

## PolyCore PC-7413

Technical Data Sheet (Ver. 1.1, last updated: Feb, 2025)

PolyCore™ PC-7413 is specially engineered for medium-temperature composite molds & tools applications, supporting autoclave curing at temperature up to 120°C. It has undergone comprehensive validation, demonstrating exceptional performance at every stage of the process. This product features: excellent heat resistance, exceptional printability and cost effectiveness.

### Basic Properties

Property	Testing Method	Typical Value
Density (g/cm <sup>3</sup> at 21.5 °C)	ASTM D792 (ISO 1183, GB/T 1033)	1.36
Melt index (g/10 min)	300 °C, 1.2 kg	18.6
Glass transition temperature (°C)	DSC, 10 °C/min	141
Heat Deflection Temperature (°C)	ISO 75 1.8MPa	136
	0.45MPa	139

### Mechanical Properties<sup>1</sup>

Property	Testing Method	Typical Value
Young's modulus (MPa) (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	4752 ± 175
Tensile strength (MPa) (X-Y)	ASTM D638 (ISO527, GB/T 1040)	74.6 ± 1.9
Elongation at break (%) (X-Y)	ASTM D638 (ISO527, GB/T 1040)	2.39 ± 0.14
Bending modulus (MPa) (X-Y)	ASTM D790 (ISO 178, GB/T 9341)	4939 ± 148
Bending strength (MPa) (X-Y)	ASTM D790 (ISO 178, GB/T 9341)	108.2 ± 2.7
Young's modulus (MPa) (Z)	ASTM D638 (ISO 527, GB/T 1040)	3077 ± 79
Tensile strength (MPa) (Z)	ASTM D638 (ISO527, GB/T 1040)	36.4 ± 1.0
Elongation at break (%) (Z)	ASTM D638 (ISO527, GB/T 1040)	1.2 ± 0.1
Bending modulus (MPa) (Z)	ASTM D790 (ISO 178, GB/T 9341)	3301 ± 33
Bending strength (MPa) (Z)	ASTM D790 (ISO 178, GB/T 9341)	51.6 ± 2.1

1. Tested with the specimens printed under following conditions:  
 Nozzle temperature = 280°C, Nozzle diameter: 8mm, Shell width = 22mm, Layer height = 3mm, Layer time = 105s,  
 Extrusion output = 7kg/h, Room temperature = 28°C, 100% solid specimens.

## Recommended Printing Conditions

Parameter	Recommended Setting
Drying temperature (°C)	100
Drying Time (h)	4
Maximum moisture content (%)	0.1
Barrel – zone 1 temperature (°C)	240
Barrel – zone 2 temperature (°C)	290
Barrel – zone 3 temperature (°C)	290
Nozzle temperature (°C)	280
Bed temperature (°C)	100 - 120
Other Comments	
<ul style="list-style-type: none"> <li>● It is recommended to stop feeding and continue extruding until the extruder is fully empty, if the printing stops in a short term, such as 10-30 min.</li> <li>● It is recommended to stop feeding and continue extruding until the extruder is fully empty, then use polyethylene (PE) to clean the extruder, if the printing stop in a long term, such as several hours. It is helpful to avoid the carbonization of material and keep extruder working in a good condition</li> </ul>	

## Recommended printing parameters

### PolyCore PC-7413:

	Tr = 40°C Width=22mm Height=3mm	Tr = 40°C Width=16mm Height=3mm	Tr = 40°C Width=5mm Height=2mm	Tr = 25°C Width=22mm Height=3mm	Tr = 25°C Width=16mm Height=3mm	Tr = 25°C Width=5mm Height=2mm	Tr = 10°C Width=22mm Height=3mm	Tr = 10°C Width=16mm Height=3mm	Tr = 10°C Width=5mm Height=2mm
Thermal index	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)
0.33	51	47	17.7	38.2	35.2	15	27.9	25.8	12.8
0.43	64.8	59.4	20.6	48.6	44.6	17	35.8	33	14.5
0.57	82.2	68.5	24.3	61.5	56.4	19.7	45.6	41.8	16.3
0.76	94.5	77.7	29.7	77.5	66.2	23	57.6	52.5	18.6
1.00	107.7	89.6	37.2	91.5	74.7	27.2	72.5	64.2	21.5
0.76	125.3	105.2	46.6	103	85.1	34	88.2	71.3	25
0.57	149	126	58.5	119	99	42.3	98.2	80.3	30.5
0.43	186	162.2	74.2	139.5	117	53	112	92	38

#### 1: Definition of each concept

- Layer time: the time spent for depositing one layer of the printed part.
- Thermal index: A metric describing the quality of printing process. A value of 1 represents the optimal process, and deviations from 1 indicate suboptimal printing conditions



- Width: the cross-sectional dimension of the printed layer, perpendicular to the direction of the print nozzle's movement.
- Height: the vertical dimension of the printed object, or the layer thickness during pellet printing.
- Tr: room temperature when starting pellet printing.

2: Above data is inferred based on a melt temperature of 270°C at nozzle exit and a 1m\*1m\*1m square frame model.

3: The simulation condition is based on a closed room without additional air disturbances, and assumes some environment temperature increase.

4: Above data is inferred based on the thermal history simulation software, Dragon, by Helio Additive. It should be used for reference only. For a more detailed analysis, please contact Polymaker.

We recommend using the layer times within the green-highlighted range (i.e., where the thermal index approaches 1) for printing. Different printing parameters correspond to different optimal layer time ranges.

## Disclaimer

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The typical values presented in this data sheet are intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. Actual values may vary significantly with printing conditions. End-use performance of printed parts depends not only on materials, but also on part design, environmental conditions, printing conditions, etc. Product specifications are subject to change without notice.

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