

HP 3D High Reusability (HR) PA 12 S, enabled by Arkema

Ideal for producing premium surface aesthetics with a lower cost per part¹ and high reusability.²

Produce quality parts with premium surface aesthetics

Achieve premium surface aesthetic parts directly from the printer that are up to 70% smoother,³ thanks to unique particle shapes and narrow particle size distribution, which makes it ideal for when exceptionally smooth surfaces are required.

Produce functional prototypes and final parts with fine detail and dimensional accuracy across a variety of industries.

Deliver smooth and accurate molds for clear aligners, ideal for dental applications. No additional post-processing needed to attain clean surfaces and enhanced transparency.

Gain versatility to produce a broad range of parts, including industrial and consumer goods. Extend your reach into lighting, merchandising/promotional items, volume prototyping, jigs and fixtures, and eye-catching covers.



Data courtesy of Bega

Achieve an even lower cost per part¹

Reduce variable cost per part and your total cost of ownership.⁴

Get consistent performance while achieving up to 85% surplus powder reusability with this low reactive material.⁵

Optimize production with HP Multi Jet Fusion technology, which streamlines post-processing to help save time and reduce costs. Minimize tumbling post processing and still achieve smooth end products.



Data courtesy of Decathlon

Minimize waste and embrace recyclability

Maximize powder efficiency with an 85% reusability ratio and optimize usage, allowing for continuous printing and a reduced environmental impact.¹

Embrace a circular economy with Arkema's Virtucycle recycling program. Grant a second life to polymer waste powder and printed parts, fostering sustainability and environmental responsibility.²

Mechanical properties

Test results for HP 3D HR PA 12 S, enabled by Arkema^{i,ii,iii}

This table shows the values that were obtained for HP 3D HR PA 12 S, enabled by Arkema in the HP Jet Fusion 5600 Series 3D Printing Solution with the Balanced PA 12 S print profile and Type I tensile specimens, following the ASTM D638 standard.

	Average (XY)	Average (Z)	Test method
Tensile Strength (MPa) ^{iv}	45	43	ASTM D638
Tensile Modulus (MPa)	1700	1700	ASTM D638
Elongation at yield (%)	10	5	ASTM D638
Elongation at break (%)	12	5	ASTM D638
Impact Strength (kJ/m ²) ^v	2.5	2	ASTM D256
Density (g/cm ³)	0.98		ASTM D792

- i. Based on internal testing and measured using the "HP Half Commercial Datasheet Job". Results may vary with other jobs and geometries.
- ii. Using HP 3D HR PA 12 S, enabled by Arkema material, 15% refresh ratio, Balanced print profile, natural cooling, and measured after bead-blasting with glass beads at 5-6 bars.
- iii. Following all HP recommended printer setup and adjustment processes and printheads aligned using semi-automatic procedure.
- iv. Tensile strength typical variation (95% of parts) falls within the 40-48 MPa range, while tensile modulus values remain within the 1600 to 1900 MPa range.
- v. Using the Izod test method A with notched @ 3.2 mm specimen according to the ASTM D256 standard.

Table 1. Results for HP HR PA 12 S, enabled by Arkema

Dimensional capabilities

Performance results for the HP 3D HR PA 12 S, enabled by Arkema

Testing was performed for HP 3D HR PA 12 S, enabled by Arkema, with a 15% refresh ratio using the PA 12 S Balanced print profile, natural cooling, and measured after bead-blasting with glass beads at 5-6 bars.

This table shows the dimensional tolerances obtained during the characterization for a target process capability^a of $C_{pk} = 1.33$ (4 sigma).

Tolerances for $C_{pk} = 1.33^{i,ii,iii}$ (in mm)	Nominal dimension					
	0 - 30 mm		30 - 50 mm		50 - 80 mm	
	XY	Z	XY	Z	XY	Z
With the general dimensional profile for the HP Jet Fusion 5200 Series 3D Printing Solution	±0.25	±0.42	±0.30	±0.50	±0.37	±0.60

- i. Based on internal testing and measured using the "HP dimensional capability characterization job". Results may vary with other jobs and geometries.
- ii. Using HP 3D HR PA 12 S, enabled by Arkema material, 15% refresh ratio, Balanced PA 12 S print profile, natural cooling, and measured after bead-blasting with glass beads at 5-6 bars.
- iii. Following all HP-recommended printer setup and adjustment processes and printheads aligned using semi-automatic procedure.

Table 2. Dimensional capabilities for HP 3D HR PA 12 S, enabled by Arkema. Target process capability of $C_{pk} = 1.33$



Table 3 shows the dimensional tolerances if the process capability is set to $C_{pk} = 1.00$ (3 sigma).

Tolerances for $C_{pk} = 1.00^{i,ii,iii}$ (in mm)	Nominal dimension					
	0 - 30 mm		30 - 50 mm		50 - 80 mm	
	XY	Z	XY	Z	XY	Z
With the general dimensional profile for the HP Jet Fusion 5200 Series 3D Printing Solution	±0.19	±0.34	±0.23	±0.40	±0.28	±0.47

- i. Based on internal testing and measured using the "HP dimensional capability characterization job". Results may vary with other jobs and geometries.
- ii. Using HP 3D HR PA 12 S, enabled by Arkema material, 15% refresh ratio. Balanced PA 12 S print profile, natural cooling, and measured after bead-blasting with glass beads at 5-6 bars.
- iii. Following all HP recommended printer setup and adjustment processes and printheads aligned using semi-automatic procedure.

Table 3. Dimensional capabilities for HP 3D HR PA 12 S, enabled by Arkema. Target process capability of $C_{pk} = 1.00$

Ordering information*

Product number	Material
910J7A	HP 3D HR PA 12 S, enabled by Arkema, 300 L/170 kg material
9V508A	HP 3D HR PA 12 S, enabled by Arkema, 1,220 L/500 kg material

Table 4. Ordering information for HP 3D HR PA 12 S, enabled by Arkema.

* Only available for the HP Jet Fusion 5600 3D Printing Solution and the HP Jet Fusion 5200 3D Printing Solution, and the HP Jet Fusion 5000 3D Printer.



Based on internal HP testing, you can achieve zero waste by applying all the fresh materials added to the system to the final printed parts (starting at 85% reusability ratio and 7% packing density).
With HP 3D HR PA 12 S, enabled by Arkema, using Balanced print mode, printed part density doubles powder density, optimizing powder usage for continuous printing (requiring a fresh material ratio that's twice the input packing density).

Recycling program from Arkema. Available in Europe and US. Check Arkema's website for more information.

Based on internal HP testing for Linear Surface roughness (Ra), HP tested 5 copies using HP 3D HR PA12, enabled by Evonik, and HP 3D HR PA12 S, enabled by Arkema (both using Balanced print mode), with the HP Jet Fusion 5200 series 3D Printing Solution and post-processed with sandblasting. Tested all 5 faces of the printed part.

Cost analysis based on standard solution configuration price, supplies price, and maintenance costs recommended by HP, comparing HP 3D HR PA12, enabled by Evonik and HP 3D HR PA12 S, enabled by Arkema (both using Balanced print mode) and power reusability recommended by HP. Cost criteria: printing 5 full builds per week, 220 working days per year, 36 cc part volume, 7% packing density, and 80 parts per build.

HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability PA 12 S, enabled by Arkema, provide up to 85% powder reusability ratio, producing functional parts batch after batch. For testing, material is aged in real printing conditions and powder is tracked by generations (worst case for reusability). Parts are then made from each generation and tested for mechanical properties and accuracy.

