

HP 3D High Reusability (HR) PA 12 Glass Beads

with the HP Jet Fusion 5200 Series 3D Printing Solution



Data courtesy of Nacar and Prometal3D

HP 3D High Reusability
PA 12 Glass Beads—
ideal for producing stiff,
dimensionally stable,
quality parts

Produce stiff, functional parts

- 40% glass bead-filled thermoplastic material with both optimal mechanical properties and high reusability¹
- Provides dimensional stability along with repeatability²
- Ideal for applications requiring high stiffness, like enclosures and housings, fixtures and tooling

Quality and high reusability¹

- Less waste—reuse surplus powder batch after batch and get functional parts without throwing away the excess anymore¹
- Get consistent performance while achieving up to 70% surplus powder reusability³
- Glass beads come from recycled glass
- Optimize cost and part quality—cost-efficient material with high surplus powder reusability¹

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 reusability⁴
- Engineered to produce common glass bead applications with fine detail and dimensional accuracy

General properties

	Value	Method
Powder melting point (DSC) (°C / °F)	186 / 367	ASTM D3418
Particle size (µm)	58	ASTM D3451
Bulk density of powder (g/cm ³ / lb/in ³)	0.48 / 0.017	ASTM 1895

Mechanical properties

This table shows the values that were obtained for HP 3D HR PA 12 GB in the HP Jet Fusion 5200 Series 3D Printing Solution with PA 12 GB Balanced print profile and Type I tensile specimens, following the ASTM D638 standard. In this case heat deflection temperature was characterized in a separate job configured for this purpose using a standard bar specimen according to the ASTM D648 standard.

HP 3D HR PA12 GB ^{i,ii,iii}	Axis	Average value	Method
Tensile Strength (MPa) ^{iv,v}	XY	31	ASTM D638
	Z	30	
Tensile Modulus (MPa) ^{iv,v}	XY	2900	ASTM D638
	Z	3000	
Heat deflection temperature [@0.45 MPa, 66 psi] (°C) ^{vi}	XY	170	ASTMD648
	Z	172	
Heat deflection temperature [@ 1.82 MPa, 264 psi] (°C) ^{vi}	XY	113	ASTMD648
	Z	118	
Elongation at Yield (%) ^v	XY	8	ASTM D638
	Z	4	
Elongation at Break (%) ^v	XY	9	ASTM D638
	Z	5	
Impact strength (kJ/m ²) ^{vii}	XY	3	ASTMD256
	Z	3	
Density (g/cm ³)	XY	1.3	ASTMD792
	Z	1.3	

- 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 GB material, 30% 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 28-32 MPa range, while tensile modulus values remain within the 2600 to 3200 MPa range.
 v. Tensile test type I specimens measured with a pulling speed of 5 mm/min to comply with ASTM D638 test standards.
 vi. Using a standard bar specimen measuring 5" x ½" x ¼" in accordance with ASTM D648.
 vii. Using the Izod test method A with notched @ 3.2 mm specimen according to the ASTM D256 standard.

Dimensional capabilities

Testing was performed for HP 3D HR PA 12 Glass Beads with a 30% refresh ratio using the PA 12 Glass Beads 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 of Cp_k= 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 default setting for HP Jet Fusion 5200 Series 3D Printing Solutions	±0.31	±0.43	±0.35	±0.71	±0.39	±1.16

- 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 Glass Beads material, 30% refresh ratio, PA12 Glass Beads 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.

This table shows the dimensional tolerances if the process capability target 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 default setting for HP Jet Fusion 5200 Series 3D Printing Solutions	± 0.27	± 0.33	± 0.30	± 0.56	± 0.32	± 0.89

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 Gloss Beads material, 30% refresh ratio, PA12 Gloss Beads Balanced print profile, natural cooling, and measured after bead-blasting with gloss beads at 5-6 bars.
 iii. Following all HP recommended printer setup and adjustment processes and printheads aligned using semi-automatic procedure.

Ordering information*

Product number	Material
V1R23A	HP 3D HR PA 12 GB 1400L/700 kg Material
V1R22A	HP 3D HR PA 12 GB 300L/150 kg Material
V1R35A	HP 3D HR PA 12 GB 300L/150 kg P Material

*Compatible with the HP Jet Fusion 5200 Series 3D Printing Solution and the HP Jet Fusion 5000 3D Printer.

Safety datasheet*

Product number	Link to Safety Datasheet
V1R23A	HP 3D HR PA 12 GB 1400L/700 kg Material
V1R22A	HP 3D HR PA 12 GB 300L/150 kg Material
V1R35A	HP 3D HR PA 12 GB 300L/150 kg P Material

*The link provided refer to US English version of the Safety Datasheet.

Other country specific Safety Datasheets are available [here](#).

If you need more information please contact your HP AM representative.



1. Based on using recommended packing densities, offers high reusability of surplus powder. Liters refers to the materials container size and not the actual materials volume. Materials are measured in kilograms.
2. Testing according to ASTM D638, ASTM D256, and ASTM D648 with a 3D scanner for dimensional stability. Testing monitored using statistical process controls.
3. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability PA 12 Glass Beads provide up to 70% 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.
4. Compared to selective laser sintering (SLS) technology. Based on running a scan on the 3D Printing part to measure and compare with the original STL file (using GOM software). 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.

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