HP 3D High Reusability PA 12

Strong, lowest cost,[1] quality parts

Produce strong, functional, detailed complex parts

- Robust thermoplastic produces high-density parts with balanced property profiles and strong structures.
- Provides excellent chemical resistance to oils, greases, aliphatic hydrocarbons, and alkalies.[2]
- Ideal for complex assemblies, housings, enclosures, and watertight applications.
- Biocompatibility certifications—meets USP Class I-VI and US FDA guidance for Intact Skin Surface Devices.[3]

Quality at the lowest cost per part[1]

- Achieve the lowest cost per part[1] and reduce your total cost of ownership.[4]
- Minimize waste—reuse surplus powder batch after batch and get functional parts, no throwing away anymore.[5]
- Get consistent performance while achieving 80% surplus powder reusability.[6]
- Optimize cost and part quality—cost-efficient material with industry-leading surplus powder reusability.[5]

Engineered for HP Multi Jet Fusion technology

- Designed for production of functional parts across a variety of industries.
- Provides the best balance between performance and reusability.[7]
- Achieves watertight properties without any additional post-processing.
- Engineered to produce final parts and functional prototypes with fine detail and dimensional accuracy.

Picture taken after graphite post-processing

For more information, please visit
hp.com/go/3DMaterials

Technical specifications[8]

Category	Measurement	Value	Method
General properties	Powder melting point (DSC)	187°C/369°F	ASTM D3418
	Particle size	60 µm	ASTM D3451
	Bulk density of powder	0.425 g/cm³/0.015 lb/in³	ASTM D1895
	Density of parts	1.01 g/cm³/0.036 lb/in³	ASTM D792
Mechanical properties	Tensile strength, max load,[9] XY, XZ, YX, YZ	48 MPa/6960 psi	ASTM D638
	Tensile strength, max load,[9] ZX, ZY	48 MPa/6960 psi	ASTM D638
	Tensile modulus,[9] XY, XZ, YX, YZ	1800 MPa/261 ksi	ASTM D638
	Tensile modulus,[9] ZX, ZY	1800 MPa/261 ksi	ASTM D638
	Elongation at break,[9] XY, XZ, YX, YZ	20%	ASTM D638
	Elongation at break,[9] ZX, ZY	15%	ASTM D638
	Flexural strength (@ 5%),[10] XY, XZ, YX, YZ	70 MPa/10150 psi	ASTM D790
	Flexural strength (@ 5%),[10] ZX, ZY	70 MPa/10150 psi	ASTM D790
	Flexural modulus,[10] XY, XZ, YX, YZ	1800 MPa/261 ksi	ASTM D790
	Flexural modulus,[10] ZX, ZY	1800 MPa/261 ksi	ASTM D790
	Izod impact notched (@ 3.2 mm, 23°C), XY, XZ, YX, YZ	3.6 kJ/m²	ASTM D256 Test Method A
	Izod impact notched (@ 3.2 mm, 23°C), ZX, ZY	3.5 kJ/m²	ASTM D256 Test Method A
	Shore Hardness D, XY, XZ, YX, YZ, ZX, ZY	80	ASTM D2240
Thermal properties	Heat deflection temperature (@ 0.45 MPa, 66 psi), XY, XZ, YX, YZ	175°C/347°F	ASTM D648 Test Method A
	Heat deflection temperature (@ 0.45 MPa, 66 psi), ZX, ZY	175°C/347°F	ASTM D648 Test Method A
	Heat deflection temperature (@ 1.82 MPa, 264 psi), XY, XZ, YX, YZ	95°C/203°F	ASTM D648 Test Method A
	Heat deflection temperature (@ 1.82 MPa, 264 psi), ZX, ZY	95°C/203°F	ASTM D648 Test Method A
Reusability	Refresh ratio for stable performance	20%	
Accuracy	Dimensional accuracy	±0.2 mm/0.008 inches to ±0,2%[11]	
Recommended environmental conditions	Recommended relative humidity	50-70% RH	
Certifications	USP Class I-VI and US FDA guidance for Intact Skin Surface Devices, RoHS,[12] EU REACH, PAHs, UL 94, UL 746A , Statement of Composition for Toy Applications		

Ordering Information

	HP 3D High Reusability PA 12	HP 3D High Reusability PA 12	HP 3D High Reusability PA12 Production Material	HP 3D High Reusability PA12[13]
Product number	V1R10A	V1R16A	V1R34A	V1R20A
Weight	13 kg/28.7 lb	130 kg/286.7 lb	130 kg/286.7 lb	600 kg/1322.8 lb
Capacity	30L[14]	300L[14]	300L[14]	1400L[14]
Dimensions (xyz)	600 x 333 x 302 mm	800 x 600 x 1205 mm	800 x 600 x 1205 mm	1143 x 1143 x 1500 mm
Printer compatibility	HP Jet Fusion 3D 4210/4200 Printing Solution	HP Jet Fusion 3D 4210/4200 Printing Solution	HP Jet Fusion 3D 4210 Printing Solution	HP Jet Fusion 3D 4210 Printing Solution
Fast cooling compatibility	Compatible	Compatible	Compatible	Compatible

Eco Highlights

- Powders and agents are not classified as hazardous[15]
- Cleaner, more comfortable workplace—enclosed printing system, and automatic powder management[16]
- Minimizes waste due to industry-leading reusability of powder[17]

Find out more about HP sustainable solutions at hp.com/ecosolutions

Dynamic security enabled printer. Only intended to be used with cartridges using an HP original chip. Cartridges using a non-HP chip may not work, and those that work today may not work in the future. More at: hp.com/go/learnaboutsupplies.

Learn more at
hp.com/go/3DMaterials

1. Based on internal testing and public data for solutions on market as of April, 2016. Cost analysis based on: standard solution configuration price, supplies price, and maintenance costs recommended by manufacturer. Common cost criteria: using HP 3D High Reusability PA 12 material, and the powder reusability ratio recommended by manufacturer. HP Jet Fusion 3D 4200 Printing Solution average printing cost per part is half the average cost of comparable fused deposition modeling (FDM) and selective laser sintering (SLS) printer solutions from $100,000 to $300,000 USD. Cost criteria: printing 1 build chamber per day/5 days per week over 1 year of 30 cm³ parts at 10% packing density. HP Jet Fusion 3D 4210 Printing Solution average printing cost per part is 65% lower versus the average cost of comparable FDM and SLS printer solutions from $100,000 to $300,000 USD and is 50% lower versus the average cost of comparable SLS printer solutions for $300,000 to $450,000 USD. Cost criteria: printing 1.4 full build chambers of parts per day/5 days per week over 1 year of 30 cm³ parts at 10% packing density on fast print mode.
2. Tested with diluted alkalies, concentrated alkalies, chlorine salts, alcohol, ester, ethers, ketones, aliphatic hydrocarbons, unleaded petrol, motor oil, aromatic hydrocarbons, toluene, and DOT 3 brake fluid.
3. Based on HP internal testing, June 2017, HP 3D600 Fusing and Detailing Agents and HP 3D High Reusability PA 12 powder meet USP Class I-VI and US FDA's guidance for Intact Skin Surface Devices. Tested according to USP Class I-VI including irritation, acute systemic toxicity, and implantation; cytotoxicity per ISO 10993-5, Biological evaluation of medical devices–part 5: Tests for in vitro cytotoxicity; and sensitization per ISO 10993-10, Biological evaluation of medical devices–Part 10: Tests for irritation and skin sensitization. It is the responsibility of the customer to determine that its use of the fusing and detailing agents and powder is safe and technically suitable to the intended applications and consistent with the relevant regulatory requirements (including FDA requirements) applicable to the customer's final product. For more information, see www.hp.com/go/biocompatibilitycertificate/PA12.
4. Compared to selective laser sintering (SLS) and fused deposition modeling (FDM) technologies, HP Multi Jet Fusion technology can reduce the overall energy requirements needed to attain full fusing and reduce the system requirements for large, vacuum-sealed ovens. In addition, HP Multi Jet Fusion technology uses less heating power than SLS systems for better material properties and material reuse rates, minimizing waste.
5. Based on using recommended packing densities and compared to selective laser sintering (SLS) technology, offers excellent reusability without sacrificing mechanical performance. Tested according to ASTM D638, ASTM D256, ASTM D790, and ASTM D648 and using a 3D scanner for dimensional accuracy. Testing monitored using statistical process controls.
6. HP Jet Fusion 3D printing solutions using HP 3D High Reusability PA 12 provide 80% post-production surplus powder reusability, producing functional parts batch after batch. For testing, material is aged in real printing conditions and powder is tracked by generations (worst case for recyclability). Parts are then made from each generation and tested for mechanical properties and accuracy.
7. Compared to selective laser sintering (SLS) technology. Tested according to ASTM D638, ASTM D256, ASTM D790, and ASTM D648.
8. The following technical information should be considered representative of averages or typical values and should not be used for specification purposes. These values are with FW TATDAG_15_18_11.69 and have been obtained from a sample of specimens printed in plots with 6% packing density. Separation between specimens in the plot was 10 mm. Modulus has been calculated using the slope of the regression line between 0.05% and 0.25% strain measured with an automatic extensometer during the entire test. Cross-section dimension measures using a micrometer with round ends. Conditioning according to ASTM D618 Procedure A. Testing conducted 48 hours after printing and unpacking of the parts at 23°C/73°F and 50% RH. Orientations defined according to ASTM F2971.
9. Test results realized under the ASTM D638 with a test rate of 10 mm/min, specimens type V.
10. Test results realized under ASTM D790 Procedure B at a test rate of 13.55 mm/min.
11. Dimensional accuracy of ±0.2 mm/0.008 inches on XY for hollow parts below 100 mm/3.94 inches and ±0.2% for hollow parts over 100 mm/3.94 inches, using HP 3D High Reusability PA 12 material, measured after sandblasting.
12. RoHS certification for EU, Bosnia-Herzegovina, China, India, Japan, Jordan, Korea, Serbia, Singapore, Turkey, Ukraine, Vietnam.
13. Additional material management equipment is required.
14. Liters refers to the materials container size and not the actual materials volume. Materials are measured in kilograms.
15. The HP powder and agents do not meet the criteria for classification as hazardous according to Regulation (EC) 1272/2008 as amended.
16. Compared to manual print retrieval process used by other powder-based technologies. The term "cleaner" does not refer to any indoor air quality requirements and/or consider related air quality regulations or testing that may be applicable.
17. Compared to PA 12 materials available as of June, 2017. HP Jet Fusion 3D printing solutions using HP 3D High Reusability PA 12 provide 80% post-production surplus powder reusability, producing functional parts batch after batch.

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