



# FFF Printer Comparison

markforged.com

## Desktop

Reliable entry-level machines. Accurate parts with good surface finish. Prints with standard materials.

## Industrial

Industrial-grade machines with large build envelope and in-chamber sensors for optimized performance. Superior accuracy, resolution, and speed. Full industrial material portfolio.

	Onyx Pro™	Mark Two™	X7™	FX10™	FX20™
<b>Process</b>					
Fused Filament Fabrication	Thermoplastic-based filaments are heated and extruded through a nozzle in discrete layers				
Continuous Fiber Reinforcement	Continuous fibers laid down in-layer, reinforcing FFF infill to aluminum-strength				
<b>Engineering Thermoplastics<sup>3</sup></b>					
Onyx™ (Micro carbon fiber filled nylon)	x	x	x	x	x
Onyx ESD™			x		x
Onyx FR™ <sup>2</sup>			x		x
Nylon		x	x	x	
Precise PLA	x	x	x		
Smooth TPU 95A	x	x	x		
ULTEM™ 9085 Filament <sup>1</sup>					x
Vega™ (Micro carbon fiber filled PEKK)					x
<b>Continuous Fibers<sup>3</sup></b>					
Continuous Fiberglass	x	x	x		x
Continuous Carbon Fiber		x	x	x	x
Continuous Carbon Fiber FR <sup>2</sup>			x		x
High Temperature Carbon Fiber <sup>1</sup>					x
Continuous HSHF Fiberglass		x	x		
Continuous Aramid Fiber (Kevlar®) <sup>4</sup>		x	x		x
<b>Advanced Features</b>					
Out-of-Plastic Detection	x	x	x	x	x
Out-of-Fiber Detection			x	x	x
Fiber Jam Detection	x	x	x	x	x
Adaptive Bed Leveling			x	x	x
Automated Bed Leveling				x	x
Micron Precision Linear Encoders					x
Print Speed (default Z resolution)	1x	1x	1x	3x	3x
Turbo Print Speed	4x	4x	4x	8x	8x
Inspection (compatible)			x	x	
<b>Hardware</b>					
Build Volume	320 x 132 x 154 mm, 6.5 L (12.6 x 5.2 x 6.0 in)		330 x 270 x 200 mm, 17.8 L (13.0 x 10.6 x 7.9 in)	375 x 300 x 300, 33.8 L (14.8 x 11.8 x 11.8 in)	525 x 400 x 400 mm, 84 L (20.7 x 15.7 x 15.7 in)
Print Bed	Flat to within 160 µm; Kinematic coupling Manual shim leveling		Flat to within 80 µm; Kinematic coupling Manual laser-assisted leveling	Heated, Precision-ground aluminum vacuum bed, Auto leveling	Precision ground aluminum vacuum bed Auto leveling
Z Resolution Range	100 - 250 µm		50 - 250 µm	125-250 µm	50 - 250 µm
Build Chamber	Not heated			Heated up to 60°C	Heated up to 200°C
Material Storage	Outboard dry box		Inboard dry box	Humidity controlled material drawer, 4 spool bays	
	800cc spool		800cc spool	800cc spools	800cc or 3200cc spools
Supports	Same material breakaway supports				Same material breakaway supports (Onyx) Dedicated breakaway support (Ultem™ Filament and Vega)
Infill	Closed-cell infill; Multiple geometries available				
<b>Specifications</b>					
Storage	Cloud included; Offline available				
Power	100-240 VAC, 150W (2A peak)			100-120 VAC, 12A or 200-240 VAC, 6A	200-240VAC 3P+E, 24A or 347-416VAC 3P+N+E, 14A; 8 kW
Weight	16 kg (35 lb)		48 kg (106 lb)	109 kg (240 lb)	530 kg (1170 lb)
Footprint	584 x 330 x 355 mm (23 x 13 x 14 in)		584 x 483 x 914 mm (23 x 19 x 36 in)	760 x 640 x 1200 mm (30in x 25in x 46in)	1325 x 900 x 1925 mm (52 x 36 x 76 in)

<sup>1</sup>ULTEM™ and 9085 trademarks are used under license from SABIC, its affiliates or subsidiaries.

<sup>2</sup>Available in -A version with traceability.

<sup>3</sup>Support for all Markforged plastic and fiber materials on the FX20 and FX10 will be added over time, although not every combination.

<sup>4</sup>Dupont™ and Kevlar® are trademarks and registered trademarks of E. I. du Pont de Nemours and Company.