Product Information

VESTAKEEP® L 4000 G High Purity

HIGH VISCOSITY, UNREINFORCED POLYETHER ETHER KETONE



VESTAKEEP® L 4000 G High Purity is a high viscosity, unreinforced lubricated polyether ether ketone for injection molding and extrusion. The product is refined by Evonik's special filtration technology.

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

VESTAKEEP® L 4000 G High Purity 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 High Purity 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.
Pigmentation may affect values.

FOR FURTHER INFORMATION PLEASE CONTACT US AT EVONIK-HP@EVONIK.COM OR VISIT OUR PRODUCT AT WWW.INDUSTRIAL.VESTAKEEP.COM

Mechanical properties ISO	dry	Unit	Test Standard
Tensile Modulus	**3600**	MPa	ISO 527
Tensile Strength	**96**	MPa	ISO 527
Yield stress	**94**	MPa	ISO 527
Yield strain	**5**	%	ISO 527
Nominal strain at break, εtB	**30**	%	ISO 527
Charpy impact strength, +23°C	**N**	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	**N**	kJ/m²	ISO 179/1eU
Charpy notched impact strength, +23°C	**7**	kJ/m²	ISO 179/1eA

Type of failure	**C**	-	-
Charpy notched impact strength, -30°C	**6**	kJ/m²	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 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 stress, 23°C, annealed	**100**	MPa	ASTM D 638
Yield strain, 23°C, annealed	**6.4**	%	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

Physical properties	**dry**	**Unit**	**Test Standard**
Water absorption	**0.5**	%	Sim. to ISO 62
Density	**1300**	kg/m³	ISO 1183
Shore D hardness, 1s, annealed	**87**	-	ASTM D 2240

Burning Behav.	**dry**	**Unit**	**Test Standard**
Burnin behav. at thickness h	**V-0**	class	IEC 60695-11-10
Thickness tested	**3.2**	mm	-
Burning behav. at 1.5 mm nom. thickn.	**V-0**	class	IEC 60695-11-10
Thickness tested	**1.6**	mm	-
Oxygen index	**38**	%	ISO 4589-1/-2
Limiting Oxygen Index	**38**	%	ASTM D 2863

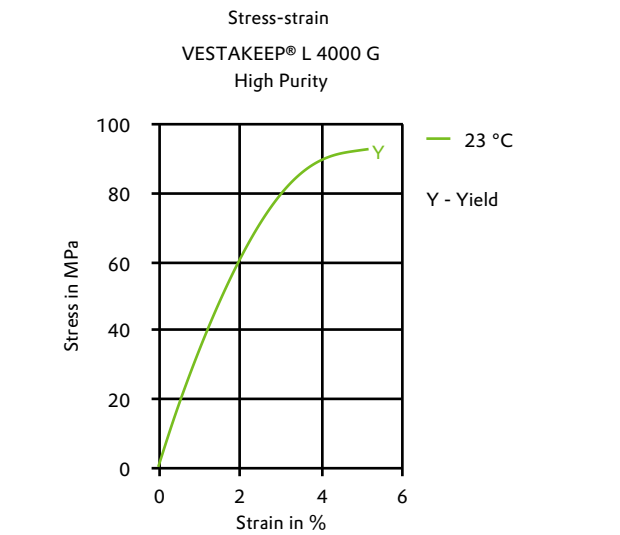
Electrical properties	**dry**	**Unit**	**Test Standard**
Relative permittivity, 100Hz	**2.8**	-	IEC 62631-2-1
Relative permittivity, 1MHz	**2.8**	-	IEC 62631-2-1
Dissipation factor, 1MHz	**50**	E-4	IEC 62631-2-1
Volume resistivity, ρV	**>1E13**	Ohm*m	IEC 62631-3-1
Surface resistivity, σE	**1E15**	Ohm	IEC 62631-3-2
CTI, test solution A, 50 drops value	**200**	-	IEC 60112

Rheological properties	**dry**	**Unit**	**Test Standard**
Melt volume-flow rate, MVR	**12**	cm³/10min	ISO 1133
Temperature	**380**	°C	-
Load	**5**	kg	-
Molding shrinkage, parallel	**0.9**	%	ISO 294-4, 2577

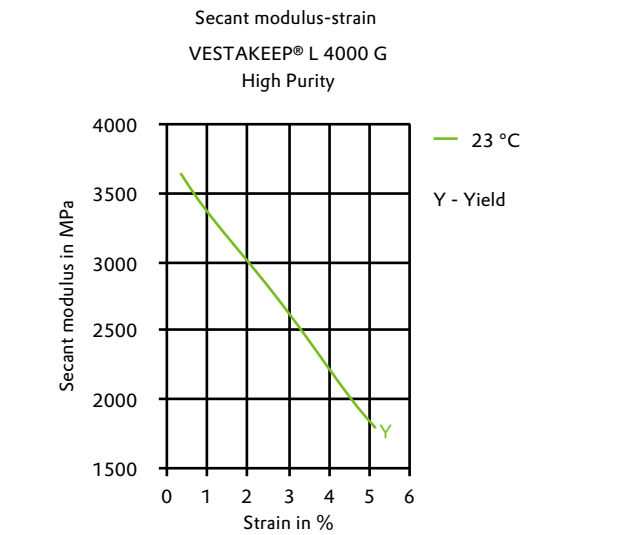
Molding shrinkage, normal	**1.1**	%	ISO 294-4, 2577

Diagrams

Stress-strain



Secant modulus-strain



Characteristics

Key Feature, Industrial Sector
Automotive, Electrical and Electronical, Oil and Gas

Key Feature, Processing
Injection Molding, Extrusion

Key Feature, Certificate / Licence
Food contact

Processing
Film Extrusion, Profile Extrusion

Delivery form
Pellets, Granules

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)	-

This information and all technical and other advice are based on Evonik's present knowledge and experience. However, Evonik assumes no liability for such information or advice, including the extent to which such information or advice may relate to third party intellectual property rights. Evonik reserves the right to make any changes to information or advice at any time, without prior or subsequent notice. Evonik disclaims all representations and warranties, whether express or implied, and shall have no liability for, merchantability of the product or its fitness for a particular purpose (even if Evonik is aware of such purpose), or otherwise. EVONIK SHALL NOT BE RESPONSIBLE FOR CONSEQUENTIAL, INDIRECT OR INCIDENTAL DAMAGES (INCLUDING LOSS OF PROFITS) OF ANY KIND. It is the customer's sole responsibility to arrange for inspection and testing of all products by qualified experts. Reference to trade names used by other companies is neither a recommendation nor an endorsement of the corresponding product, and does not imply that similar products could not be used.

® is a registered trademark of Evonik Industries AG or one of its subsidiaries

Evonik Operations GmbH
Smart Materials
High Performance Polymers
45772 Marl / Germany
Tel: +49 2365 49-9878
evonik-hp@evonik.com

www.plastics-database.com