ENSINGER
ASK. THINK. SUCCEED.

Material Data Sheet, October 2005

VESPEL® SP1

Chemical Designation :	Polyimide
DIN−Abbreviation:	PI
Colours, fillers:	natural

Main features

- high strength and elongation
- optimum electrical properties
- low outgassing
- low thermal condutivity
- high purity
- inherent low flammability (UL94 V−O)

Preferred Fields

- Semiconductor technology
- electronics
- hot gas technology
- aircraft and aerospace industries

Applications

Mechanical and electrical parts at elevated temperatures, valve seats, seal, insulators

Properties

Mechanical	**dry / moist**		**standard**
Tensile strength at yield		MPa	
Elongation at yield		%	
Tensile strength at break	86	MPa	ASTM D 1708
Elongation at break	7,5	%	ASTM D 1708
Modulus of elasticity in tension	3280	MPa	ASTM D 638
Modulus of elasticity after flexural test	3100	MPa	

Hardness			
Impact strength 23º C (Charpy)		KJ/m²	
Creep rupture strength after 1000 h with static load		MPa	
Time yield limit for 1% elongation after 1000 h		MPa	
Co−efficient of friction p = 0,05 N/mm²v=0,6 m/s on steel, hardened and ground	0,35		
Wear p = 0,05 N/mm²v=0,6 m/s on steel, hardened and ground		µm/km	

Thermal	**dry / moist**		**standard**
Crystalline melting point		°C	
Glass transition temperature		°C	
Heat distortion temperature HDT, Method A	360	°C	
Heat distortion temperature HDT, Method B	360	°C	
Max. service temperature			
short term	360	°C	
long term	300	°C	
Thermal conductivity (23º C)	0,35	W/(K·m)	
Specific heat (23º C)	1,13	J/g.K	
Coefficient of thermal expansion (23−55ºC)	5,4	10^{-5}1/K	ASTM D 696

Properties

Electrical	dry / moist		standard
Dielectric constant (10^6 Hz)	3,55		ASTM D 150
Dielectric loss factor (10^6 Hz)	0,0034		ASTM D 150
Specific volume resistance	10^14 – 10^15	Ω*cm	ASTM D 257
Surface resistance	10^15 – 10^16	Ω	ASTM D 257
Dielectric strength	22	kV/mm	ASTM D 149
Resistance to tracking			

Miscellaneous	dry / moist		standard
Density	1,43	g/cm^3	ASTM D 792
Moisture absorption (23°C/50RH)	1,3	%	
Water absorption to equilibrium		%	
Flammability acc. to UL standard 94	V0		

(1) Testing of semi−finished products

The above information corresponds with our current knowledge and indicates our products and possible applications. We cannot give a legally binding guarantee of chemical resistance, of certain properties and the suitability of our products and their applications. Our products are not destined for use in medical and dental implants. Existing commercial patents must be observed. Unless otherwise stated, these values represent averages taken from injection moulding samples, dry as moulded. We reserve the right to make technical alterations.