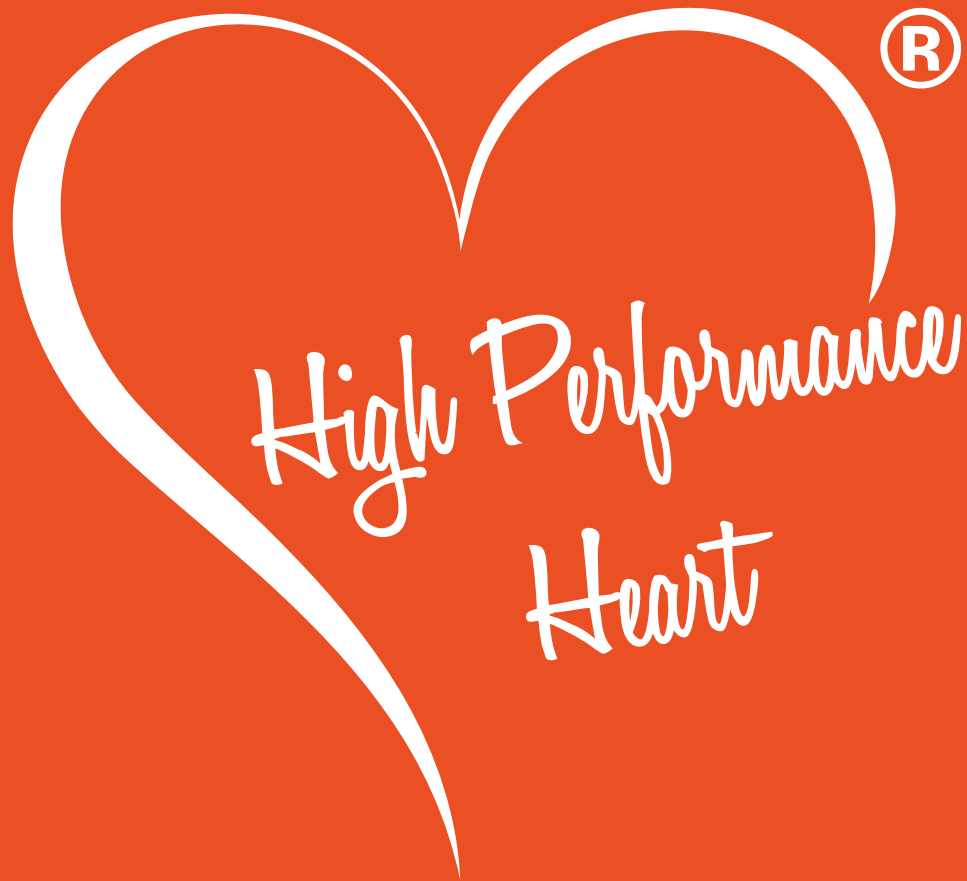


SEMI-FINISHED AND FINISHED PRODUCTS



DUPONT™ VESPEL®

 **FLUORTEN®**
PTFE & TECHNOPOLYMERS MANUFACTURING



“Give your equipment
a High Performance Heart
through Fluorten srl
engineering components”



FLUORITEN[®]
PTFE & TECHNOPOLYMERS MANUFACTURING

COMPONENTS IN DUPONT™ VESPEL[®]

The components in Dupont™ Vespel[®] combine the best characteristics of plastics, ceramics and metals; they are resistant to wear and sliding and in practice never melt: thanks to these properties they can be used in conditions of extreme operation.

In short, the components in Dupont™ Vespel[®]:

- are exceptionally resistant to wear even in the absence of lubrication (PV limit value when dry: up to 12 MPa·m/s, which can be exceeded in the presence of lubrication),
- can operate continuously in a vast range of temperatures, from cryogenic ones up to 288°C and, for short periods, up to 482°C and above,
- can withstand loads at temperatures which are prohibitive for the majority of plastics,
- have a low thermal and electric conductivity,
- can be used to manufacture sealing gaskets thanks to their conformability and their capacity to resist permanent deformation. The sealing characteristics are generally greater than metal/metal ones for which much narrower tolerances are necessary,
- can easily be machined by tools without the need for special equipment or processes.

MACHINING DUPONT™ VESPEL[®]

Fluoriten can provide finished components, machined with a machine tool or semi-finished in rods, tubes and sheets (see table) which can be finished by the customer with machine tools. The machining tolerances of the components in Dupont™ Vespel[®] are lower than those which can be obtained with other plastics and the parameters for machining are generally the same as those used for metals such as brass. Semi-finished goods in Dupont™ Vespel[®] are relatively easy to work mechanically thanks to the high characteristics of mechanical resistance, strength and dimensional stability of the material at the working temperatures.

Below please find a short guide to the choice of the various types of Dupont™ Vespel[®] depending on the applications and a table with the main characteristics.

FIELDS OF APPLICATION

- transport, for the production of any kind of vehicle, military or civil;
- aerospace, to reduce the weight of the components used;
- in semiconductors, with a saving given by a longer duration than average;
- industrial in general, for compressors, valves, pumps, insulators;
- in office machinery, such as printers, photocopiers etc.
- in ball valves for oil & gas, to simplify the design of seals and housings, increase their life, avoid damage of the ball, reduce the operating torque and increase the temperature range of use: from cryogenic to 288°C in continuous and above 420°C for short periods.

GUIDE TO THE CHOICE OF TYPES



APPLICATIONS	TYPE
Mechanical and electrical components at high temperatures, housings of valves, seals, electric insulators, connectors, nozzles for plasma torches, parts for the semiconductor sector.	SP - 1. Base resin not loaded. It has the highest mechanical resistance and elongation, the lowest flexural modulus and thermal conductivity and excellent electric properties.
Lubricated and non-lubricated applications, with requirements of low friction and resistance to wear. Housings of valves, seals, ball bearings, washers, sealing gaskets.	SP - 21. With 15% of graphite (in weight). Further improvement of its natural resistance to wear and long-term thermal stability.
Applications in which a low coefficient of thermal dilation is more important than mechanical resistance (which is slightly less). Ball bearings (bushings, washers, etc.) sweep-out fingers for hot glass bottles.	SP --22. With 40% of graphite (in weight). Lowest coefficient of thermal dilation. Maximum resistance to creep.
Applications with requisites of low friction and resistance to wear, in moderate conditions of PV and temperature, Ball bearings (bushings, washers, etc.) housings of ball valves.	SP - 211. With 15% of graphite and 10% of fluorocarbon Teflon® (in weight). Minimum coefficient of static friction
Components with requisites of low friction and resistance to wear, which work in a vacuum or in the presence of inert gases. Ball bearings, rings for pistons and seals.	SP - 3. With 15% of MoS2 (in weight) Excellent behaviour in wear in anhydrous conditions.

SEMI-FINISHED PRODUCTS IN DUPONT™ VESPEL®

TUBE

EXTERNAL DIAMETER	INTERNAL DIAMETER	RATED LENGTH
180,00	142,00	838
170,00	142,00	838
162,00	142,00	838
170,00	119,00	838
149,00	119,00	838
142,00	119,00	838
165,00	109,00	838
154,00	109,00	838
144,00	109,00	838
137,00	109,00	838
137,00	86,30	838
124,00	86,30	838
109,00	86,30	838
129,00	66,00	838
119,00	66,00	838
101,00	66,00	838
86,30	66,00	838
124,00	48,20	838
111,00	48,20	838
94,00	48,20	838
78,70	48,20	838
43,10	35,50	330 (min. 3 PZ)

RODS

RATED DIAMETER	RATED LENGTH
3,1	965
6,30	965
9,50	965
11,10	965
12,70	965
15,80	965
19,00	965
25,40	965
31,70	965
38,10	965
50,80	965
63,50	965
82,50	685

Tol. Diameter +0/+0.25

SHEETS

THICKNESS	SIZE
12,7	127 x 127
25,4	127 x 127
38,1	127 x 127
50,8	127 x 127
6,3	127 x 254
38,1	127 x 254
50,8	127 x 254
1,6	254 x 254
3,2	254 x 254
4,8	254 x 254
6,3	254 x 254
12,7	254 x 254
25,4	254 x 254
38,1	254 x 254
50,8	254 x 254

Measurements in mm
The dimensions are rated
Sizes and dimensions not available for all types.

DUPONT™ VESPEL® FEATURES



PROPERTY / PROPRIETÀ	TEMP. °C	ASTM METHOD	UNITS	SP-1	SP-21	SP-22	SP-211	SP-3
Tensile Strength / Resistenza a trazione	23	D1708	Mpa	86,2	65,5	51,7	44,8	58,5
	260			41,4	37,9	23,4	24,1	-
Elongation, ultimate / Allungamento % a rottura	23	D1708	%	7,5	4,5	3	3,5	4
	260			6	3	2	3	-
Flexural strength, ultimate / Resistenza a flessione	23	D790	Mpa	110,3	110,3	89,6	68,9	75,8
	260			62,1	62	44,8	34,5	39,9
Flexural Modulus / Modulo a flessione	23	D790	Mpa	3102	3792	4826	3102	3275
	260			1724	2551	2758	1379	1862
Compressive Stress / Resistenza a compressione								
@ 1% strain	23	D695	Mpa	24,8	29	31,7	20,7	34,5
@ 10% strain				133,1	133,1	112,4	102	127,6
@ 0,1% strain				51	45,5	41,4	37,2	-
Compressive Modulus / Modulo a compressione				2413	2895	3275	2068	2413
Axial fatigue, Endurance limit / Resistenza a fatica assiale								
@ 10 ³ cycles	23	-	Mpa	55,8	46,2	-	-	-
	260			26,2	22,8	-	-	-
@ 10 ⁷ cycles	23	-	Mpa	42,1	32,4	-	-	-
	260			16,5	16,5	-	-	-
Radial fatigue, Endurance limit / Resistenza a fatica radiale								
at 10 ³ cycles / a 10 ³ cicli	23	-	Mpa	65,5	65,5	-	-	-
at 10 ⁷ cycles / a 10 ⁷ cicli	23	-		44,8	44,8	-	-	-
Shear Strength / Resistenza al taglio	23	D732	Mpa	89,6	77,2	-	-	-
Impact Strength, Izod Notched / Resistenza all'urto Izod con intaglio	23	D256	J/m	42,7	42,7	-	-	21,3
Impact Strength, Izod unnotched / Resistenza all'urto Izod senza intaglio	23	D256	J/m	747	320	-	-	112
Poisson's Ratio / Coefficiente di Poisson	23	-	-	0,41	0,41	-	-	-
Wear Rate (*) / Resistenza all'usura	-	-	m/sx10 ⁻¹⁰	17-85	6,3	4,2	4,9	17-23
Coefficient of friction (*) / Coefficiente di attrito				(*)= Unlubricated in air / Non lubrificato, in aria				
PV = 0,875 Mpa.m/s	-	-	-	0,29	0,24	0,3	0,12	0,25
PV = 3,5 Mpa.m/s				-	0,12	0,09	0,08	0,17
In vacuum / sotto vuoto				-	-	-	-	0,83
Static in air / Statico in aria				0,35	0,3	0,27	0,2	-
Coefficient of linear thermal expansion / Coefficiente di dilatazione termica lineare	23 to 260	D696	µm/m/°C	54	49	38	54	52
Thermal conductivity / Conducibilità termica	40	-	W/m. °C	0,35	0,87	1,73	0,76	0,47
Specific heat / Calore specifico	-	-	J/Kg/°C	1130	-			
Deformation under 14 Mpa load / Deformazione sotto carico di 14 Mpa	50	D621	%	0,14	0,1	0,08	0,13	0,12
Deflection temperature at 2Mpa / Temperatura di deformazione a 2 Mpa	-	D648	°C	360	360	-	-	-
Dielectric constant / Costante dielettrica								
@ 102 Hz	23	D150	-	3,62	13,53	-	-	-
@ 104 Hz				3,64	13,28	-	-	-
@ 106 Hz				3,55	13,41	-	-	-
Dissipation factor / Fattore di dissipazione								
@ 102 Hz	23	D150	-	0,0018	0,0053	-	-	-
@ 104 Hz				0,0036	0,0067	-	-	-
@ 106 Hz				0,0034	0,0106	-	-	-
Dielectric strength - short time 2 mm thickness / Rigidità dielettrica - tempo corto 2 mm spessore	-	D149	MV/M	22	9,84	-	-	-
Volume resistivity / Resistività volumetrica	23	D257	Ω.m	10 ¹⁴ - 10 ¹⁵	10 ¹² - 10 ¹³	-	-	-
Surface resistivity / Resistività superficiale	23	D257	Ω	10 ¹⁵ - 10 ¹⁶	-	-	-	-
Water absorption / Assorbimento d'acqua								
24 h	23	D570	%	0,24	0,19	0,14	0,21	0,23
48 h	50			0,72	0,57	0,42	0,49	0,65
equilibrium, 50% RH / Equilibrio 50% RH	-			1,0-1,3	0,8-1,1	-	-	-
Specific gravity / Densità	23	D792	gr/cm ³	1,43	1,51	1,65	1,55	1,6
Oxygen Index / Indice d'ossigeno	-	D2863	%	53	-	49	-	-



Italy

Factory and Head Office

Via Cercone 34,
24060 Castelli Calepio (BG) Italy
P +39 035 44 25 115

info@fluorten.com

Germany, Switzerland, Austria

Fluorten Sales Office

Leutenbach - Germany
Mr. Martin Schuster
P +49 7195 590 9267
M +49 151 7005 4012

martin.schuster@fluorten.com

North America

Sealcore LLC Sales Office

Ohio - USA
Mr. Henrik Zimmer
P +1 440 324 1144
M +1 419 706 1651

hzimmer@sealcore.net

Asia-Pacific

Sealcore Network Sales Office

Shanghai - China
Ms. Helen Song
P +86 137 01 977 508

china.office@fluorten.com



EN 9100: 2018 - CERTIFICATE N.5695/3



ISO 9001: 2015 - CERTIFICATE N.21



ISO 14001: 2015 - CERTIFICATE N.27

