Product Information

VESTAKEEP® 4000 FC30

CARBON FIBER-REINFORCED, GRAPHITE AND PTFE-FILLED POLYETHER ETHER KETONE

VESTAKEEP® 4000 FC30 is a carbon fiber reinforced, graphite and PTFE-filled polyether ether ketone for injection molding. Parts made of this resin can be used for bearing bushing or gearbox parts due to the selflubricating effect.

The semi-crystalline polymer features superior mechanical, thermal, and chemical resistance. Parts made from VESTAKEEP® 4000 FC30 are of low flammability.

VESTAKEEP® 4000 FC30 can be processed by common injection molding machines for thermoplastics.

We recommend a melt temperature between 370°C and 380°C during the injection molding process. If temperatures exceed 380°C, toxic gases can be released. Adequate ventilation and protective equipment must be provided. The mold temperature should be within a range of 160°C to 200°C, preferably 180°C.

VESTAKEEP® 4000 FC30 is supplied as cylindrical pellets 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.

Key Features

Industrial Sector
Automotive and Mobility, Industry and Engineering

Processing
Injection molding, Extrusion

Delivery form
Pellets, Granules

Resistance to
Heat (thermal stability), Fire / burn

Additives
Carbon fibers

Mechanical properties ISO	dry	Unit	Test Standard
Tensile modulus	**12500**	MPa	ISO 527
Tensile strength	**160**	MPa	ISO 527
Stress at break	**160**	MPa	ISO 527
Strain at break, B	**2**	%	ISO 527
Charpy impact strength, +23°C	**45**	kJ/m²	ISO 179/1eU
Type of failure	**C**	-	-
Charpy impact strength, -30°C	**45**	kJ/m²	ISO 179/1eU
Type of failure	**C**	-	-
Charpy notched impact strength, +23°C	**8**	kJ/m²	ISO 179/1eA
Type of failure	**C**	-	-
Charpy notched impact strength, -30°C	**7**	kJ/m²	ISO 179/1eA
Type of failure	**C**	-	-
Flexural strength, 23°C	**240**	MPa	ISO 178
Flexural modulus, var. temp.	**10300**	MPa	ISO 178

Thermal properties	dry	Unit	Test Standard
Melting temperature	**340**	°C	ISO 11357-1/-3
Temp. of deflection under load A, 1.80 MPa	**310**	°C	ISO 75-1/-2
Temp. of deflection under load B, 0.45 MPa	**330**	°C	ISO 75-1/-2
Vicat softening temperature A, 10 N, 50 K/h	**340**	°C	ISO 306
Vicat softening temperature B, 50 N, 50 K/h	**335**	°C	ISO 306
Coeff. of linear therm. expansion, 23°C to 55 °C, parallel	**20**	E-6/K	ISO 11359-1/-2
Melting Temperature	**340**	°C	ASTM D 3418

Physical properties	dry	Unit	Test Standard
Density	**1450**	kg/m³	ISO 1183
Water absorption	**0.4**	%	Sim. to ISO 62

Moisture content	**0.05**	Gew.-%	ISO 15512
Density	**1450**	kg/m³	ASTM D 792
Shore D hardness, 1s, annealed	**83.5**	-	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	**1.5**	mm	-
Burnin behav. at thickness h	**V-0**	class	IEC 60695-11-10
Thickness tested	**3.0**	mm	-
Burning behav. at thickness h	**V-0**	class	IEC 60695-11-10
Thickness tested	**0.8**	mm	-
Burnin behav. at thickness h	**V-0**	class	IEC 60695-11-10
Thickness tested	**0.4**	mm	-
Oxygen index	**44**	%	ISO 4589-1/-2
Limiting Oxygen Index	**44**	%	ASTM D 2863
Glow Wire Flammability Index (GWFI)	**960**	°C	IEC 60695-2-12
Glow Wire Ignition Temperature (GWIT)	**900**	°C	IEC 60695-2-13
Hot Wire Ignition (HWI)	**4**	PL-Klasse	IEC 60695-2-20
HWI - thickness tested	**0.4**	mm	-
Hot Wire Ignition (HWI)	**2**	PL-Klasse	IEC 60695-2-20
HWI - thickness tested	**0.8**	mm	-
Hot Wire Ignition (HWI)	**1**	PL-Klasse	IEC 60695-2-20
HWI - thickness tested	**1.5**	mm	-
Hot Wire Ignition (HWI)	**1**	PL-Klasse	IEC 60695-2-20
HWI - thickness tested	**3.0**	mm	-

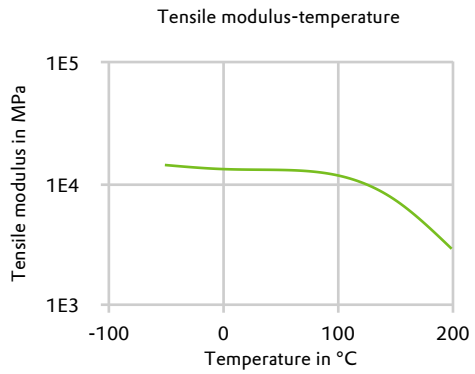
Electrical properties	dry	Unit	Test Standard
Volume resistivity, V	**100000**	Ohm*m	IEC 62631-3-1
Surface resistivity, E	**1000000**	Ohm	IEC 62631-3-2
Relative permittivity, 100Hz	**5.9**	-	IEC 62631-2-1
Relative permittivity, 1MHz	**4.9**	-	IEC 62631-2-1
Dissipation factor, 100Hz	**600**	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	**200**	E-4	IEC 62631-2-1
CTI, Performance Level Categories, PLC	**4**	class	ASTM D 3638

Rheological properties	dry	Unit	Test Standard
Melt volume-flow rate, MVR	**38**	cm^3/10min	ISO 1133
Temperature	**400**	°C	-
Load	**21.6**	kg	-
Melt volume-flow rate, MVR	**38**	cm^3/10min	ISO 1133
Temperature	**400**	°C	-
Load	**21.6**	kg	-
Molding shrinkage, parallel	**0.2**	%	ISO 294-4, 2577
Molding shrinkage, normal	**0.4**	%	ISO 294-4, 2577

Test specimen production	dry	Unit	Test Standard
Injection Molding, melt temperature	**410**	°C	ISO 294
Injection Molding, mold temperature	**200**	°C	ISO 294
Injection Molding, injection velocity	**200**	mm/s	ISO 294
Injection Molding, pressure at hold	**120**	MPa	ISO 294

Diagrams

Tensile modulus-temperature



Characteristics

Applications
Electrical and Electronical, Encapsulation

Color
Natural color

Special Characteristics
Semi-crystalline

Chemical Resistance
General chemical resistance

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 (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
Min. mold temperature	**160**	°C	-
Max. mold temperature	**200**	°C	-
Min. melt temperature	**380**	°C	-
Max. melt temperature	**400**	°C	-