



MJF - PA12 GF / GB

Schwarz gefärbtes glaskugelgefülltes Polyamid

HP Multi Jet Fusion

HP Multi Jet Fusion (kurz: MJF) ist eine Technologie auf Pulverbasis, für die kein Laser erforderlich ist. Eine wärmeleitende Flüssigkeit wird eingespritzt, wenn Partikel selektiv geschmolzen werden müssen. Um für scharfe Kanten und eine gute Oberflächenqualität zu sorgen, wird eine wärmehemmende Flüssigkeit um die Konturen gespritzt. Durch Infrarot-Leuchtmittel, welches sich über die Oberfläche des Pulverbettes bewegt, nimmt das eingespritzte Material Wärme auf und es entsteht eine verschmolzene Schicht. Beim HP Multi Jet Fusion-Verfahren wird ein feinkörniges PA 12 GF / GB - Material verwendet, das mit einer Schichtdicke von 80 Mikrometern gedruckt wird. Dadurch entstehen Teile mit hoher Dichte und geringer Porosität im Vergleich zu lasergesinterten Bauteilen.

Materialeigenschaften

Das schwarz gefärbte Polyamid PA12 GF / GB hat eine leicht-raue, im ungefärbten Zustand eine steingrau-farbene Oberfläche und lässt sich durch geringe Vorlaufzeiten ideal für funktionale Prototypen und Serien von einsatzfähigen Bauteilen verwenden. Die Oberfläche erfordern für die meisten Anwendungen keine weiteren Bearbeitungen, für glattere Flächen können die Bauteile jedoch gleitgeschliffen oder chemisch geglättet werden. Die Bezeichnung „GF“ / GB“ steht für „**G**las-Filled / **G**las **B**eads“.

Das Material besteht zu 40 % aus Glasperlen und bietet damit optimale mechanische Eigenschaften. Es ist zudem sehr formstabil und abriebfest. PA12 GB / GF eignet sich hervorragend für Anwendungen, die eine hohe Steifigkeit erfordern, z. B. für Abdeckungen und Gehäuse, Befestigungen und Werkzeuge. Eine hohe chemische Beständigkeit gegenüber Alkohol, Benzin, Fetten, Ölen und Reinigungsmitteln ist gegeben.

Flammschutz

PA12 GF / GB ist als ein nicht leicht brennbarer Feststoff gemäß Entflammbarkeitsverordnung (EG) Nr. 440 eingestuft. Des Weiteren liegt eine Zertifizierung nach UL 94 und UL 746A vor (siehe Anhang).

Kontakt mit Lebensmittel

Die Bauteile sollten nicht für Lebensmittelanwendungen oder direkten und indirekten Lebensmittelkontakt verwendet werden.

Thermische Eigenschaften

Prüfung	Einheit	Wert	Methode
Wärmeformbeständigkeit (0,45 MPa)	°C	172	ASTM D648
Wärmeformbeständigkeit (1,82 MPa)	°C	120	ASTM D648
Schmelzpunkt Pulver	°C	186	ASTM D3418

Mechanische Eigenschaften

Prüfung	Einheit	Wert	Methode
Zugfestigkeit- XY	MPa	30	ASTM D638
Zugfestigkeit- Z	MPa	29	ASTM D638
Bruchdehnung - XY	%	10	ASTM D638
Bruchdehnung - Z	%	5	ASTM D638
Zugmodul - XY, XZ, YX, YZ	MPa	2600	ASTM D638
Zugmodul - ZX, XY	MPa	3000	ASTM D638
Biegefestigkeit (bei 5 %) - XY, XZ, YX, YZ	MPa	57,5	ASTM D790
Biegefestigkeit (bei 5 %) - ZX, XY	MPa	65	ASTM D790
Biegemodul - XY, XZ, YX, YZ	MPa	2400	ASTM D790
Biegemodul - ZX, XY	MPa	2700	ASTM D790
Izod Kerbschlagzähigkeit (23°C)	kJ/m ²	3,0	ASTM D256
Dichte (gefertigt)	g/cm ³	1,3	ASTM D792
Shore-Härte D, XY, XZ, YX, YZ, ZX, ZY	D	82	ASTM D2240

Datenblatt (Stand Mai 2020)

MJF - PA12 GF / GB

Schwarz gefärbtes glaskugelgefülltes Polyamid



rapidobject[®]
ideenzumanfassen

Preisbeispiel

Bauteilbezeichnung:	Zahnrad
Größe:	38 x 38 x 8 mm
Volumen:	ca. 5 cm ³
Preis:	28,56 €
	<small>Inkl. MwSt., zzgl. Versandkosten</small>



MJF - PA12 GF / GB

Schwarz gefärbtes glaskugelgefülltes Polyamid



rapidobject[®]
ideenzumanfassen



HP 3D High Reusability PA 12 Glass Beads¹ Plastics for Additive Manufacturing UL 94 and UL 746A Certification Technical Note

HP 3D High Reusability PA 12 Glass Beads with HP 3D600/3D700/3D710 Fusing and Detailing Agents has been certified by UL according to the UL 94 Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances testing and the UL 746A Standard for Polymeric Materials to measure Short Term Property Evaluations, and has obtained the corresponding UL Plastics for Additive Manufacturing Certificate (Blue Card), currently published on the UL IQ™ database.

Blue Card

UL 94 certification serves as a preliminary indication of a plastic's acceptability for use as part of a device or appliance with respect to its flammability. The standard determines the material's tendency to either extinguish or spread the flame once the specimen has been ignited.

Additionally, the Blue Card also provides **UL 746A** Certification information, which covers short-term test procedures for the evaluation of materials used for parts intended for specific applications in electrical end products.

The flammability degree obtained and certified by UL is **HB** at a **0.75 mm thickness** for all the orientations tested, thus being the thinnest 3D printing plastic material, along with HP 3D High Reusability PA 12, that UL has certified as HB when the Blue Card was obtained.² This means that the material tolerates slow burning on a horizontal position (at a burning rate ≤ 75 mm/min for thicknesses < 3 mm or burning stops before 100 mm). With this rating, HP 3D High Reusability PA 12 Glass Beads¹ can target any application that is not exposed to flame hazard.

Electric conductivity behavior of the material, obtained and certified according to the **UL 746A** standard, indicates that the HP 3D High Reusability PA 12 Glass Beads material is insulating against electric conductivity, with **Dielectric strength** values obtained of **3.38 kV/mm³** and **7.29 kV/mm⁴** depending on orientation and **Volume Resistivity** values of **10¹⁴ ohm-cm**.

White Card: Additional testing

The White Card, an extension at the bottom of a Blue Card, displays and certifies additional information related to materials performance evaluated using international standards.

In particular, Glow Wire Ignition Testing, Glow Wire Flammability Index, and IEC Ball Pressure have been included in the White Card for HP 3D High Reusability PA 12 Glass Beads.¹

MJF - PA12 GF / GB

Schwarz gefärbtes glaskugelgefülltes Polyamid



rapidobject[®]
ideenzumanfassen

Glow Wire Ignition and Flammability testing has been performed on the material.¹

The results obtained certify that the material can resist exposure to a range of 650° C to 725° C¹ depending on the orientation, dimension, and thickness of the part. The fact that this material with a Glow Wire rating ranges between these values means that, at a minimum thickness, it can be considered acceptable when application requirements specify temperatures below this number. For example, in those cases when requirements specify a minimum temperature of 550° C.²

Finally, the **IEC Ball Pressure** or abnormal heat resistance test has delivered a result of **170° C**, which is acceptable and above the required temperature in those cases when the application requirement states that 75° C or 125° C are considered acceptable.

Based on these results, UL certifies that similar articles made from this material,¹ under the same conditions of printing, will meet the performance obtained as per the UL 94 and UL 746A tests. This performance is verified by UL annually to certify that both the material¹ and the additive manufacturing process conditions provide the same performance stated in the Blue Card and White Card published in the UL IQ™ database.

It is the responsibility of each customer to determine that its use of HP 3D High Reusability PA 12 Glass Beads powder and HP 3D600/3D700/3D710 Fusing and Detailing Agents are safe and technically suitable to the customer's intended applications and consistent with the relevant regulatory requirements applicable to the customer's final product. Customers should conduct their own testing to ensure that this is the case.

For additional information about HP 3D High Reusability PA 12 Glass Beads, please contact our HP 3D Printing Materials team at 3dmaterials@hp.com.

To see the UL Blue Card and White Card certificates, please visit <http://iq.ul.com/ul/cert.aspx?ULID=103651195>.

-
1. Testing performed for HP 3D High Reusability PA 12 Glass Beads and HP 3D600/3D700/3D710 Fusing and Detailing Agents with HP Jet Fusion 3D 4210 and 4200 Printing Solutions. Samples were prepared with up to maximum 80% reused powder. Reuse of the material could be up to 20 times. HP considers the samples representative of the printing process.
 2. UL Blue Card and White Card for HP 3D High Reusability PA 12 Glass Beads and HP 3D600/3D700/3D710 Fusing and Detailing Agents published in the UL IQ™ QMTC2 Plastics for Additive Manufacturing Database in April, 2018.
 3. Results obtained with specimens printed in horizontal orientations.
 4. Results obtained with specimens printed in vertical orientations.

© Copyright 2018 HP Development Company, L.P.

Nothing herein should be construed as constituting an additional warranty. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services and/or in a written agreement between you and HP. HP believes that the information herein is correct based on the current state of scientific knowledge and as the date of its publication, however, to the maximum extent permitted by law HP EXPRESSLY DISCLAIMS ANY REPRESENTATIONS AND WARRANTIES OF ANY KIND, WHETHER EXPRESS OR IMPLIED, AS TO THE ACCURACY, COMPLETENESS, NON-INFRINGEMENT, MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE (EVEN IF HP IS AWARE OF SUCH PURPOSE) WITH RESPECT TO ANY INFORMATION PROVIDED. Except to the extent that exclusion is prevented by law, HP shall not be liable for technical or editorial errors or omissions, and damages or losses of any kind or nature that result from the use of or reliance upon this information, which is subject to change without notice. The HP Jet Fusion 3D products have not been designed, manufactured or tested by HP for compliance with legal requirements for specific 3D printed parts and their uses, and recipients are responsible for determining the suitability of HP Jet Fusion 3D products for their uses, ensuring compliance with applicable laws and regulations, and being aware that other safety or performance considerations may arise when using, handling or storing the product.

4AA7-3009ENW, May 2018

This is an HP Indigo digital print.

