

Product Information

# VESTAKEEP® iC 4800 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](mailto:EVONIK-HP@EVONIK.COM)  
OR VISIT OUR PRODUCT AT [WWW.EVONIK.COM/MEDICAL-TECHNOLOGY](http://WWW.EVONIK.COM/MEDICAL-TECHNOLOGY)

## Key Features

### Industrial Sector

Medical Devices, 3D Printing

### Processing

3D Printing

### Delivery form

(Mono)filament

### Optics

Opaque

### Resistance to

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

### Electrical

Insulating

### Conformity

Biocompatibility, Medical application

### Additives

Mineral fillers

## Mechanical properties ISO

	dry	Unit	Test Standard
Tensile modulus	<b>4350</b>	MPa	ISO 527
Tensile strength	<b>90</b>	MPa	ISO 527
Yield stress	<b>90</b>	MPa	ISO 527
Yield strain	<b>4</b>	%	ISO 527
Strain at break, B	<b>10</b>	%	ISO 527
Charpy notched impact strength, +23°C	<b>4.7</b>	kJ/m <sup>2</sup>	ISO 179/1eA
Type of failure	<b>C</b>	-	-

## Thermal properties

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

e: 20 K/minute

## Physical properties

	dry	Unit	Test Standard
Density	<b>1460</b>	kg/m <sup>3</sup>	ISO 1183
Water absorption	<b>0.4</b>	%	Sim. to ISO 62

Density	<b>1460</b>	kg/m <sup>3</sup>	ASTM D 792
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Rheological properties	dry	Unit	Test Standard
Melt volume-flow rate, MVR	<b>10</b>	cm <sup>3</sup> /10min	ISO 1133
Temperature	<b>380</b>	°C	-
Load	<b>5</b>	kg	-

### Characteristics

#### 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

#### Regulatory

US Pharmacopeia Class VI conformity

#### Color

Grey

#### Additives

Inorganic fillers

#### Chemical Resistance

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

### Other extrusion

#### Drying recommendations

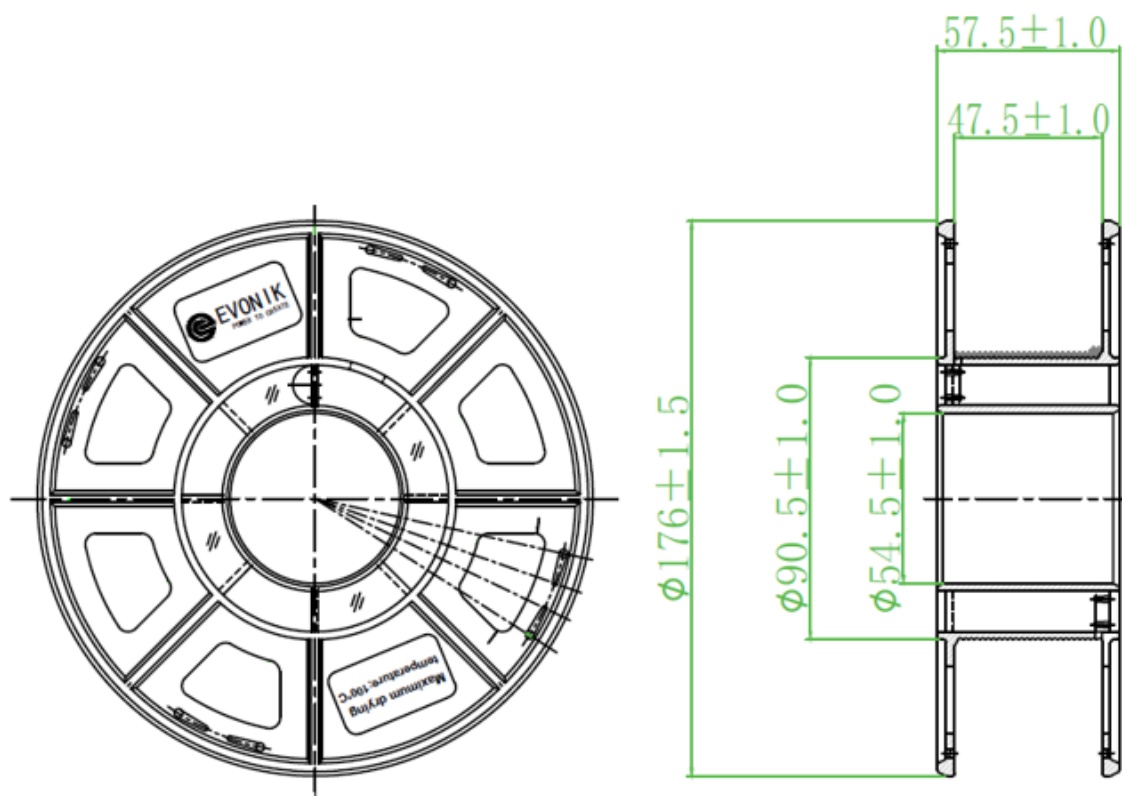
We recommend to dry the filament prior to usage to avoid stringing, bubbles, or other defects.

- 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).



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**Evonik Operations GmbH**  
**Smart Materials**  
**High Performance Polymers**  
 45772 Marl / Germany  
 Tel: +49 2365 49-9878  
[evonik-hp@evonik.com](mailto:evonik-hp@evonik.com)  
[www.plastics-database.com](http://www.plastics-database.com)