

Technical Information

# Stock Shapes Machining Guidelines

## DELIVERY FORMS OF VESTAKEEP® PEEK MATERIALS

Under the brand name VESTAKEEP® Evonik offers polyetheretherketone materials and compounds in precisely the delivery form you need for your PEEK application. Our materials are offered as powders, granules and stock shapes.

Producing PEEK parts from stock shapes is of particular interest if small to medium part numbers are produced and if high flexibility to change the design or the size is required.

This technical information provides guidelines for the machining of VESTAKEEP® PEEK Stock Shapes. For information on melt processing or sintering of our resins, please contact us.

## MACHINING OF VESTAKEEP® STOCK SHAPES

VESTAKEEP® PEEK stock shapes can easily be machined using standard equipment for drilling, turning and milling operations.

Due to the low thermal conductivity of plastics the generated heat should be kept at a minimum to prevent deformations, stresses and colour changes during machining process.

Tungsten carbide, ceramic or diamond tipped tools might increase the durability of the tools.

Machining parameter recommendations are found in the table on page 2.

### Coolants

Coolants are usually not required upon machining VESTAKEEP® PEEK. It is recommended to avoid coolants, lubricants and other processing aids. Using compressed air cooling to reduce the temperature at the cutting area can improve the surface finish and better tolerances can be achieved.

Using commercially available emulsions and cutting oils can also improve the surface and quality of the parts. It must be considered that residues might remain on the parts. Tests or validation might be required to ensure the compatibility of coolants or lubricants with the final application.



### Annealing

We supply state of the art VESTAKEEP® PEEK stock shapes. All our rods and plates are annealed in order to minimize residual internal stresses.

Upon machining, stock shapes are exposed to mechanical and thermal stresses which might result in new internal stresses. If these stresses cannot be avoided during the machining process, it can be necessary to anneal the parts after machining. In order to achieve parts of highest precision, it can also be appropriate to subject the part to intermediate annealing before finishing to final dimensions.

The annealing steps below can be applied to reduce internal stresses in parts with a wall thickness up to 2cm. It might be required to adapt the annealing process to the particular part and production process

1. Ramp up to 150°C at max 30°C/h
2. Hold at 150°C for 3h
3. Ramp up to 200°C at max 30°C/h
4. Hold at 200°C for 4h
5. Cool down to room temperature at max 15°C/h

## STOCK SHAPES MACHINING PARAMETER RECOMMENDATIONS

Process	Unit
<b>Sawing</b>	
Clearance Angle	15–30°
Rake Angle	0–5°
Cutting Speed (m/min)	500–800
Pitch (Mm)	3–5
Coolants	avoid
<b>Drilling</b>	
Clearance Angle	5–10°
Rake Angle	3–5°
Point Angle	90–120°
Cutting Speed (m/min)	50–80
Feed Rate (mm/rev)	0.1–0.3
Coolants	avoid
<b>Milling</b>	
Clearance Angle	5–15°
Rake Angle	0–15°
Cutting Speed (m/min)	150–300
Coolants	avoid
<b>Turning</b>	
Clearance Angle	5–10°
Rake Angle	0–10°
Side Angle	45–60°
Cutting Speed (m/min)	200–400
Feed Rate (mm/rev)	0.05–0.5
Coolants	avoid

VESTAKEEP® is a registered trademark of the Evonik Degussa GmbH

This information and any recommendations, technical or otherwise, are presented in good faith and believed to be correct as of the date prepared. Recipients of this information and recommendations must make their own determination as to its suitability for their purposes. In no event shall Evonik assume liability for damages or losses of any kind or nature that result from the use of or reliance upon this information and recommendations. EVONIK EXPRESSLY DISCLAIMS ANY REPRESENTATIONS AND WARRANTIES OF ANY KIND, WHETHER EXPRESS OR IMPLIED, AS TO THE ACCURACY, COMPLETENESS, NON-INFRINGEMENT, MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE (EVEN IF EVONIK IS AWARE OF SUCH PURPOSE) WITH RESPECT TO ANY INFORMATION AND RECOMMENDATIONS PROVIDED. Reference to any 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. Evonik reserves the right to make any changes to the information and/or recommendations at any time, without prior or subsequent notice.

April 2017 | DP APT 0005 M.01

**Evonik Resource Efficiency GmbH**  
High Performance Polymers  
Paul-Baumann-Straße 1  
45772 Marl, Germany

Phone +49 6151 18-6732  
Fax +49 6151 18-84255  
evonik-hp@evonik.com  
www.evonik.com/vestakeep-medical