

Product Information

VESTAKEEP® L 4000 G

HIGH VISCOSITY, UNREINFORCED POLYETHER ETHER KETONE



VESTAKEEP® L 4000 G is a high viscosity, unreinforced lubricated polyether ether ketone for injection molding and extrusion.

The semi-crystalline polymer features superior, thermal and chemical resistance. Parts made from VESTAKEEP® L4000G are of low flammability.

VESTAKEEP® L 4000 G can be processed by common machines for thermoplastics.

The additional lubrication agent improves the feeding process.

We recommend a melt temperature between 370°C and 380°C during the injection molding process. The mold temperature should be within a range of 160°C to 200°C, preferably 180°C.

VESTAKEEP® L 4000 G is supplied as granules in 25 kg boxes with moisture-proof polyethylene liners.

Inside the original and undamaged packaging, the product has a shelf life of at least 2 years when stored in dry rooms at temperatures not exceeding 30°C.

Key Features

Industrial Sector

Automotive and Mobility, Energy, Oil and Gas

Conformity

Food contact

Processing

Injection molding, Extrusion

Additives

Unfilled

Delivery form

Pellets, Granules

Mechanical properties ISO

Tensile modulus

dry

3600

Unit

MPa

Test Standard

ISO 527

Tensile strength	96	MPa	ISO 527
Yield stress	94	MPa	ISO 527
Yield strain	5	%	ISO 527
Nominal strain at break, tB	30	%	ISO 527
Charpy impact strength, +23°C	N	kJ/m ²	ISO 179/1eU
Charpy impact strength, -30°C	N	kJ/m ²	ISO 179/1eU
Charpy notched impact strength, +23°C	7	kJ/m ²	ISO 179/1eA
Type of failure	C	-	-
Charpy notched impact strength, -30°C	6	kJ/m ²	ISO 179/1eA
Type of failure	C	-	-
Flexural modulus, 23°C	3450	MPa	ISO 178
Flexural stress at conv. deflection, 23°C	114	MPa	ISO 178
Flexural strength, 23°C	148	MPa	ISO 178
Flexural strain at flexural strength, 23°C	7	%	ISO 178
Flexural stress at break, 23°C	N	MPa	ISO 178
Flexural strain at break, 23°C	N	%	ISO 178

Mechanical properties ASTM	dry	Unit	Test Standard
Tensile Modulus, var. test speed	4070	MPa	ASTM D 638
Yield stress, var. test speed	96.5	MPa	ASTM D 638
Yield strain, var. test speed	6.5	%	ASTM D 638
Stress at break, var. test speed	89.6	MPa	ASTM D 638
Nominal strain at break, var. test speed	75	%	ASTM D 638
tensile modulus, annealed	4067.9	MPa	ASTM D 638
Yield strain, 23°C, annealed	6.4	%	ASTM D 638
Yield stress, 23°C, annealed	100	MPa	ASTM D 638
Nominal strain at break, 23°C, annealed	40	%	ASTM D 638
Flexural Modulus, 23°C, annealed	3690	MPa	ASTM D 790

Flexural strength, 23°C, annealed	179	MPa	ASTM D 790
Flexural stress at 5% fiber strain, 23°C, annealed	165	MPa	ASTM D 790

Thermal properties	dry	Unit	Test Standard
Melting temperature	340	°C	ISO 11357-1/-3
Temp. of deflection under load A, 1.80 MPa	155	°C	ISO 75-1/-2
Temp. of deflection under load B, 0.45 MPa	205	°C	ISO 75-1/-2
Vicat softening temperature A, 10 N, 50 K/h	335	°C	ISO 306
Vicat softening temperature B, 50 N, 50 K/h	305	°C	ISO 306
Coeff. of linear therm. expansion, 23°C to 55 °C, parallel	60	E-6/K	ISO 11359-1/-2
Melting Temperature	340	°C	ASTM D 3418

Physical properties	dry	Unit	Test Standard
Density	1300	kg/m ³	ISO 1183
Water absorption	0.5	%	Sim. to ISO 62
Humidity absorption	0.3	%	Sim. to ISO 62
Density	1300	kg/m ³	ASTM D 792
Shore D hardness, 1s, annealed	87	-	ASTM D 2240

Burning Behav.	dry	Unit	Test Standard
UL Yellow Card available	yes	-	-
Burning behav. at 1.5 mm nom. thickn.	V-0	class	IEC 60695-11-10
Thickness tested	1.6	mm	-
Burnin behav. at thickness h	V-0	class	IEC 60695-11-10
Thickness tested	3.2	mm	-
Oxygen index	38	%	ISO 4589-1/-2
Limiting Oxygen Index	38	%	ASTM D 2863
Hot Wire Ignition (HWI)	1	PL-Klasse	IEC 60695-2-20
HWI - thickness tested	3.2	mm	-

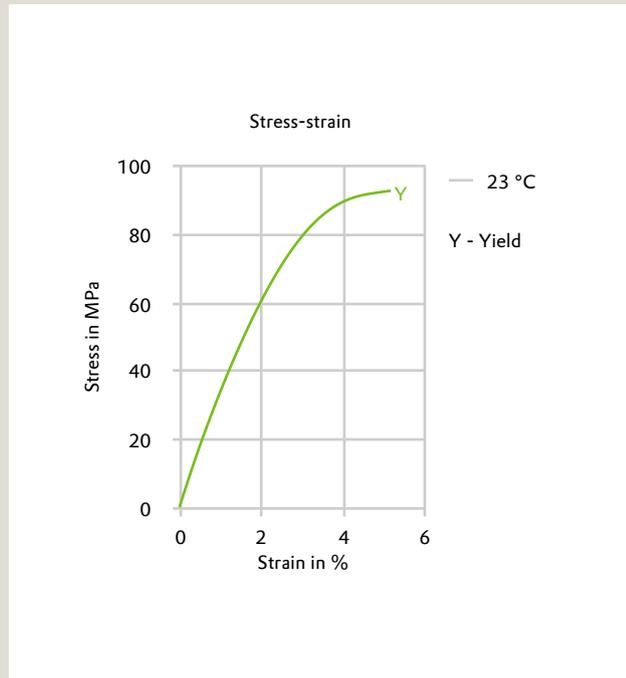
Electrical properties	dry	Unit	Test Standard
Volume resistivity, V	>1E13	Ohm*m	IEC 62631-3-1
Surface resistivity, E	1E15	Ohm	IEC 62631-3-2
Relative permittivity, 100Hz	2.8	-	IEC 62631-2-1
Relative permittivity, 1MHz	2.8	-	IEC 62631-2-1
Dissipation factor, 1MHz	50	E-4	IEC 62631-2-1
CTI, test solution A, 50 drops value	200	-	IEC 60112
Assessment of the insulation group	III a	-	DIN EN 60664-1
CTI, Performance Level Categories, PLC	3	class	ASTM D 3638

Rheological properties	dry	Unit	Test Standard
Melt volume-flow rate, MVR	12	cm ³ /10min	ISO 1133
Temperature	380	°C	-
Load	5	kg	-
Molding shrinkage, parallel	0.9	%	ISO 294-4, 2577
Molding shrinkage, normal	1.1	%	ISO 294-4, 2577

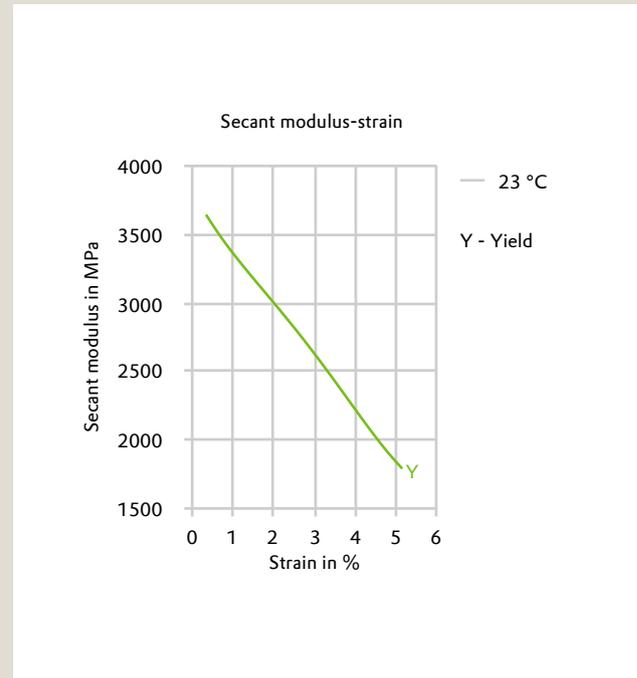
Test specimen production	dry	Unit	Test Standard
Injection Molding, melt temperature	380	°C	ISO 294
Injection Molding, mold temperature	180	°C	ISO 294
Injection Molding, injection velocity	200	mm/s	ISO 294
Injection Molding, pressure at hold	120	MPa	ISO 294

Diagrams

Stress-strain



Secant modulus-strain



Characteristics

Applications

Electrical and Electronical

Processing

Film extrusion, Profile extrusion

Chemical Media Resistance

Acids

- ✓ Acetic Acid (5% by mass) (23°C)
- ✓ Citric Acid solution (10% by mass) (23°C)
- ✓ Hydrochloric Acid (36% by mass) (23°C)
- ✗ Nitric Acid (40% by mass) (23°C)
- ✓ Sulfuric Acid (38% by mass) (23°C)
- ✓ Sulfuric Acid (5% by mass) (23°C)
- ✓ Chromic Acid solution (40% by mass) (23°C)

Bases

- ✓ Sodium Hydroxide solution (35% by mass) (23°C)
- ✓ Sodium Hydroxide solution (1% by mass) (23°C)
- ✓ Ammonium Hydroxide solution (10% by mass) (23°C)

Alcohols

- ✓ Isopropyl alcohol (23°C)
- ✓ Methanol (23°C)
- ✓ Ethanol (23°C)

Hydrocarbons

- ✓ n-Hexane (23°C)
- ✓ Toluene (23°C)
- ✓ iso-Octane (23°C)

Ketones

- ✓ Acetone (23°C)

Ethers

- ✓ Diethyl ether (23°C)

Mineral oils

- ✓ SAE 10W40 multigrade motor oil (23°C)
- ✓ Insulating Oil (23°C)

Standard Fuels

- ✓ Standard fuel without alcohol (pref. ISO 1817 Liquid C) (23°C)
- ✓ Standard fuel with alcohol (pref. ISO 1817 Liquid 4) (23°C)
- ✓ Diesel fuel (pref. ISO 1817 Liquid F) (23°C)

Salt solutions

- ✓ Sodium Chloride solution (10% by mass) (23°C)
- ✓ Sodium Hypochlorite solution (10% by mass) (23°C)
- ✓ Sodium Carbonate solution (20% by mass) (23°C)
- ✓ Sodium Carbonate solution (2% by mass) (23°C)
- ✓ Zinc Chloride solution (50% by mass) (23°C)

Other

- ✓ Ethyl Acetate (23°C)
- ✓ Hydrogen peroxide (23°C)

- ✓ Ethylene Glycol (50% by mass) in water (108°C)
- ✓ Water (23°C)
- ✓ Deionized water (90°C)

Rheological calculation properties

	dry	Unit	Test Standard
Thermal conductivity of melt	0.18	W/(m K)	-
Spec. heat capacity of melt	2110	J/(kg K)	-
Min. mold temperature	160	°C	-
Max. mold temperature	200	°C	-
Min. melt temperature	360	°C	-
Max. melt temperature	380	°C	-