

Product Information

VESTAKEEP® iC4800 3DF

IMPLANTABLE-GRADE POLYETHER ETHER KETONE FILAMENT FOR 3D PRINTING WITH ENHANCED OSSEOINTEGRATION FOR LONG TERM IMPLANTABLE MEDICAL DEVICES



VESTAKEEP® iC4800 3DF is an opaque, natural colored, high viscosity polyether ether ketone (PEEK) filament based on VESTAKEEP® iC4800 G resin. It contains calcium phosphates to enhance osseointegration. It therefore belongs to the VESTAKEEP® Fusion product family.

Biocompatibility

The base resin VESTAKEEP® iC4800 G is especially designed for long term implantable medical devices. The compound composition is optimised for high biocompatibility and mechanical, thermal and chemical resistance.

The biocompatibility testing program follows ISO 10993-1 recommendations for permanent tissue/bone contact and USP Class VI.

Available biocompatibility reports for VESTAKEEP® iC4800 G

STANDARD	DESCRIPTION
ISO 10993-12	GC/MS Fingerprint of extractable organic substances
USP CLASS VI	Acute Systemic Toxicity Intracutaneous Reactivity Muscle Implantation
ISO 10993-5	Cytotoxicity
ISO 10993-10	Irritation: Intracutaneous Reactivity
ISO 10993-10	Sensitization: Maximization test according to Magnusson and Kligman
ISO 10993-11	Acute Systemic Toxicity
ISO 10993-3	Genotoxicity: Ames Test
ISO 10993-3	Genotoxicity: Mouse Lymphoma test
ISO 10993-11	Subchronic Systemic Toxicity (28 days)
ISO 10993-6	Test for local effects after Implantation in bone (28, 90, 180 days)
ISO 10993-11	Material-mediated pyrogenes

Delivery

VESTAKEEP® iC4800 3DF filament has a diameter of 1.75 mm (+/- 0.02 mm*) and is supplied on TROGAMID® spools with 250g or 500g. The spools are packaged in double bags to facilitate transfer into clean areas.

The properties listed are for information only and only apply to the VESTAKEEP® iC4800 G resin used in the manufacture of VESTAKEEP® iC4800 3DF. The performance and the purity of any parts manufactured from VESTAKEEP® iC4800 3DF are highly dependent on any 3D- or additive-printing processes, or any other processing, to which the filament is subjected.

Only density and filament diameter apply to VESTAKEEP® iC4800 3DF directly.

*Diameters are tested by a multi-axis laser gauge. The diameter is the average of these axis.

FOR FURTHER INFORMATION PLEASE CONTACT US AT EVONIK-HP@EVONIK.COM OR VISIT OUR PRODUCT AT WWW.EVONIK.COM/MEDICAL-TECHNOLOGY

Mechanical properties ISO	dry	Unit	Test Standard
Tensile modulus	4350	MPa	ISO 527
Tensile strength	90	MPa	ISO 527
Yield stress	90	MPa	ISO 527
Yield strain	4	%	ISO 527
Strain at break, εB	10^[1]	%	ISO 527
Charpy notched impact strength, +23°C	4,7	kJ/m ²	ISO 179/1eA
Type of failure	C	-	-

1: Minimum value

Thermal properties	dry	Unit	Test Standard
Melting temperature	340	°C	ISO 11357-1/-3
Glass transition temperature, 2 nd heating, onset	145	°C	ISO 11357
Glass transition temperature, 2 nd heating, midpoint	155	°C	ISO 11357
Recrystallization temperature, 10 K/min	285^[e]	°C	ISO 11357
Melting Temperature	644	°F	ASTM D 3418

e: 20 K/minute

Physical properties	dry	Unit	Test Standard
Density	1460	kg/m ³	ISO 1183
Water absorption	0,4	%	Sim. to ISO 62
Density	1,46	g/cm ³	ASTM D 792

Rheological properties	dry	Unit	Test Standard
Melt volume-flow rate, MVR	10	cm ³ /10min	ISO 1133
Temperature	380	°C	-
Load	5	kg	-

Characteristics

Key Features, Industrial Sector

Medical Devices, 3D Printing

Key Features, Processing

3D Printing

Key Features, Delivery form

(Mono)filament

Key Features, Optics

X-ray opaque, Opaque

Key Features, Resistance to

Heat (thermal stability), Hydrolysis / hot water, UV / light / weathering

Key Features, Electrical

Insulating

Key Features, Conformity

Biocompatibility, Medical application

Key Features, Additives

Mineral fillers

Applications

Medical implants

Processing

Fused deposition molding, Additive manufacturing

Special Characteristics

Phosphorus-free, PTFE-free, High impact strength, Semi-crystalline, High viscosity, Self-extinguishing

Features

Low odor, Non-corrosive

Color

Grey

Additives

Inorganic fillers

Chemical Resistance

Acid resistance, Solvent resistance, Oxidation resistance, Radiation resistance, General chemical resistance

Other extrusion

Drying recommendations

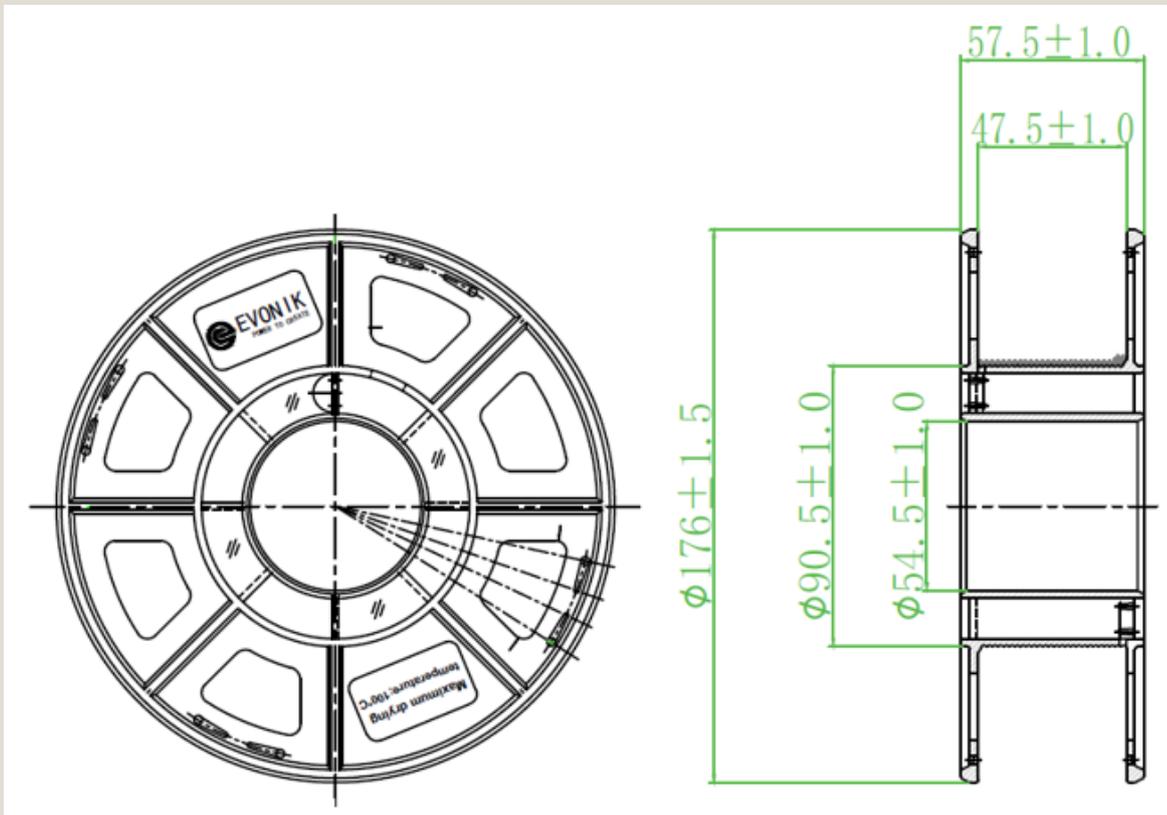
We recommend to dry the filament prior to usage to avoid stringing, bubbles, or other defects.

- a) Filament on spool: minimum 12 hours at 80°C to 100°C. 100°C must not be exceeded to avoid distortion of the spool.
- b) Filament removed from spool: minimum 4 hours at 130°C to 140°C.

The maximum drying temperature of the filament is 140°C. Please also pay attention to the instructions of your drying device.

Spool dimensions

For dimensions of the spool, please see drawing below. All dimensions are given in millimeter (mm).



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