



# HIGH PERFORMANCE MATERIALS FOR MEDICAL TECHNOLOGY

PLASTICS  
ENGINEERED BY **GEHR** 

## » CONTENT

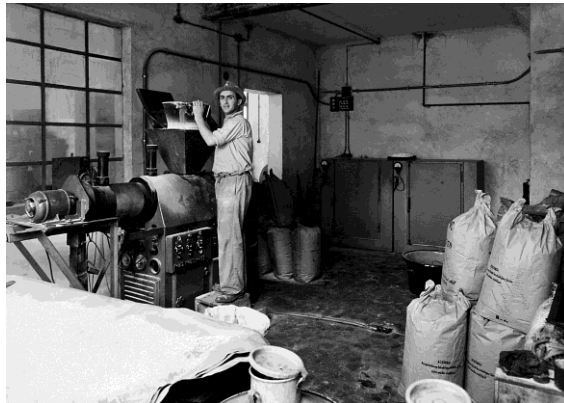
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- » Our Company
- » **MEDIGEHR®** General Information
- » **MEDIGEHR®** Products
- » **MEDIGEHR®** Applications
- » Sterilization / Cleaning
- » **MEDIGEHR®** Delivery Programme
- » Contact



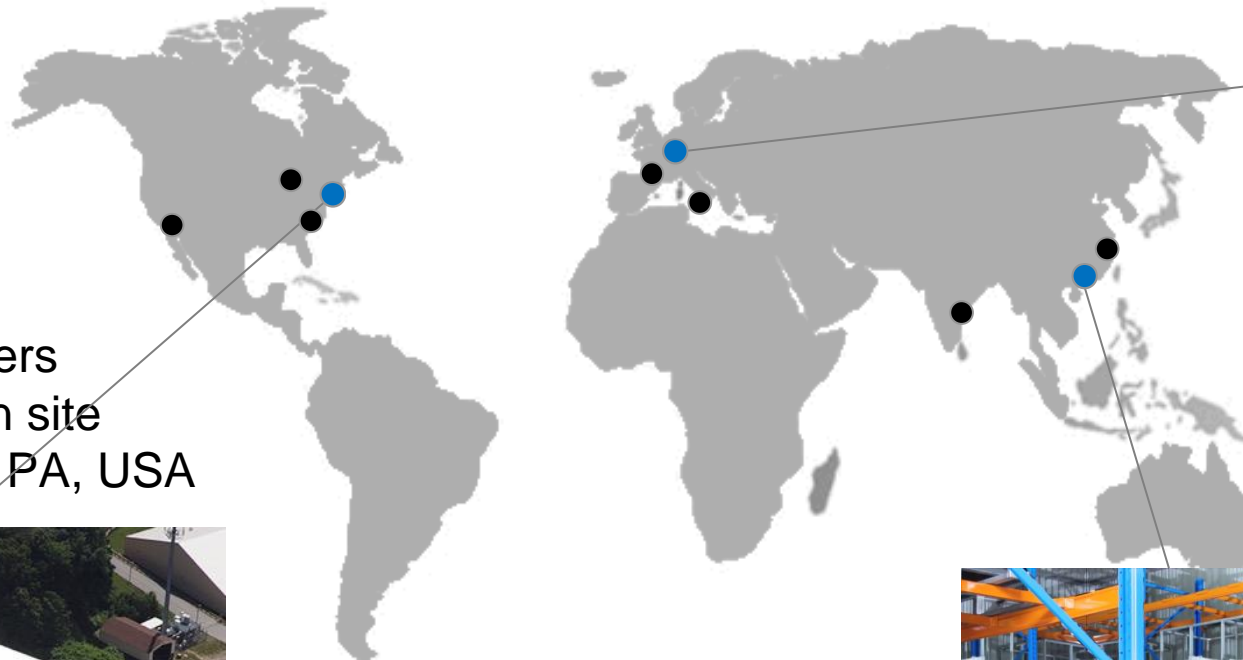


# » FAMILY OWNED AND OPERATED COMPANY WITH TRADITION



# » GEHR – AN INTERNATIONAL COMPANY

» US headquarters and production site  
**Philadelphia, PA, USA**



» World headquarters and production site  
**Mannheim, Germany**



» Asia headquarters and warehouse  
**Hong Kong**



# » QUALITY AND INNOVATION



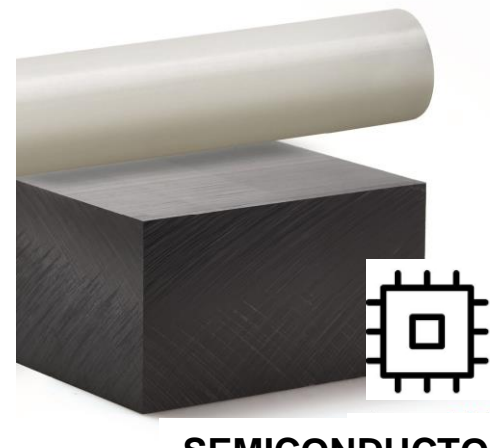
# » MARKET SEGMENTS



STOCK SHAPES



MEDI-GEHR®



SEMICONDUCTOR



FIL-A-GEHR®



WRITING INSTRUMENTS



COSMETICS



MULTI-LAYER TUBES

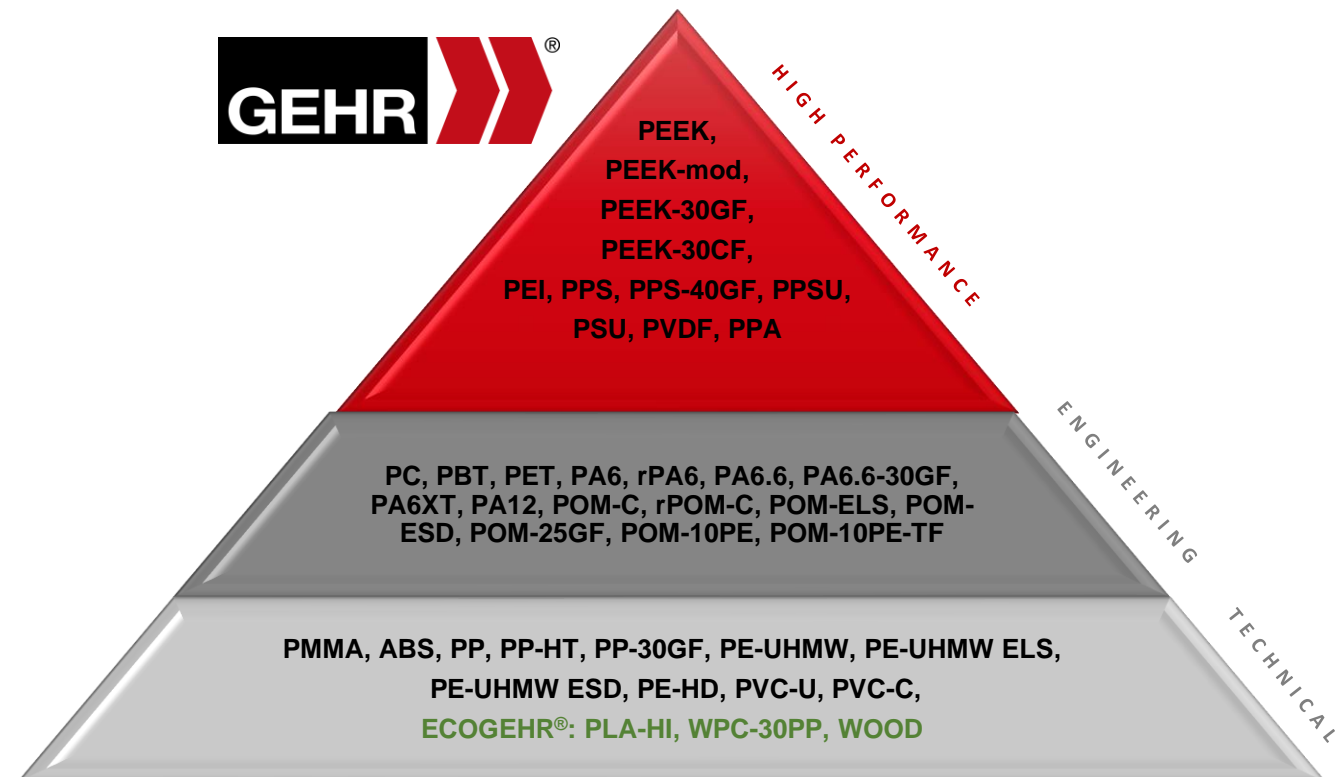
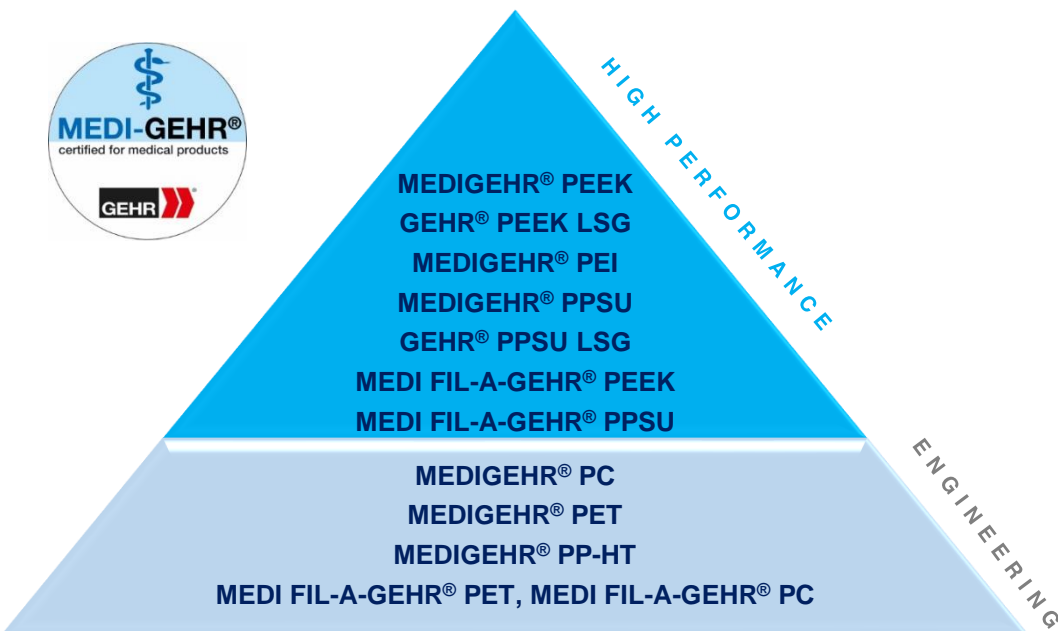


CUT TO SIZE

# » GEHR EXPERTISE

**EXTRUDED RODS, SHEETS, TUBES,  
PROFILES AND FILAMENTS**

- » Rods up to 700 mm diameter
- » Thick plates up to 300 mm thickness
- » Calendered sheets from 1 mm
- » Decorative precision tubes
- » Semi-finished products for medical applications
- » Filaments for professional 3D printing





# » ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

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## CO<sub>2</sub>-NEUTRAL PRODUCTION

- Conversion to green electricity and green gas in Mannheim and Philadelphia.
- Achievement of the implementation packages of Katowice Scope1 and Katowice Scope1 and 2

## SINCE 2016: 100% RENEWABLE ELECTRICITY

Since 2016, total electricity requirements covered by renewable energies - mainly from hydropower in Norway.

## COOLING PROCESS OPTIMIZED

In order to sustainably conserve water as a resource, we have also made mechanical adjustments to our plants. This has enabled us to significantly reduce the amount of water required in the cooling system as well as the supply of fresh water.

## RECYCLING CONCEPT FOR THE AVOIDANCE OF PRODUCTION WASTE

The returned material is sorted, ground, recycled and reused in production wherever possible and permitted.





# » SUSTAINABILITY REPORT 2022

## CERTIFICATIONS

- » ISO 9001, ISO 13485, ISO 14001, ISO 50001, ISO 45001
- » ISCC Plus
- » ECOVADIS Rating 2022: Silver



## CORPORATE PHILOSOPHY

- » Long-term independence
- » Extensive sustainable portfolio
- » Quality leadership
- » Innovation
- » Corporate social responsibility in terms of sustainable management, CSR responsibility

## REDUCTION OF ENERGY CONSUMPTION

Since 2013 10% reduction of energy per kg extruded material thru:

- » new efficient extruder
- » optimized annealing process
- » new compressed air machine,
- » energetic refurbishment of buildings
- » new photovoltaic system to be installed in 2023 that will cover approx. 15% of demand

## SOCIAL RESPONSIBILITY

- » Below industry average for „1000-man quota“ (accident rate per 1000 full-time workers)
- » Cooperation with the University of Mannheim
- » Flexible working hours / mobile working stations
- » Sponsoring local sport events / teams

## RECYCLING

- » Recycling rate increased to 7,8%
- » Reduced scrap rate by 2%
- » Strategic partnership with plastic recovery company

## LIFECYCLE ASSESSMENT

- » Status Quo carbon footprint analysis based on GHG protocol
- » Currently emissions are 2145t CO<sub>2</sub> eq.

## GREENHOUSE GAS EMISSIONS

- » Scope 1: 5%      Scope 2: 0%      Scope 3: 95%
- » Reduction of 11% in 2022 (compared to 2021)

## ACCOMPLISHED ACTIONS

- » **ECO**GEHR® & **ECO** FIL-A-GEHR®
- » Since 2016: green electricity
- » Since 2020: green gas
- » ECOVADIS Rating 2022: Silver
- » ISCC+ biocircular PP for writing instruments
- » Member of Mannheim climate protection alliance

## CORPORATE GOVERNANCE

- » Corporate Environment, culture, leadership
- » Dealing with business partners, customers, suppliers
- » Supply chains
- » Anti Trust, compliance, confidentiality
- » Whistleblowing

## » MOBILITY OF THE FUTURE

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In collaboration with TU Munich and Evonik, we are ensuring that the Hyperloop project moves into the next phase. Hyperloop is a new concept for transporting goods and people at almost the speed of sound. The train travels like a maglev train in a low-pressure tube above the earth's surface. In this team, we produced sheets made of VESTAMID® (PA12 filled with glass fibers) for a 24-m-long test track. After extrusion, these sheets are machined before installation to hold the magnetic coils in position for the train.



## » GENERAL INFORMATION ABOUT MEDIGEHR®

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Products suitable for medical and pharmaceutical applications with direct body contact with tissue, bone, skin and mucosa for up to 24 hours. All raw materials used for the medical grade products are food grade (FDA, EU 10/2011) and have been tested and evaluated by an independent accredited testing laboratory and meet the following biocompatibility requirements:

- » ISO 10993-1: Assessment and testing as part of a risk management system
- » ISO 10993-5: Tests for in vitro cytotoxicity
- » ISO 10993-12: Sample preparation and reference materials
- » ISO 10993-18: Chemical characterization of materials\*
- » USP Class VI\*





## » GENERAL INFORMATION ABOUT **MEDI-GEHR**®

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During production, we ultrasonically inspect our semi-finished products to ensure that they are free of defects and voids. As a manufacturer, we thus fulfill a special duty of care that makes it easier for medical device manufacturers to obtain approval for their end products by reducing costs and time. We also attach great importance to the traceability of the stock goods that leave our production facilities.



## » MEDIGEHR® PP-HT MG

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- » High heat resistance
- » High stiffness
- » High surface hardness
- » Low density
- » Very high chemical resistance
- » Resistance to hot steam sterilization
- » Brittle at low temperature

### APPLICATIONS:

- » Sterilization cassettes and inserts
- » Centrifuge holders
- » Analysis technology





## » **MEDIGEHR® PET MG**

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- » Very good chemical resistance
- » Very high impact strength
- » High surface hardness
- » High hydrolysis resistance
- » High creep resistance
- » Good polishability
- » Good sliding friction properties and abrasion resistance
- » Good electrical insulation properties
- » High resistance to gamma radiation

### APPLICATIONS:

- » Operating room lights
- » Housings
- » Medical components
- » Disposables for biomedical applications





## » MEDIGEHR® PC MG

- » Continuous service temperature from -60°C to +120°C
- » Very high stiffness
- » Very high impact strength
- » Very high dimensional stability
- » Resistance to x-ray irradiation
- » Very good heat deflection temperature (approx. 135°C)
- » High surface hardness

### APPLICATIONS:

- » Surgical lights
- » Dialysis machines
- » Incubators
- » Oxygen equipment
- » Inhalers





## » **MEDI**GEHR® PEI MG

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- » Long-term Service Temperature 170°C
- » High Chemical and Hydrolysis Resistance
- » Very high strength and stiffness as well as creep resistance
- » Very high torsional strength and hardness
- » High heat resistance
- » Very Good Weather Resistance
- » High resistance to  $\gamma$ -rays

### APPLICATIONS:

- » Delivery capsule for minimally invasive procedures
- » Autoclave components
- » Structural medical components
- » Radiation therapy systems
- » Infusion pumps

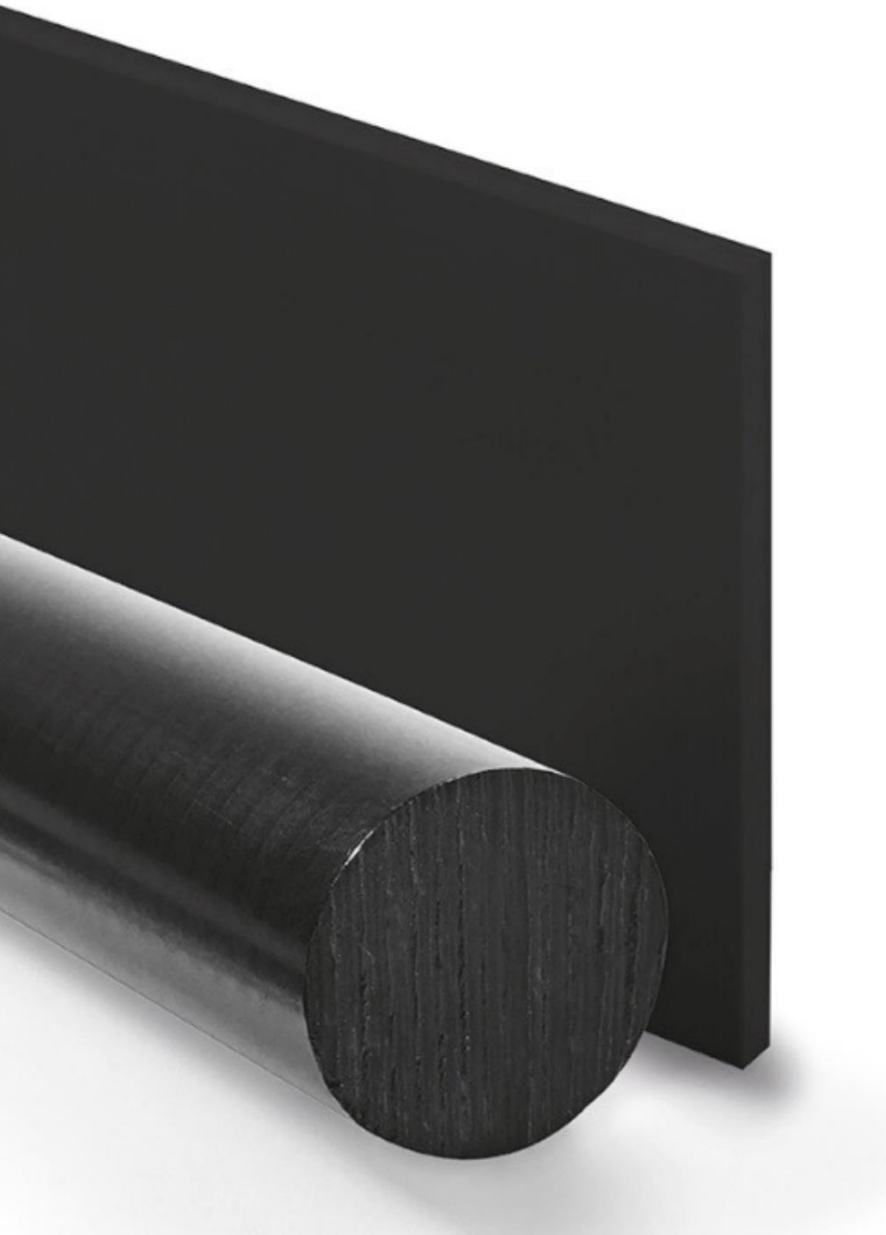
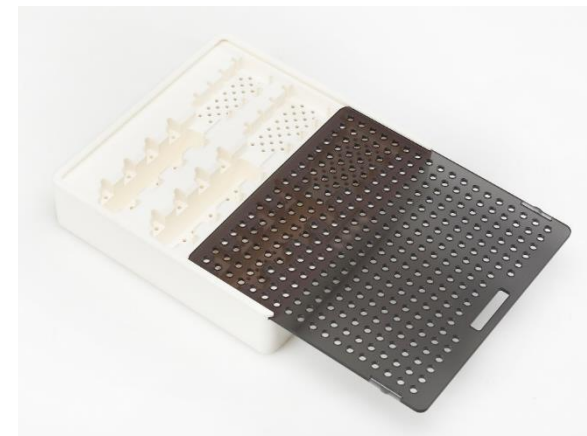
## » MEDIGEHR® PPSU MG

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- » Continuous service temperature 170°C
- » High strength and stiffness
- » Very high toughness (even at low temperatures)
- » Very high dimensional stability
- » Very high chemical resistance
- » Very good sterilizability
- » Lower chemical resistance than comparable semi-crystalline materials

### APPLICATIONS:

- » Instrument handles
- » Instruments for microinvasive surgery
- » Components in the food industry
- » Pump impellers, pump bodies
- » Valves





## » GEHR® PPSU LSG

» Your benefit: All dimensions are made-to-order; customization with fast delivery and minimum order quantity of 25 kg

» Available colors:

red (~RAL 3001)

blue (~RAL 5005)

yellow (~RAL 1006)

green (~RAL 3262)

purple (~RAL 7668 C)

» More colors are available on request

» Material: Solvay Radel® PPSU

» Diameter Ranging: 10 to 100mm

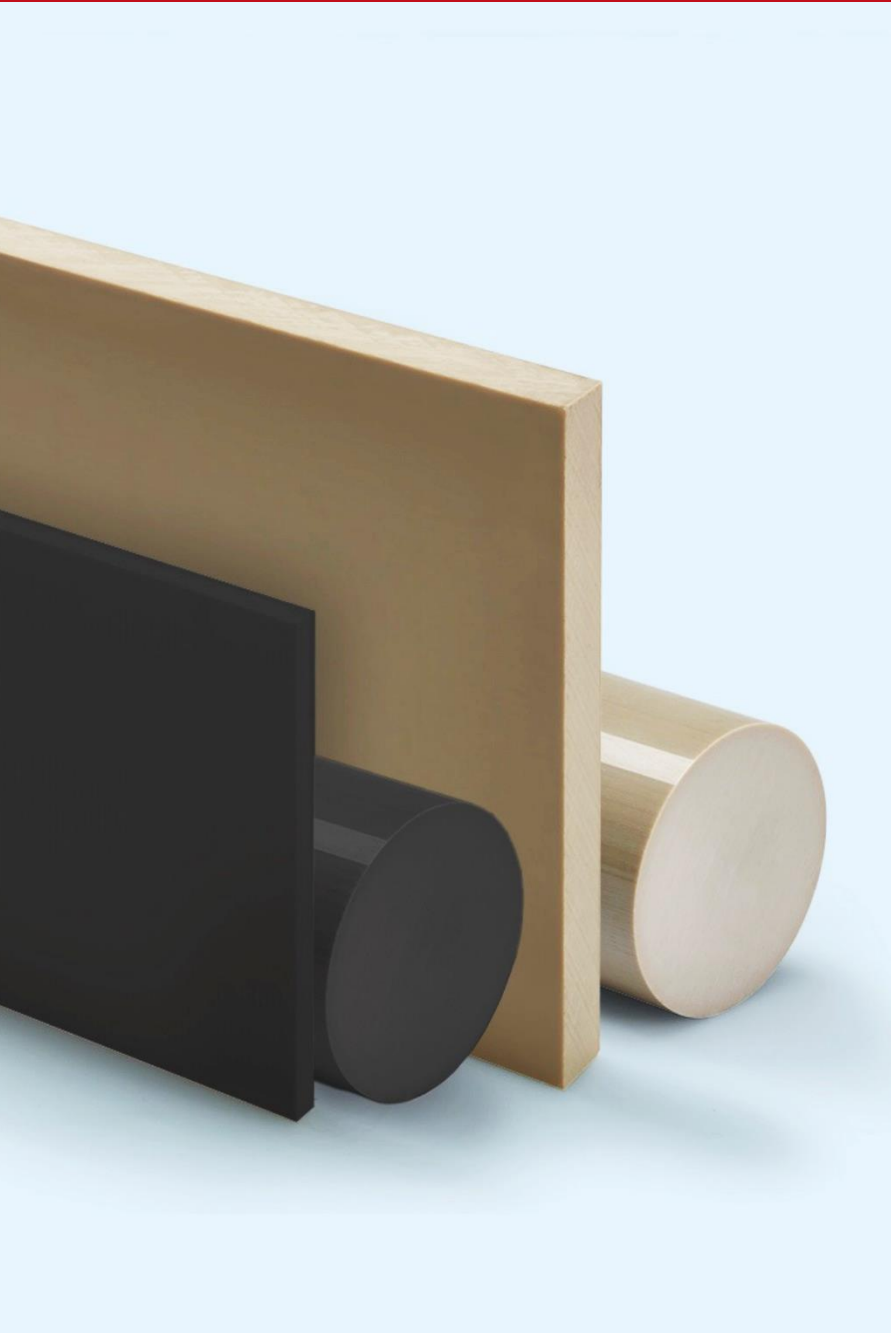
### APPLICATIONS:

» Instrument handles

» Sizers and spacers

» Surgical instruments





## » MEDIGEHR® PEEK MG

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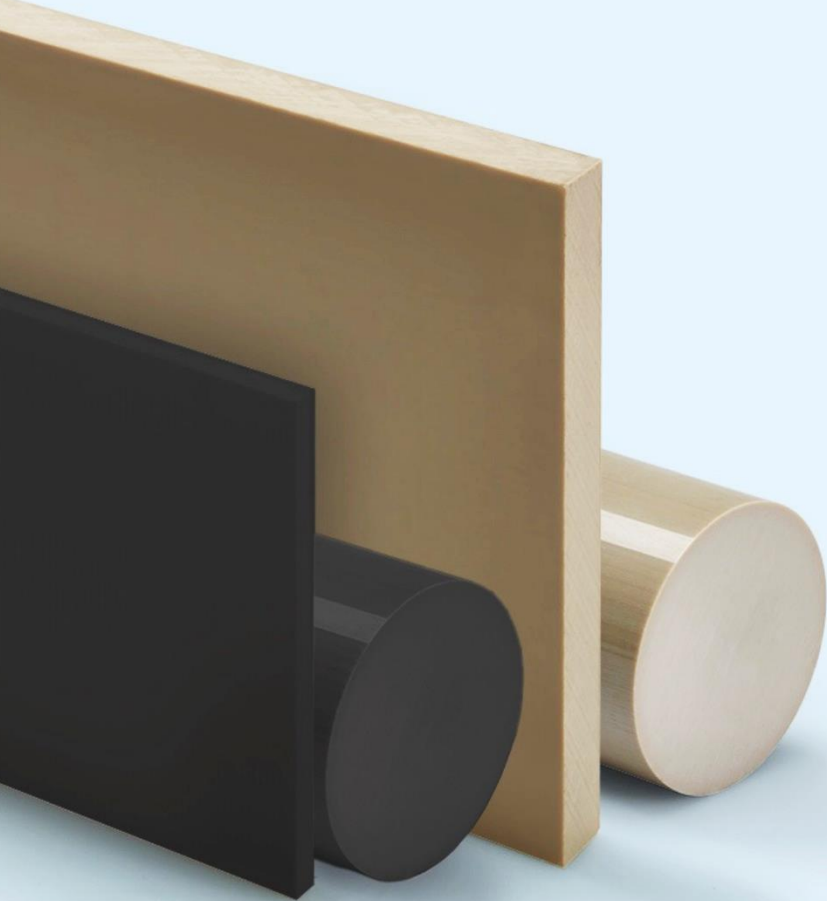
- » Continuous service temperature -40°C to +260°C
- » Excellent sterilizability with all common methods (superheated steam, gamma, e-beam, EtO)
- » Very high strength, stiffness and toughness
- » Very high temperature and heat resistance
- » Very high creep resistance
- » Very high dimensional stability
- » Very high resistance to  $\beta$ -,  $\gamma$ -, X-ray and infrared radiation
- » High resistance to hydrolysis
- » Good wear properties
- » Low water absorption
- » Inert

## » MEDIGEHR® PEEK MG

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### APPLICATIONS:

- » Dental instruments
- » In-vitro diagnostics
- » Locking devices
- » Connectors
- » Sealing rings, spacers, dosing systems
- » Flanges and sleeves, housing parts
- » Grippers, holders, insulation sleeves,
- » Primary packaging in the pharmaceutical sector





## » GEHR® PEEK LSG

» Your benefit: All dimensions are made-to-order; customization with fast delivery and minimum order quantity of 25 kg

» Available colors:

red (~RAL 3001)

blue (~RAL 5005)

yellow (~RAL 1006)

green (~RAL 3262)

purple (~RAL 7668 C)

» More colors are available on request

» Material: Solvay Ketaspire® KT-820

» Diameter Ranging: 10 to 100mm

### APPLICATIONS:

» Dental instruments

» Sizer and spacer

» Locking devices





## » **MEDI FIL-A-GEHR®**

**MEDI FIL-A-GEHR®** products are suitable for medical and pharmaceutical applications with direct body contact with tissue, bone, skin and mucosa for up to 24 hours. All materials meet the same requirements as the semi-finished products. Especially for our certificates and approvals:

**FDA\***, **EU 10/2011\***, **ISO 10993-1, -5, -12, -18** and **USP Class VI**

\* only for raw material

### MATERIALS:

- » **MEDI FIL-A-GEHR®** PET MG (white and transparent)\*
- » **MEDI FIL-A-GEHR®** PC MG
- » **MEDI FIL-A-GEHR®** PPSU MG
- » **MEDI FIL-A-GEHR®** PEEK MG



**MEDI FIL-A-GEHR®** PPSU MG  
Arthroscope prototype



**MEDI FIL-A-GEHR®** PEEK MG  
Instrument holder prototype



medical filaments



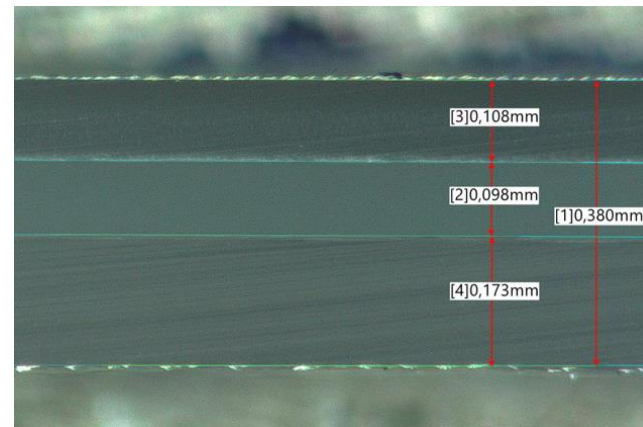
colored PPSU tubes

## » GEHR CUSTOMIZING

- » Special manufacture of semi finished products such as tubes, plates, rods, profiles, etc. for industrial and medical applications
- » Tolling of high performance material filaments (also for implants)
- » Extrusion of sheets and rods for medical and electronic segment in clean room
- » Extrusion of multi-layer co-extruded tubes



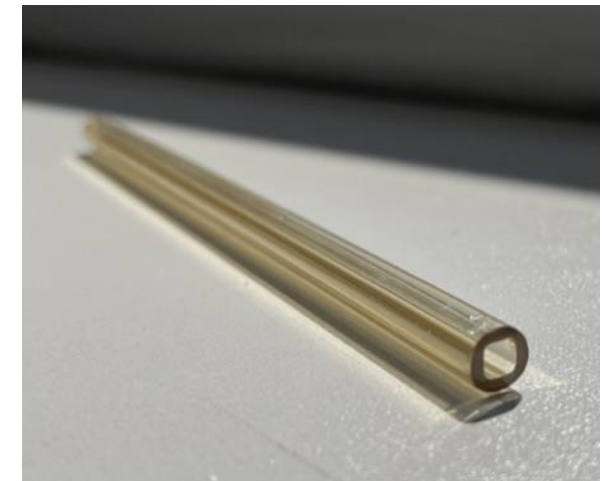
3-layer co-extruded tubes



1. layer

2. layer

3. layer



PPSU tubes for surgical instruments



## » MEDIGEHR® meets ECOGEHR®

- » Started as a customer project
- » Application: Suction tube

### Requirements:

- » Biobased or recycled material
- » All medical approvals
- » Transparent tube



### Our solution:

- » ECO MEDIGEHR® PP Tubes
- » Material: PPH made of used fry grease
- » Approvals on the raw material:
  - » ISO 10993
  - » USP <88> Class VI
  - » Food Contact: EU 10/2011, FDA 177.1520

# » MEDIGEHR APPLICATIONS

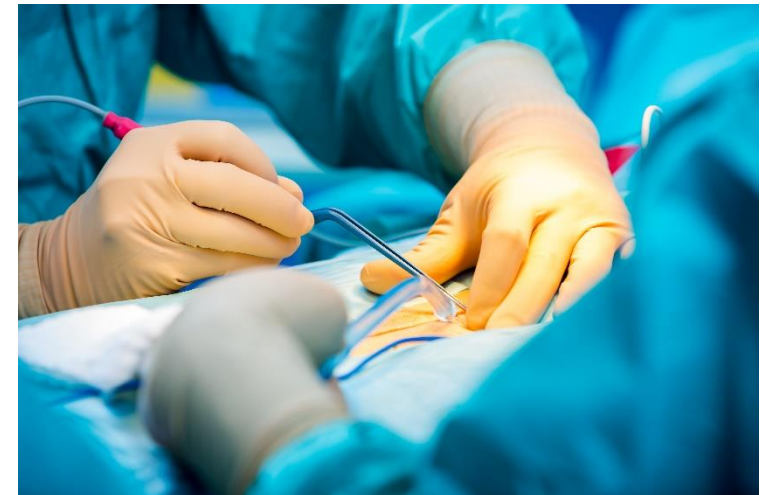
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Surgical Equipment



Dental Applications



Medical Disposables



Surgical Instruments

## » STERILIZATION / CLEANING

Product	UV irradiation	Gamma irradiation	Autoclave	Ethylene oxide	Hydrogene peroxide
MEDI GEHR® PP-HT MG	-	-	+	-	-
MEDI GEHR® PET MG	+	+	-	+	+
MEDI GEHR® PC MG	+	+	+	+	+
MEDI GEHR® PEI MG	+	+	+	+	+
MEDI GEHR® PPSU MG	-	+	+	+	+
GEHR® PPSU LSG	-	+	+	+	+
MEDI GEHR® PEEK MG	-	+	+	+	+
GEHR® PEEK LSG	-	+	+	+	+
MEDI FIL-A-GEHR® PET MG	+	+	-	+	+
MEDI FIL-A-GEHR® PC MG	+	+	+	+	+
MEDI FIL-A-GEHR® PPSU MG	-	+	+	+	+
MEDI FIL-A-GEHR® PEEK MG	-	+	+	+	+



\*Discoloration may occur

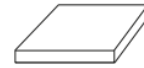
+	Compatible
-	Incompatible
o	Not tested





### VOLLSTÄBE / ROUND RODS

Ø mm	MEDI-GEHR PEEK MG®	MEDI-GEHR PPSU MG®	MEDI-GEHR PP-HT MG®	MEDI-GEHR PC MG®	MEDI-GEHR PET MG®
	Länge / Length: 1   2   3 m kg/m	Länge / Length: 1   2   3 m kg/m	Länge / Length: 1   2   3 m kg/m	Länge / Length: 1   2   3 m kg/m	Länge / Length: 1   2   3 m kg/m
5	0,032	0,027			
6	0,040	0,038			
8	0,072	0,068			
10	0,110	0,106			0,097
12	<b>0,164</b> ⊙	0,153		0,143	0,140
15	0,252	0,239		0,223	0,219
16	<b>0,285</b> ⊙●	0,272		0,253	0,249
18	0,360	0,345		0,321	0,315
20	<b>0,439</b> ⊙●	<b>0,443</b> ●●●●●●		0,396	0,389
22	0,535	0,515		0,479	0,471
25	<b>0,685</b> ⊙●	<b>0,665</b> ●●●●●●	<b>0,484</b> ⊙	0,619	0,608
28	0,850	0,834		0,776	0,763
30	1,000	0,985		0,891	0,876
32	<b>1,110</b> ⊙●	<b>1,089</b> ●●●●●●		1,013	0,996
36	<b>1,430</b> ⊙●	1,379		1,283	1,261
40	1,740	<b>1,750</b> ●●●●●●	<b>1,230</b> ⊙	1,583	1,557
45	2,220	2,154		2,004	1,971
50	<b>2,770</b> ⊙●	<b>2,730</b> ●●●●●●	<b>1,930</b> ⊙	<b>2,474</b> ⊙	2,433
56	3,400	3,336			<b>3,052</b> ⊙○
60	<b>3,920</b> ⊙●	3,940	<b>2,770</b> ⊙		3,503
65	4,550	4,495			4,111
70	5,400	5,213			4,768
75	6,100	5,984			5,474
80	6,960	6,970			6,228
90	8,800	8,617			7,882
100	10,800	10,900			9,731
110	13,000				
120	15,610				
125	16,930				
140	21,300				
150	24,600		<b>21,472</b> ⊙		



### PLATTEN / SHEETS

Länge / Length: 1 | 2 | 3 m

mm	Toleranzen / Tolerances mm		MEDI-GEHR PEEK MG®	MEDI-GEHR PPSU MG®	MEDI-GEHR PP-HT MG®	MEDI-GEHR PC MG®	MEDI-GEHR PET MG®
	min.	max.	Breite/Width 620 mm kg/m	Breite/Width 620 mm kg/m	Breite/Width 610 mm kg/m	Breite/Width 620 mm kg/m	Breite/Width 620 mm kg/m
15	+ 0,3	+ 1,5			<b>8,743</b> ⊙	11,718	11,337
16	+ 0,3	+ 1,5	<b>14,340</b> ⊙●			12,499	12,093
20	+ 0,3	+ 1,5	<b>17,730</b> ⊙●	<b>17,970</b> ●	<b>11,657</b> ⊙	<b>15,624</b> ⊙	<b>15,116</b> ⊙○
25	+ 0,3	+ 1,5	<b>22,320</b> ⊙●	<b>22,270</b> ●		19,530	18,895
30	+ 0,5	+ 2,5			<b>17,485</b> ⊙	23,436	22,674
35	+ 0,5	+ 2,5		<b>31,390</b> ●		27,342	26,453
40	+ 0,5	+ 2,5	<b>35,200</b> ⊙	<b>35,690</b> ●	<b>23,314</b> ⊙	31,248	30,232
50	+ 0,5	+ 2,5		<b>44,290</b> ●		39,060	37,790



### FILAMENTE / FILAMENTS

kg	MEDI-FIL-A-GEHR PEEK MG®	MEDI-FIL-A-GEHR PPSU MG®	MEDI-FIL-A-GEHR PC MG®	MEDI-FIL-A-GEHR PET MG®
	Ø 1,75mm	Ø 1,75mm	Ø 1,75mm	Ø 1,75mm
0,1	⊙	●		
0,2	⊙	●		
0,5	⊙	●		
1	⊙	●	⊙	⊙○

Auf Lager

Stock item

Farben / Colours:

- ⊙ natur / natural
  - ⊙ transparent / transparent
  - grün / green (~RAL 3262)
  - schwarz / black (~RAL 9004)
  - rot / red (~RAL 3000)
  - gelb / yellow (~RAL 1006)
  - weiß / white (~RAL 9010)
  - blau / blue (~RAL 5005)
  - lila / purple (~RAL 7668 C)
- Mehr Farben auf Anfrage / More colors on request

# » FURTHER INFORMATION

**DELIVERY PROGRAM**

**FIL-A-GEHR**

**NEW PRODUCTS**

**PRODUCT**

## CONTACT US

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