HIGH PERFORMANCE MATERIALS

FOR AEROSPACE INDUSTRY

PLASTICS ENGINEERED BY GEHR®

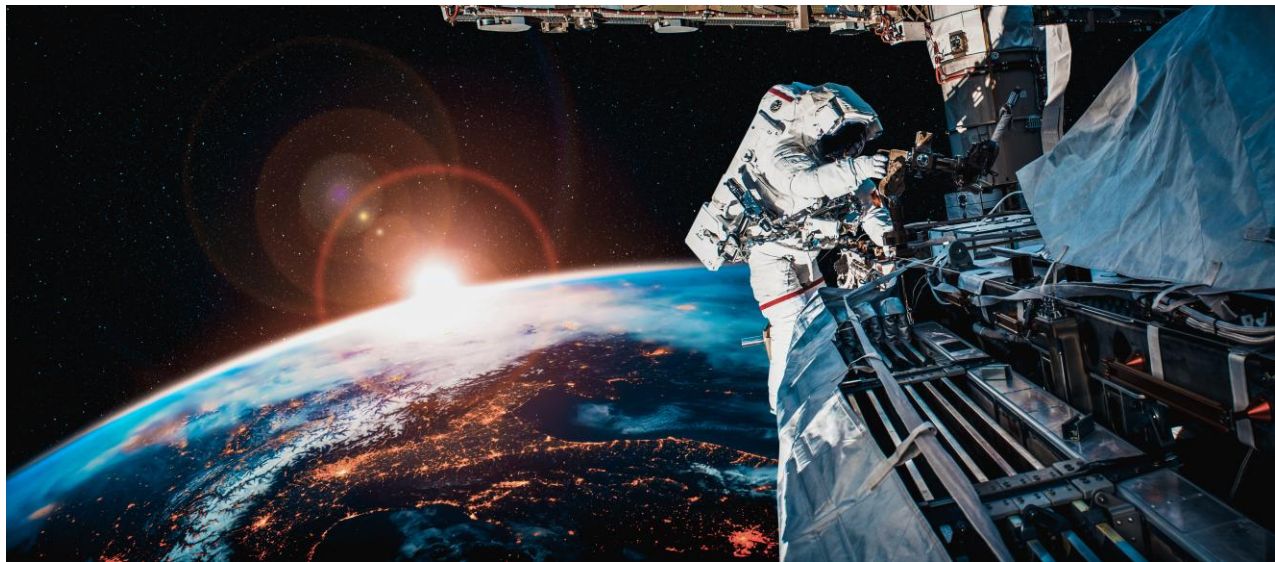
CONTENT

Aerospace Industry

- Materials in the aerospace industry must withstand extrem conditions, such as strong temperature fluctuations, cosmic radtion, contact with chemicals (gas, oil,…).
- The use of high performance plastics can reduce fuel consumption due to their light weight compared to metals.
- The plastics used are extremely stable and resistant to radiation.
- The materials used have electrical insulation and high heat resistance.
- Materials must meet special requirements (e.g. fire protection tests) before they can be used.

Aerospace & Defence Industry

- Plastics that are not inherently flame retardant can be modified with a flame retardant additive (FR).
- Prototyping and small series production are affordable and rapidly available with additive manufacturing reaching the mainstream.
- GEHR materials for aerospace applications meet the requirements to FAR 25.853:
  - PA6 FR
  - PPS
  - PPS-40GF
  - PPSU
  - PEI
  - PEEK
  - PEEK mod
  - PEEK-30GF



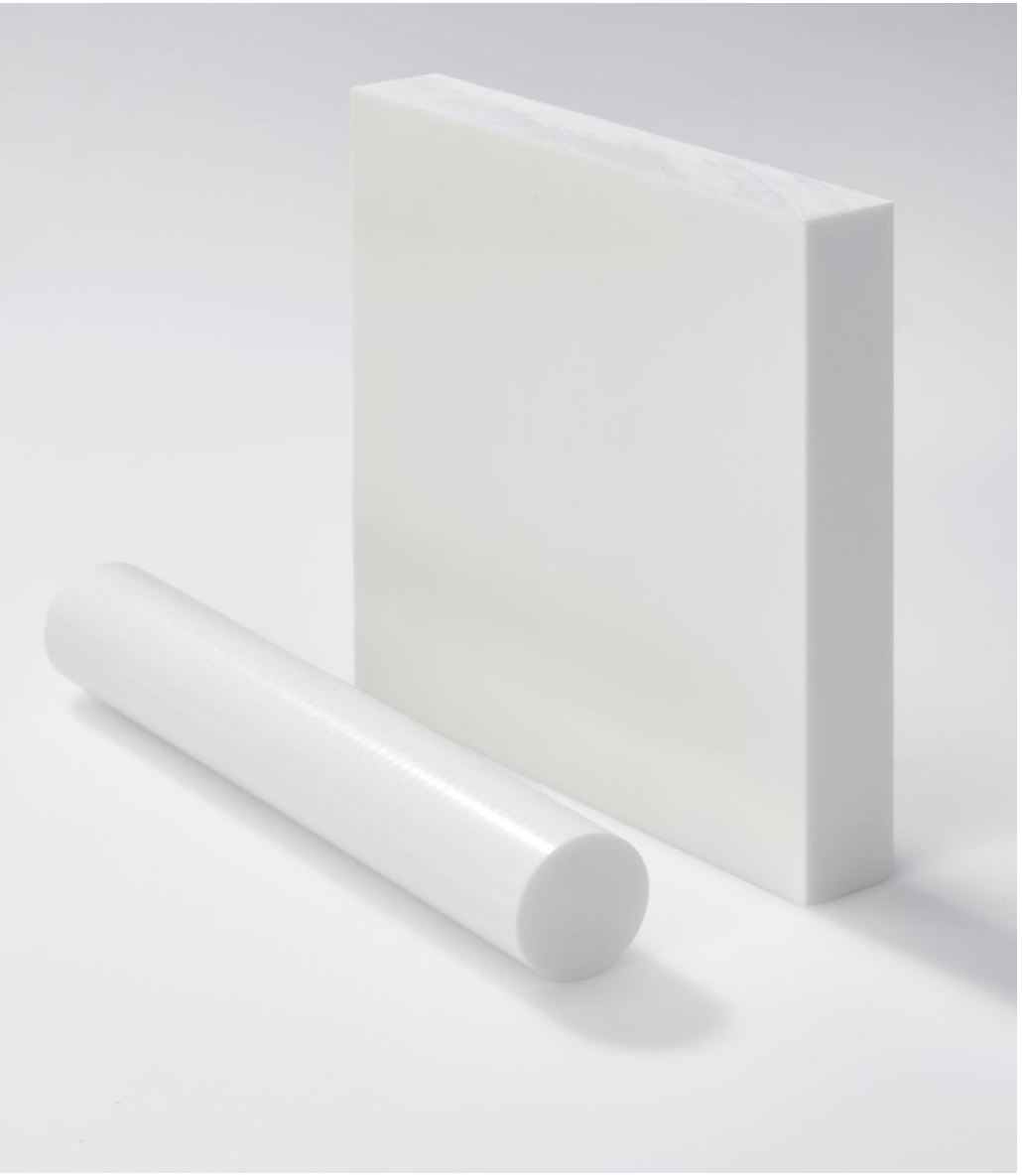
Aerospace Approvals

» FAR Part 25 is a key test for the usage of materials in the aerospace industry.

» The FAR policy is mandated by the U.S. Federal Aviation Administration (FAA).

» We are also pleased to offer further tests upon customer request.

Test description	FAR 25.853	Airbus ABD 0031 specification	Boeing specification
Flammability (60 seconds Vertical)	FAR Part 25, § 25.853 (a) and Appendix F, Part I, para. (a)(1)(i)	AITM 2.0002A	BSS 7230 F1
Flammability (12 seconds Vertical)	FAR Part 25, § 25.853 (a) and Appendix F, Part I, para. (a)(1)(ii)	AITM 2.0002B	BSS 7230 F2
Flammability (15 seconds Horizontal)	FAR Part 25, § 25.853 (a) and Appendix F, Part I, para. (a)(1) (iv)	AITM 2.0003	BSS 7230 F3
	FAR Part 25, § 25.853 (a) and Appendix F, Part I, para. (a)(1) (v)		BSS 7230 F4
Heat Release	FAR Part 25, § 25.853 (d) and Appendix F, Part IV	AITM 2.0003	BSS 7322
Smoke Density	FAR Part 25, § 25.853 (d) and Appendix F, Part V	AITM 2.0007A & B	BSS 7322
Combustion Toxicity	N/A	AITM 3.0005	BSS 7239



GEHR® PA6 FR

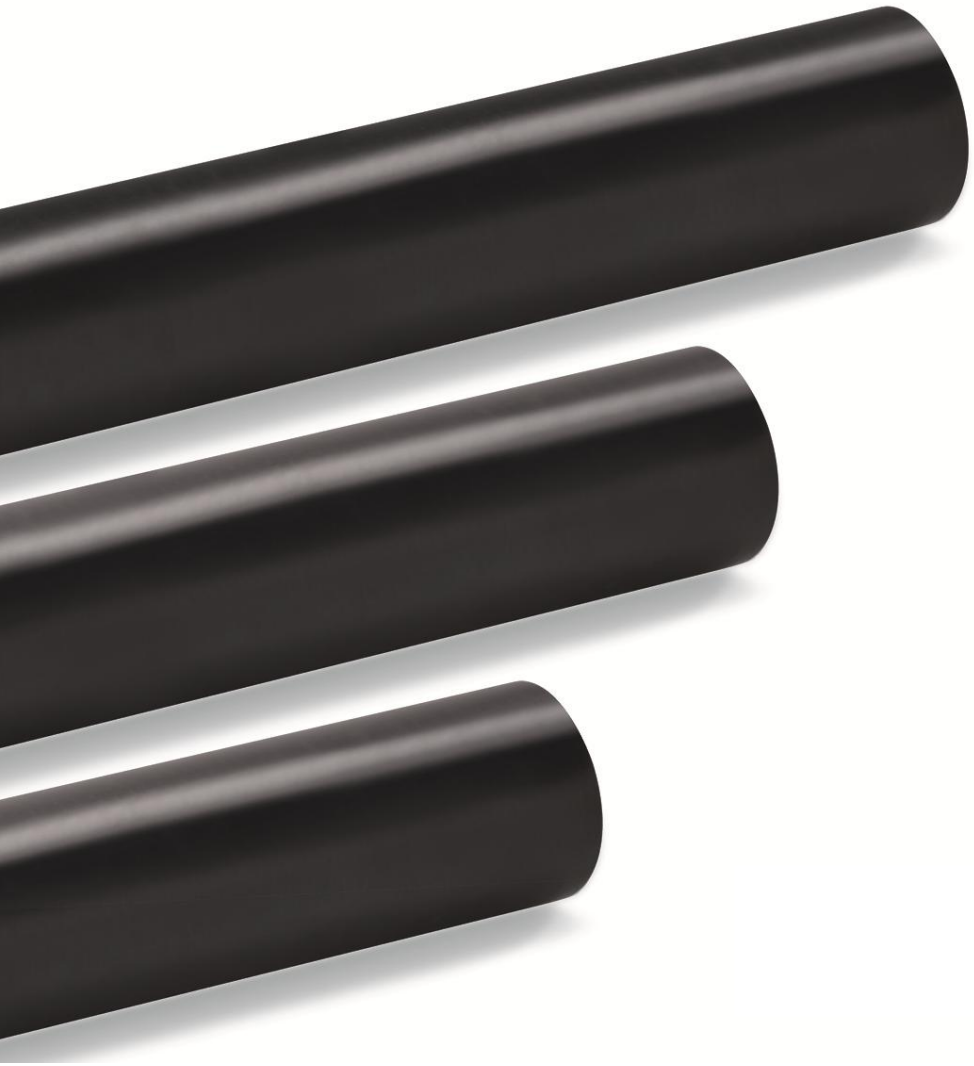
» Flame retardant
» Resistance to many oils, greases and fuels
» High strength and stiffness
» Good sliding and dry running operating features
» High impact and notch impact strength
» High heat deflection temperature
» Shock-absorbing properties
» Size alteration by humidity absorption must be considered

PRODUCT RANGE:

» Colour: Natural and black
» Rods and sheets

APPROVALS OF THE SEMI-FINISHED PRODUCTS:

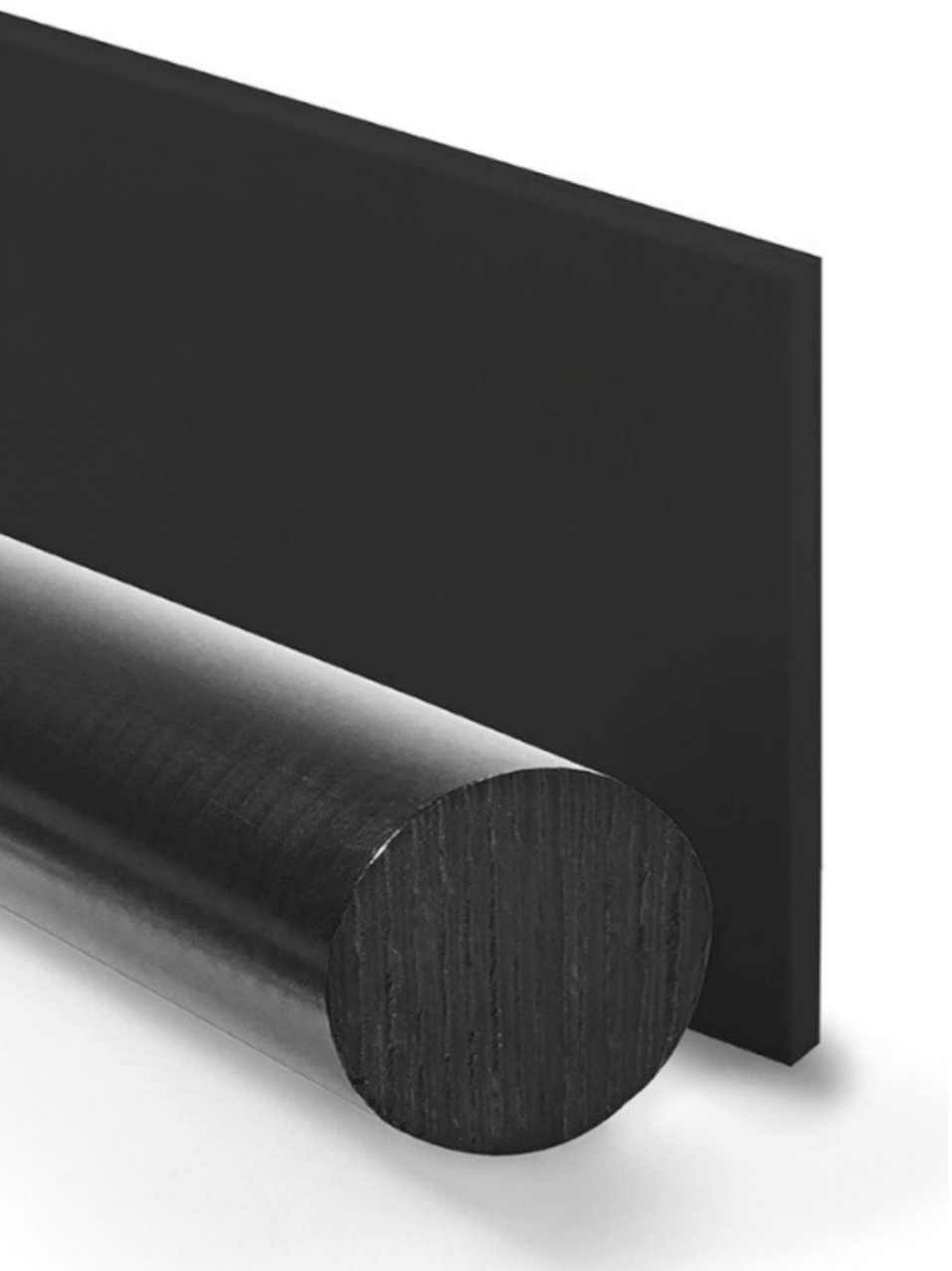
» Railway EN45545-2:2013+A1:2015



GEHR® PPS and GEHR® PPS-40GF

» Very high strength and hardness
» High stiffness
» High heat resistance (down to -40 °C)
» High dimensional stability
» Very high chemical resistance
» Very good electrical insulating properties
» High resistance to weathering
» High hydrolysis resistance

PRODUCT RANGE:
» Colour: Natural / black
» Rods and sheets



GEHR® PPSU

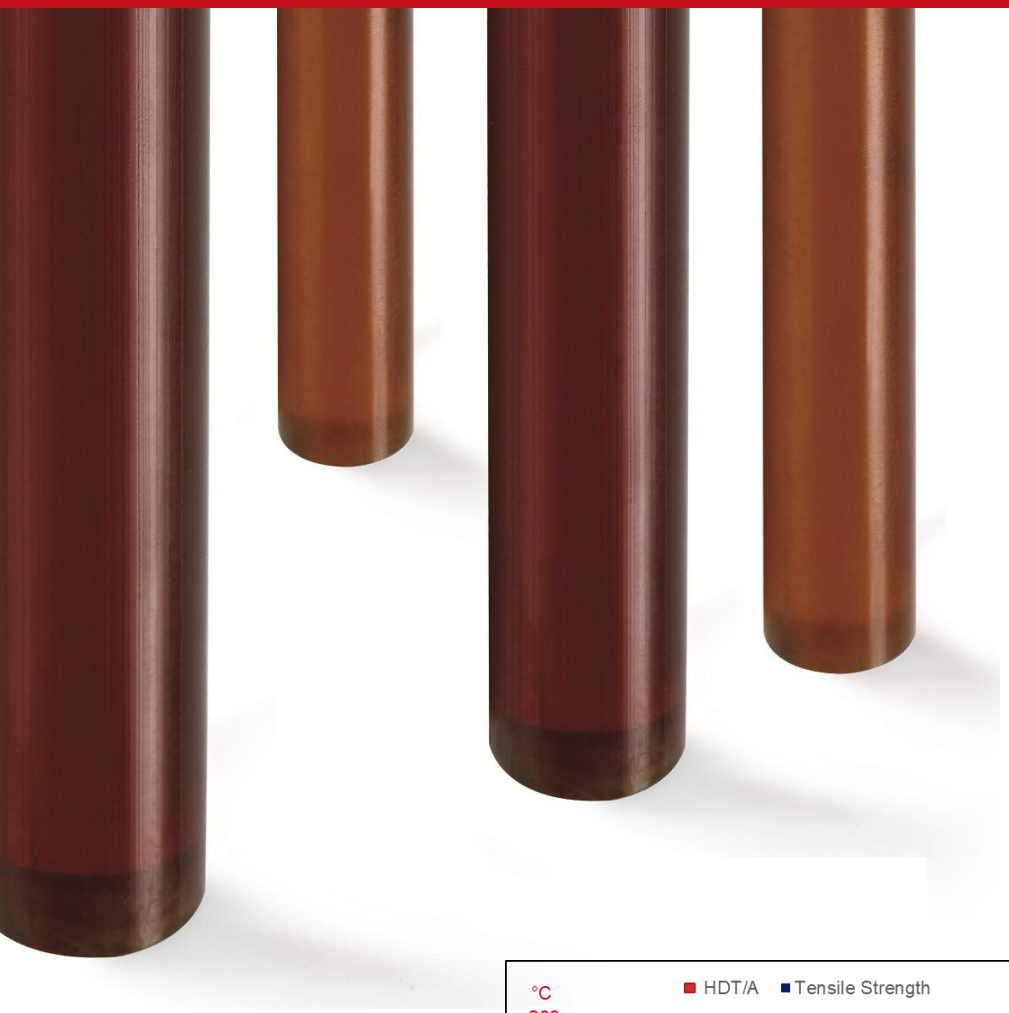
» High Strength and Stiffness
» Very High Toughness
» Very High Dimensional Stability
» Long-term Service Temperature 170°C
» High Chemical and Hydrolysis Resistance
» Higher Resistance to Stress Cracking

PRODUCT RANGE:

» Colour: black
» Rods and sheets

APPROVALS OF THE RAW MATERIAL:

» FDA 21 CFR 160.170
» EU 10/2011/EC



GEHR® PEI

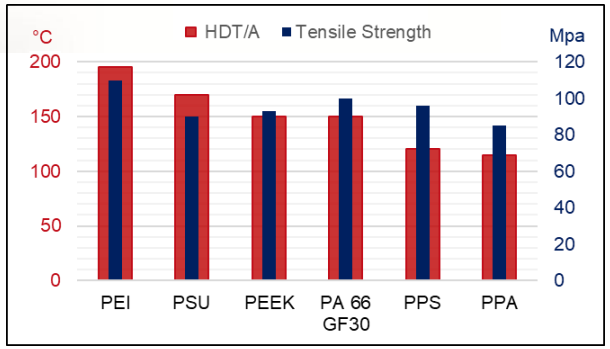
» Very High Strength and Stiffness
» Very High Thermostability
» High Creep Resistance
» Long-term Service Temperature 170°C
» High Chemical and Hydrolysis Resistance
» Very Good Weather Resistance

PRODUCT RANGE:

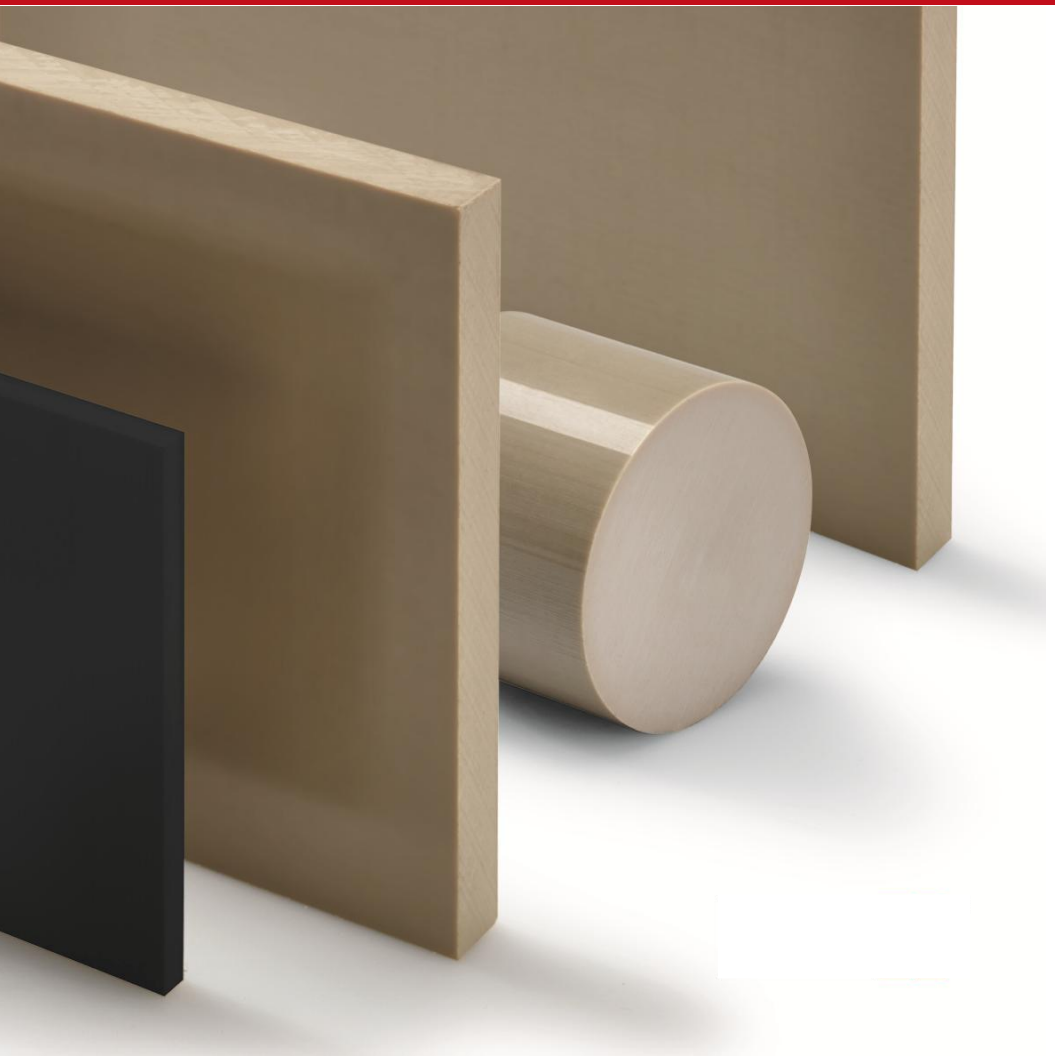
» Colour: Natural
» Rods and sheets

APPROVALS OF THE RAW MATERIAL:

» EU 10/2011/EC (except France)
» Drinking Water (KTW, WRAS, W270)
» Aerospace FAR25.853
» Rail EN45545 R6-HL3



ISCC International Sustainability & Carbon Certification



GEHR® PEEK

» Continuous service temperature: -40°C to +260°C
» Very high mechanical strength and high stiffness
» Very high toughness (even in cold weather)
» Very high thermal and dimensional stability
» Very favorable sliding friction and wear
» Good electrical and dielectric insulating properties
» Very high resistance to α-, β-, γ-ray radiation and infrared rays
» Low coefficient of linear expansion.

PRODUCT RANGE:

» Colour: Natural and black
» Rods, sheets and hollow bars

APPROVALS:

» EU 10/2011/EC
» Drinking Water (WRAS)
» Aerospace FAR 25.853, ASTM E662 (2003), DIN EN ISO 5659-2 (03.2013)
» Military MIL-P-46183

GEHR PEEK® mod

Reinforced with 10 % of each PTFE, graphite and carbonfibre. The very good friction, wear and tear properties makes this material the good choice for many applications with friction.

PRODUCT RANGE:

» Colour: black
» Rods and sheets

GEHR® PEEK-30GF

The material PEEK-30GF is a variant of PEEK modified with 30 % glass fibres. This modification significantly increases the surface hardness and heat deflection temperature compared to the already high values of the unreinforced standard type. The coefficient of linear expansion can also be reduced by approx. 25 %.

PRODUCT RANGE:

» Colour: Natural
» Rods and sheets

FIL-A-GEHR®

ADDITIVE MANUFACTURING

FOR A&D INDUSTRY

ULTEM™ AM1010F FILAMENT (PEI)

ULTEM™ AM1010F FILAMENT (PEI) is a polyetherimide product for 3D printing applications manufactured from ULTEM™ 1010 resin.

» Excellent combination of high heat resistance and dimensional stability
» High mechanical strength
» Continuous service temperature 170 °C
» High heat resistance
» Inherently flame retardant (UL94-V0)
» Print nozzle temperature 370-390°C
» Pressure plate temperature 150°C
» Pressure chamber temperature 90°C

PRODUCT RANGE:

» Colour: Natural
» Diameter: 1,75 mm
» 1 kg Spools

APPROVALS OF THE RAW MATERIAL:

» Aerospace FAR25.853

ISCC International Sustainability & Carbon Certification

ULTEM™ 9085 FILAMENT (PEI)

ULTEM™ 9085 FILAMENT (PEI) is a high-performance filament based on the well-known rawmaterial ULTEM™ 9085.

» Excellent combination of high heat resistance and mechanical strength.
» High dimensional stability
» Continuous service temperature 170 °C
» Resistant to high-energy radiation
» Inherently flame retardant (UL94-V0)
» Print nozzle temperature 360°C
» Pressure plate temperature 160°C
» Pressure chamber temperature 90°C

APPLICATIONS:

» Rail
» Aerospace
» Automotive

PRODUCT RANGE:

» Colour: Natural and black
» Diameter: 1,75 mm
» 1 kg Spools

APPROVALS OF THE RAW MATERIAL:

» Aerospace FAR25.853 and OSU55/55
» Rail EN45545 R6-HL3

ISCC International Sustainability & Carbon Certification

ML9085 SUPPORT for ULTEM™ FILAMENT

ML9085 SUPPORT for ULTEM™ FILAMENT is SABIC's breakaway support filament for use with ULTEM™ AM9085F filament. The material maintains rigidity during printing and provides exceptional pliability during post processing to help enable easier removal of structural supports at room temperature, which can reduce the time required to produce finished parts. AMS31F and ULTEM™ 9085 PEI filaments are compatible with Stratasys® Fortus® Classic printers and open format industrial printers, subject to user testing.

» Print nozzle temperature 380-420°C
» Pressure plate temperature 160-185°C
» Pressure chamber temperature 90-110°C

PRODUCT RANGE:
» Colour: Natural
» Diameter: 1,75 mm
» 1 kg Spools

FIL-A-GEHR® PPSU

FIL-A-GEHR® PPSU is an amorphous material, with improved impact and hydrolysis resistance compared to PSU and PEI. The extremely high notch impact strength remains also after a heat aging.

» High strength and rigidity
» Very high toughness (also at low temperatures)
» Very good dimensional stability
» Very high chemical resistance
» High operating temperature (approx. +170 °C)
» Very good sterilizability
» Pressure nozzle temperature 390-410°C, printing plate temperature 220°C
» Printing room temperatur 170-210°C

APPLICATIONS:

» Instruments for microinvasive surgery
» Pump impellers, pump parts
» Sterilization cassettes
» Valves

PRODUCT RANGE:

» Colours: Black, natural
» Diameter: 1,75 mm
» 1 kg Spools

FIL-A-GEHR® PEEK

The semi-crystalline polyether ether ketone **FIL-A-GEHR® PEEK** offers outstanding mechanical, thermal and chemical resistance. Thanks to its well-balanced property profile, PEEK is one of the most capable high-performance thermoplastics available.

» Excellent combination of strength, stiffness and toughness
» Low moisture absorption
» Exceptional chemical resistance
» Maximum continuous operating temperature 260 °C
» Excellent sterilisation and hydrolysis resistance
» Self-extinguishing, low smoke emission
» Pressure nozzle temperature 375°C, printing plate temperature 180°C
» Printing room temperatur 180°C

APPLICATIONS:

» Aviation
» Transport
» Oil and gas (supporting rings and supply lines)

PRODUCT RANGE:

» Colour: Natural
» Diameter: 1,75 mm
» 1 kg Spools

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