



PolyMax™ PC-FR



Industrial

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www.polymaker.com

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Printing with PolyMax™ PC-FR

PolyMax™ PC-FR

PolyMax™ PC-FR is a flame retardant PC filament (UL94V-0/1.5 mm) displaying excellent toughness, strength and heat resistance. This filament is ideal for applications in the automotive, railway and aerospace industries.



Printing settings

| | |
|----------------------|------------|
| Nozzle Temperature: | 250-270 °C |
| Bed Temperature: | 90-105 °C |
| Chamber Temperature: | 90-100 °C |
| Printing Speed: | 30-50 mm/s |
| Cooling Fan: | OFF |

Note: Settings are based on 0.4 mm nozzle, and may vary with different printers and nozzle diameters.



Bed surface

PolyMax™ PC-FR can be printed on almost any surface with a thin coat of Magigoo PC. We recommend a flex plate to facilitate the removal of the model from the plate.

———— **High temperature conditions**

We recommend a full metal hot end that can maintain a stable temperature of at least 260 °C. We also recommend to use a heated chamber capable of reaching at least 80 °C.

———— **Annealing PolyMax™ PC-FR parts**

We recommend annealing all models printed in PolyMax™ PC-FR. This allows users to take full advantage of the mechanical and thermal properties.

The annealing process consists of putting the model in an oven at 100 °C for 2 hours.

———— **Support material**

PolyDissolve™ S2 is the recommended support material for PolyMax™ PC-FR.

For more information, please visit
www.polymaker.com

PCP: Profile Creation Process

The profile creation process (PCP) allows users to rapidly develop a printing profile for any given material/printer. During this process is important to consider all of these factors to build a successful profile.

- Geometry
- Material
- Printer
- Environment
- Purpose

Polymaker developed the PCP to assist customers in creating their own tailored print profiles; taking into account the material, printer, environment as well as the models geometry and purpose. Additionally, the PCP allows individuals to develop their own knowledge and troubleshooting skills.

The PCP is available on www.polymaker.com

The PCP is divided in 5 steps:

It uses less than 300g of materials and less than 7h of working time.

- Step 1: Extrusion Flow
- Step 2: Flow Management
- Step 3: Cooling Fan
- Step 4: Warpage
- Step 5: Fine Details

Each of these steps has a specific objective and introduces an important concept about the FFF 3D printing process. Each step will also give you the possibility to push your test further for more accurate results.

Polymaker PC materials

| |  |  |  |  |  |
|--------------------------------|---|---|---|---|---|
| | Specialty | Specialty | PolyMax™ | PolyMax™ | PolyLite™ |
| | PC-ABS | PC-PBT | PC-FR | PC | PC |
| Young's modulus (MPa) | 1832 | 1986 | 2634 | 2048 | 2307 |
| Tensile strength (MPa) | 39.9 | 41.8 | 67 | 59.7 | 62.7 |
| Elongation at break (%) | 4.2 | 4.6 | 3.9 | 12.2 | 3.2 |
| Bending modulus (MPa) | 2081 | 1933 | 2518 | 2044 | 2477 |
| Bending strength (MPa) | 66.3 | 64.4 | 96.6 | 94.1 | 100.4 |
| Charpy impact strength (kJ/m²) | 25.8 | 21.4 | 11.7* | 25.1 | 3.4 |

*The flame retardant significantly reduces the toughness of the raw PC material but the composition still provides a good balance between mechanical properties and flame retardant performance.

Note: Tested with 3D printed specimens.

PolyMax™ PC-FR

“FR” stands for Flame Retardant which refers to the substance added to PolyMax™ PC-FR to prevent fires from spreading.

UL 94 is a plastics flammability standard used to measure the material's tendency to either extinguish or spread the flame once the specimen has been ignited.



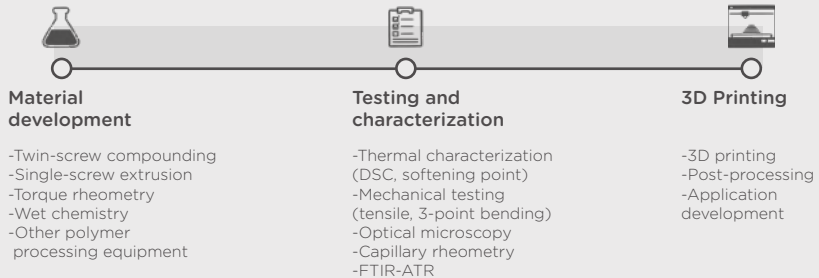
**PolyMax™ PC-FR satisfies UL 94
with the highest grading “V-0”**

Sample thickness 1.5mm:

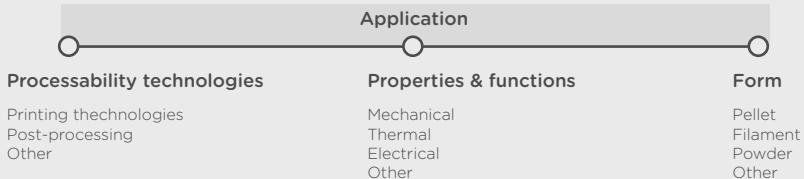
- 1)** None of the five samples can have flaming combustion for more than 10 seconds after each of two 10-second flame applications.
- 2)** Total flaming combustion time for 5 samples may not exceed 50 seconds.
- 3)** None of the five samples may burn with flaming or glowing combustion up to the holding clamp.
- 4)** None of the five samples may drip flaming particles which ignite dry absorbent cotton located 305mm below the sample.
- 5)** None of the five samples may have glowing combustion which persists for more than 30 seconds after the second removal of the flame.

Material Development

If your application requires a specific material that is not yet available in the market, consider our custom development service. With our talented material scientists and application engineers, we are ready to develop the necessary materials to enable your unique application.



Our state-of-the art R&D facilities allow us to engineer materials at different levels and fully optimize them for 3D printing. Our goal is to deliver materials with the right combination of properties/functions, processability and form to suit your needs!



Polymaker products



PolyLite™

PLA
PETG
ABS
PC
ASA



PolyMax™

PLA
PETG
PC
⚙️ PC-FR



PolyFlex™

TPU95



PolyMide™

CoPA
⚙️ PA6-CF
⚙️ PA6-GF



PolyDissolve™

S1
S2



Specialty

PolyWood™
PolySmooth™
PolySupport™
PolyCast™
⚙️ Polymaker™ PC-PBT
⚙️ Polymaker™ PC-ABS



Hardware

PolyBox™
Polysher™

More products
coming soon...

Industrial range: ⚙️

Technologies

JAM-FREE™

Regular PLA



With Jam-Free™



ASH-FREE™

Without Ash-Free™
Ash content: 0.5%



With Ash-Free™
Ash content: 0.003%



WARP-FREE™

Regular Nylon



With Warp-Free™



STABILIZED FOAMING™

Wood



Stabilized Foaming™



LAYER-FREE™

Rough surface



With Layer-Free™



FIBER ADHESION™



NANO-REINFORCEMENT



About Polymaker

Our Values



Customer
Oriented



Responsible



Entrepreneurial



Embracing
Innovation

Mission

Polymaker is committed to lowering the barriers to innovation and manufacturing, by continuously developing advanced 3D printing material technologies for industries and consumers.

Contact us

For any inquiries please contact:

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For technical support please contact:

support@polymaker.com

The information provided in this document is intended to serve as basic guidelines on how particular products can be used. Users can adjust the printing conditions based on their needs and actual situations. It is normal for the product to be used outside of the recommended ranges of conditions. Each user is responsible for determining the safety, lawfulness, technical suitability, and disposal/recycling practices of Polymaker materials for the intended application. Polymaker makes no warranty of any kind, unless announced separately, to the fitness for any particular use or application. Polymaker shall not be made liable for any damage, injury or loss induced from the use of Polymaker materials in any particular application

