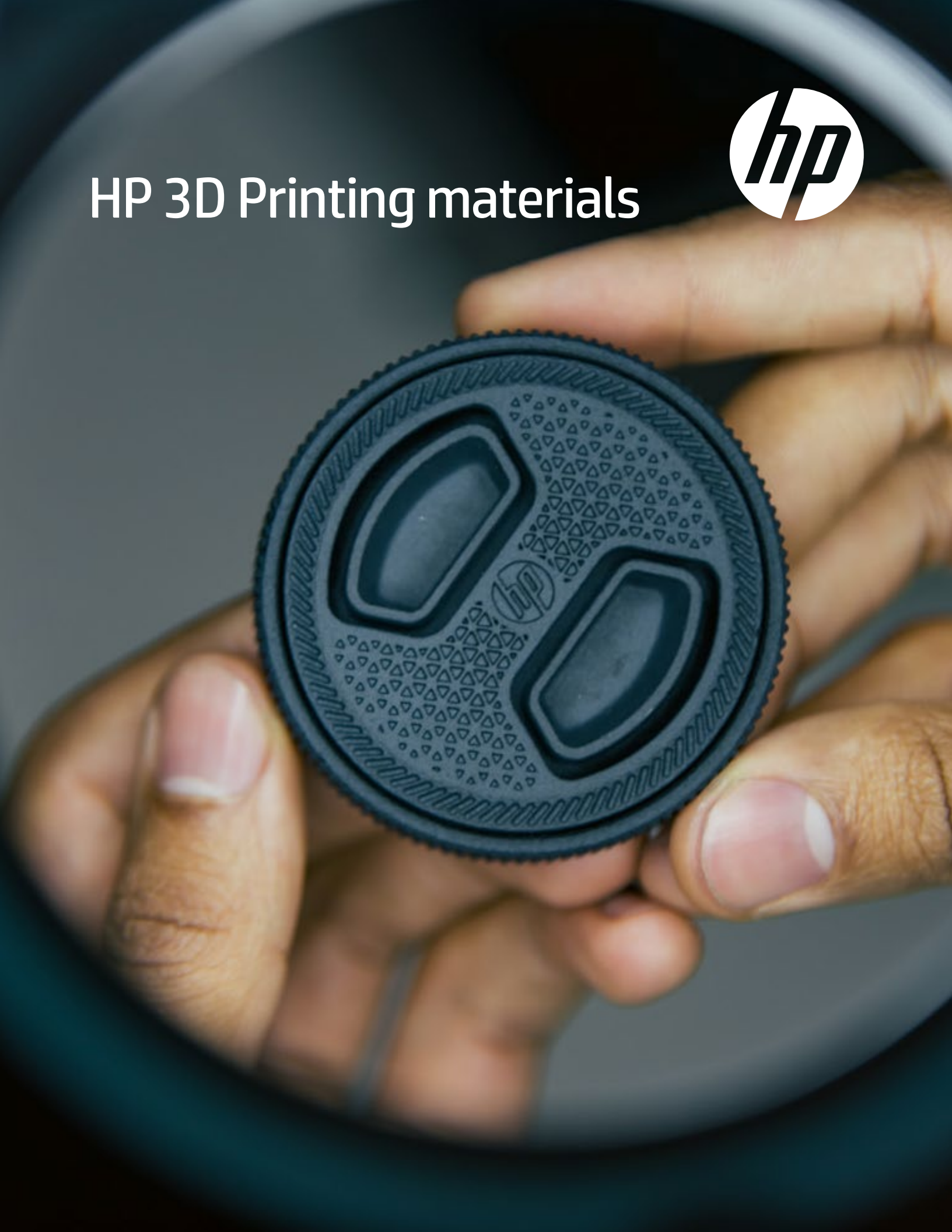
HP 3D Printing materials



Breaking down barriers to 3D printing adoption through materials innovation

Leading the charge into a new era of digital manufacturing, HP 3D Printing solutions are providing new opportunities for businesses and industries. HP Multi Jet Fusion technology disrupts the status quo with a solution that can transform part properties voxel by voxel—enabling a future of limitless applications, materials, and colors. Imagine a future where we can produce "Smart Parts" with embedded electronics and integrated traceability and intelligence. Materials innovation is at the heart of making this vision a reality.

To help your business get ready for a future era of digital manufacturing, HP is working hard to enable new materials innovations that break down some of the traditional barriers to 3D printing adoption—cost, quality, performance, and diversity. HP is doing this through a growing portfolio of HP-branded powders and Materials Certified for HP Jet Fusion 3D Printing.

Data courtesy of nicetrails.com

HP 3D Printing materials for HP Jet Fusion 5200/4200 Series 3D Printing Solutions

In addition to our flagship material, HP 3D High Reusability PA 12, HP is growing its portfolio of thermoplastics. Powders such as HP 3D High Reusability PA 12 Glass Beads and HP 3D High Reusability PA 11, deliver optimal mechanical properties. Engineered for HP Multi Jet Fusion technology, these materials test the limits of functional part creation, optimizing cost and part quality, while also delivering high[1] and, in many cases, industry-leading reusability[2] at a low cost per part.[3] Our latest addition to the portfolio, HP 3D High Reusability PP enabled by BASF,[4] provides our best value HP 3D material and delivers consistent performance with up to 100% surplus powder reusability.[5] We've also added HP 3D High Reusability TPA enabled by Evonik[6] that produces flexible and lightweight[7] parts with enhanced rebound resilience with an easy-to-process elastomer, with high part uniformity.

HP 3D High Reusability PA 11— ideal for producing ductile,[8] quality parts

Produce strong, ductile,[8] functional parts

- Thermoplastic material delivering optimal mechanical properties
- Provides excellent chemical resistance[9] and enhanced elongation-at-break[8]
- Impact resistance and ductility[8] for prostheses, insoles, sports goods, snap fits, living hinges, and more
- Biocompatibility—meets USP Class I-VI and US FDA guidance for Intact Skin Surface Devices[10]

Minimize waste with a renewable raw material[11]

- Renewable raw material from vegetable castor oil (reduced environmental impact)[11]
- Minimize waste—reuse surplus powder batch after batch and get functional parts, no throwing away anymore[2]
- Get consistent performance while achieving up to 70% surplus powder reusability[12]
- Optimize cost and part quality—cost-efficient material with industry-leading surplus powder reusability[2]

Engineered for HP Multi Jet Fusion technology

- Designed for production of functional and final parts across a variety of industries
- Provides the best balance between performance and reusability[13]
- Easy-to-process material enables high productivity and less waste[14]
- Engineered to reliably produce final parts and functional prototypes with fine detail, dimensional accuracy

Data courtesy of OT4 Orthopädietechnik GmbH

Data courtesy of Bowman - Additive Production

	Value	Method
Powder melting point (DSC)	202° C 396° F	ASTM D3418
Particle size	54 µm	ASTM D3451
Bulk density of powder	0.48 g/cm³ 0.017 lb/in³	ASTM D1895

HP 3D High Reusability PA 12—
ideal for producing strong, low-cost,[3] quality parts

Produce strong, functional, detailed complex parts

- Robust thermoplastic produces high-density parts with balanced property profiles and strong structures
- Provides good chemical resistance to oils, greases, aliphatic hydrocarbons, and alkalies[9]
- Ideal for complex assemblies, housings, enclosures, and watertight applications
- Biocompatibility—meets USP Class I-VI and US FDA guidance for Intact Skin Surface Devices[10]

Quality at a low cost per part[3]

- Achieve a low cost per part[3] and reduce your total cost of ownership[15]
- Minimize waste—reuse surplus powder batch after batch and get functional parts, no throwing away anymore[2]
- Get consistent performance while achieving up to 80% surplus powder reusability[16]
- Optimize cost and part quality—cost-efficient material with industry-leading surplus powder reusability[2]

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[17]
- Achieves watertight properties without any additional post-processing
- Engineered to produce final parts and functional prototypes with fine detail and dimensional accuracy

Data courtesy of Invent Medical

Data courtesy of Skorpion Engineering Srl

	Value	Method
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

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 reusability[1]
- Provides dimensional stability along with repeatability[18]
- Ideal for applications requiring high stiffness like enclosures and housings, fixtures and tooling

Quality and high reusability[1]

- Less waste—reuse surplus powder batch after batch and get functional parts, no throwing away anymore[1]
- Get consistent performance while achieving up to 70% surplus powder reusability[19]
- Optimize cost and part quality—cost-efficient material with high surplus powder reusability[1]

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[20]
- Engineered to produce common glass bead applications with detail and dimensional accuracy

Data courtesy of Prometal3D

	Value	Method
Powder melting point (DSC)	186° C 367° F	ASTM D3418
Particle size	58 µm	ASTM D3451
Bulk density of powder	0.48 g/cm³ 0.017 lb/in³	ASTM D1895

HP 3D High Reusability PP enabled by BASF[4]—
ideal for producing chemical resistant,[21] weldable, low moisture absorption, functional parts

Genuine, functional PP parts

- Get the same properties as many commonly used PPs with this genuine polypropylene material
- Accelerate your product development process using the same prototyping material as the final part
- Biocompatibility—meets ISO 10993 and US FDA Intact Skin Surface Devices Statements[10]

Chemical resistance,[21] low moisture absorption

- Excellent chemical resistance and low moisture absorption ideal for piping or fluid systems and containers[21]
- Outstanding welding capabilities with other PP parts produced with traditional methods like injection molding
- Versatile material ideal for a wide range of automotive, industrial, consumer goods, medical[10] applications

Lowest cost HP 3D material for HP Multi Jet Fusion

- Our best value HP 3D material delivers consistent performance with up to 100% surplus powder reuse[5]
- Provides the optimal balance between performance and cost[22]
- Easy-to-process material enables high productivity and less waste[23]

Printed with HP 3D High Reusability PP enabled by BASF

	Value	Method
Powder melting point (DSC)	138° C 280° F	ASTM D3418
Particle size	62 µm	ASTM D3451
Bulk density of powder	0.34 g/cm³ 0.012 lb/in³	ASTM D1895

HP 3D High Reusability TPA enabled by Evonik[6]—
ideal for producing easy-to-process, flexible, lightweight[7] parts

Flexible and lightweight[7] parts with enhanced rebound resilience

- Enhanced rebound resilience and elongation-at-break with lighter parts[7]
- Optimal mechanical resistance at low temperature
- Ideal for applications like winter sports equipment, car interiors, robotics and grippers, and fluid systems

Elastomer with high part uniformity

- A flexible polyamide (PA)—one of the most used additive manufacturing materials—in a thermoplastic elastomer
- High level of detail and color uniformity

Easy to process

- Smooth workflow is comparable to using other PAs, with a simple printing process and easy cleanup of complex parts
- Fastest time-to-part compared to other HP 3D Printing materials[24]
- Robust parts withstand the cleaning process
- Get consistent performance while achieving 80% surplus powder reusability[25]

Data courtesy of GoProto Inc. Printed with HP 3D High Reusability TPA enabled by Evonik

	Value	Method
Powder melting point (DSC)	152° C 305.6° F	ASTM D3418
Particle size	77 µm	ASTM D3451
Bulk density of powder	0.420 g/cm³ 0.015 lb/in³	ASTM D1895

Providing reassurance

HP 3D Printing materials comply with a number of recognized health and safety standards.

Statements[10]	HP 3D High Reusability PA 11	HP 3D High Reusability PA 12	HP 3D High Reusability PA 12 Glass Beads	HP 3D High Reusability PP enabled by BASF[4]	HP 3D High Reusability TPA enabled by Evonik[6]
Biocompatibility	✓	✓	n/a	✓	n/a
REACH	✓	✓	✓	✓	In testing
RoHS	✓	✓	✓	✓	In testing
PAHs	✓	✓	✓	✓	In testing
Statement of Composition for Toy Applications	✓	✓	n/a	✓	n/a
UL 94 and UL 746A	✓	✓	✓	In testing	In testing

HP 3D Printing materials for HP Jet Fusion 500/300 Series 3D Printers

HP 3D High Reusability CB PA 12—engineering-grade full-color[26] and white parts

Strong, functional complex parts

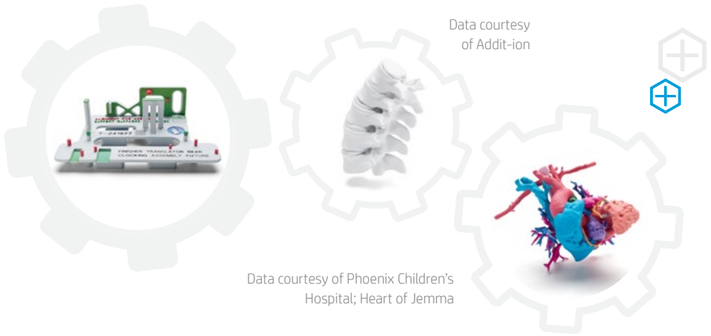
- Robust thermoplastic produces high-density parts with balanced property profiles and strong structures
- Provides excellent chemical resistance to oils, greases, aliphatic hydrocarbons, and alkalies[9]
- Ideal for color[26] and white parts like jigs, fixtures, labeling, presentation models, functional prototypes

Full-color[26] and white quality parts

- Produce functional parts in full color[26] and white with optimal mechanical properties
- Get consistent performance while achieving up to 80% surplus powder reusability[16]
- Optimize cost and quality—full-color[26] and white functional parts and industry-leading reusability[2]

Engineered for HP Multi Jet Fusion technology

- Designed for production of full-color[26] and white functional parts across a variety of industries
- Provides the best balance between color[26] and white performance, and reusability[17]
- Engineered to produce functional prototypes with fine detail and dimensional accuracy



Data courtesy of Addit-ion

Data courtesy of Phoenix Children's Hospital; Heart of Jemma

	Value	Method
Powder melting point (DSC)	189° C 372.2° F	DIN EN ISO 11357
Particle size	58 µm	ISO 8130/13
Bulk density of powder	0.442 g/cm³ 0.016 lb/in³	ISO 60

HP 3D materials certification program

The certification program provides an opportunity and pathway for third-party vendors to develop materials compatible with HP Jet Fusion 3D Printing Solutions.

Joining the HP 3D Materials Certification Program enables material innovation partners to help expand 3D printing materials to address a broader set of applications—driving performance improvements and new possibilities for part properties that address specific industry needs—and making new applications possible.

Materials partners interested in engaging with HP are invited to complete the "Connect with us" form here: hp.com/go/3Dcontactus.

Materials Certified for HP Jet Fusion 3D Printing

HP is committed to expanding our portfolio of Materials Certified for HP Jet Fusion 3D Printing Solutions. We're working with a variety of other third-party vendors to increase the materials and application options available.

Certified for HP Jet Fusion 3D printers

Tested and approved solely for compatibility with HP Jet Fusion 3D printers[2]

BASF Ultrasint®TPU01[4]—flexible, functional parts

Produce flexible TPU parts, with a high throughput, excellent quality and level of detail, and suitable for a wide range of applications.

ESTANE® 3D TPU M95A[6]—high rebound and good abrasion resistance

An ideal fit for both prototyping and manufacturing scale-up applications, delivering high energy rebound, high-impact absorption, a good abrasion resistance rate, and high elasticity, combined with excellent unpacking/de-powdering properties.

Active partnerships

We're working with the following industry-leading materials companies to better address 3D printing needs across industries. Together with our growing network of materials innovation partners, we're enabling performance improvements and new possibilities for part properties.

ARKEMA · EVONIK · BASF We create chemistry · Henkel · dressler group · Lehmann&Voss&Co. · Lubrizol · SIGMADESIGN

Hands-on materials advancement

HP offers tools and resources that encourage and support third-party materials innovation and development.

Jumpstart the development process with the Material Development Kit (MDK)—Developed by HP and SIGMADESIGN, the industry's first MDK helps materials suppliers more effectively—and successfully—develop their first powder materials for the HP Multi Jet Fusion platform. The MDK enables companies interested in certifying their materials to quickly test 3D powder spreadability and compatibility with HP Jet Fusion 3D printers prior to submitting the materials to HP for testing.

SIGMADESIGN

HP 3D Open Platform Materials and Applications Lab—As part of our commitment to the evolution and widespread adoption of 3D printing, we're inviting materials companies to work in a collaborative lab environment. Located in Corvallis, Oregon, the HP 3D Open Platform Materials and Applications Lab is the world's first state-of-the-art lab helping companies develop, test, certify, and deliver the next generation of materials and applications for HP 3D Printing.

This 3,500 square-foot facility offers 3D partners a range of equipment and in-house expertise to jumpstart and accelerate materials innovation and the development of new applications.

This is critical to quickening the evolution and adoption of 3D printing technologies.

Technical Guideline for Material Development with HP 3D Open Materials Platform—Access to comprehensive technical guidelines for suppliers who are interested in developing suitable materials for HP Multi Jet Fusion technology through the HP Open Materials Platform. For more information, please visit hp.com/go/guidelinematerialdevelopment.

HP 3D Printing materials portfolio selection guide[28]

	HP 3D Printing Materials for HP Jet Fusion 5200 Series 3D Printing Solutions					HP 3D Printing Materials for HP Jet Fusion 4200 Series 3D Printing Solutions					HP 3D Printing Materials for HP Jet Fusion 500/300 Series 3D Printers
	HP 3D HR PA 11	HP 3D HR PA 12	HP 3D HR PA 12 GB	HP 3D HR PP enabled by BASF[4]	BASF Ultrasint® TPU01[4]	HP 3D HR PA 11	HP 3D HR PA 12	HP 3D HR PA 12 GB	HP 3D HR TPA enabled by Evonik[6]	ESTANE® 3D TPU M95A[6]	HP 3D HR CB PA 12
Stiffness	●	●	★	■	▲	●	●	★	▲	▲	●
Impact resistance	●	■	▲	■	★	●	■	▲	★	★	■
Elongation	●	■	▲	■	★	●	■	▲	★	★	■
Dimensional capability	●	★	●	■	■	●	★	●	■	■	■
Level of detail	★	●	●	■	■	★	●	●	●	■	●
Flat part	■	●	★	▲	■	■	●	★	■	■	●
Temperature resistance	▲	■	●	■	▲	▲	■	●	■	●	■
Chemical resistance[9,21]	●	●	In testing	★	■	●	●	In testing	▲	In testing	●
Low moisture absorption	▲	▲	▲	★	■	▲	▲	▲	■	■	▲
Lightweight	●	●	■	★	▲	●	●	■	●[7]	▲	●

★ Best ● Good ■ Fair ▲ Not recommended

Designed for more sustainable 3D printing

HP 3D Printing technology is making companies more competitive, productive, and sustainable today and for the future.

Reinventing impact—Rethinking design, enabling a circular economy and lower carbon footprint[29]	Customer success—Reducing waste, inventory, and CO_2 emissions with lighter final and spare parts printed on-demand
Reassurance—Providing statements of compliance for HP 3D Printing materials in relation to recognized environmental, health, and safety standards[30]	Minimizing plastic and waste—Breakthrough technology enabling molded fiber packaging; industry-leading surplus powder reusability[2] and parts that use less material
Workforce of the future—Investing in the upskilling revolution for a sustainable 4th Industrial Revolution	Accessibility—Helping to make life better for virtually everyone, everywhere

Ordering information

Material		HP Jet Fusion 5200 Series 3D Printing Solutions	HP Jet Fusion 4200 Series 3D Printing Solutions	HP Jet Fusion 500/300 Series 3D Printers
V1R12A	HP 3D High Reusability PA 11 30L (14 kg)	Yes	Yes	n/a
V1R18A	HP 3D High Reusability PA 11 300L (140 kg)	Yes	Yes	n/a
V1R36A	HP 3D High Reusability PA 11 Production Material 300L (140 kg)[31]	Yes	Yes	n/a
V1R24A	HP 3D High Reusability PA 11 1700L (750 kg)[32,33,34]	Yes	Yes	n/a
V1R10A	HP 3D High Reusability PA 12 30L (13 kg)	Yes	Yes	n/a
V1R16A	HP 3D High Reusability PA 12 300L (130 kg)	Yes	Yes	n/a
V1R34A	HP 3D High Reusability PA 12 Production Material 300L (130 kg)[31]	Yes	Yes	n/a
V1R20A	HP 3D High Reusability PA 12 1400L (600 kg)[32,33,34]	Yes	Yes	n/a
V1R11A	HP 3D High Reusability PA 12 Glass Beads 30L (15 kg)	Yes	Yes	n/a
V1R22A	HP 3D High Reusability PA 12 Glass Beads 300L (150 kg)	Yes	Yes	n/a
V1R35A	HP 3D High Reusability PA 12 Glass Beads Production Material 300L (150 kg)[31]	Yes	Yes	n/a
V1R23A	HP 3D High Reusability PA 12 Glass Beads 1400L (700 kg)[32,33,34]	Yes	Yes	n/a
V1R28A	HP 3D High Reusability PP enabled by BASF 300L (100 kg) Material	Yes	n/a	n/a
V1R37A	HP 3D High Reusability PP enabled by BASF 300L (100 kg) Production Material[35]	Yes	n/a	n/a
V1R30A	HP 3D High Reusability CB PA 12 10L (4 kg)	n/a	n/a	Yes
V1R38A	HP 3D High Reusability TPA enabled by Evonik 300L (120 kg) Material[6]	No	Yes	No
V1R39A	HP 3D High Reusability TPA enabled by Evonik 300L (120 kg) Production Material[6,36]	No	Yes	No
300070	BASF Ultrasint® TPU01 30L (15 kg)	Yes	n/a	n/a
300071	BASF Ultrasint® TPU01 300L (150 kg)	Yes	n/a	n/a
300072	BASF Ultrasint® TPU01 1000L (500 kg)[37]	Yes	n/a	n/a
3DTW0030	ESTANE® 3D TPU M95A 30L (16 kg)	n/a	Yes	n/a
3DTW0300	ESTANE® 3D TPU M95A 300L (160 kg)	n/a	Yes	n/a

Note: Liters refers to the materials container size and not the actual materials volume. Materials are measured in kilograms.

Eco Highlights

- Cleaner, more comfortable experience—enclosed printing system, and automatic powder management[38]
- Minimizes waste due to industry-leading reusability of powder[2]
- Take-back program for eligible supplies available in select countries[39]

Please recycle printing hardware and eligible printing supplies.
Find out how at our website: hp.com/go/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

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

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. 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. Testing monitored using statistical process controls.
3. 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. Cost criteria: printing 1.4 full build chambers of parts per day/5 days per week over 1 year of 30 cm^3 parts at 10% packing density on Fast print mode using HP 3D High Reusability PA 12 material, and the powder reusability ratio recommended by manufacturer, and printing under certain build conditions and part geometries.
4. Available for HP Jet Fusion 5200 Series 3D Printing Solutions.
5. Based on internal HP testing, May 2020. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability PP enabled by BASF provide up to 100% powder reusability ratio, producing functional parts batch after batch. For testing, material is aged in real printing conditions and reclaimed powder is tracked by generations (worst case for reusability). Parts are then made from each subsequent generation and tested for mechanical properties and accuracy showing no degradation of properties up to three generations of use.
6. Available for HP Jet Fusion 4200 Series 3D Printing Solutions.
7. Based on published specifications as of September, 2020. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability TPA enabled by Evonik provide up to 17% lower printed part weight when compared to common powder-based thermoplastic elastomers printed under similar conditions.
8. Testing according to ASTM D638, ASTM D256, and ASTM D648 using HDT at different loads with a 3D scanner for dimensional accuracy. Testing monitored using statistical process controls.
9. For HP 3D High Reusability PA 11, PA 12, and CB PA 12, based on internal HP testing, June 2017. 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. For HP 3D High Reusability PP enabled by BASF, based on internal HP testing, May 2020, with tests for mechanical property retention, dimensional stability, and weight change after 7- and 30-day immersion with acids, bases, organic solvents, and aqueous solutions. For BASF Ultrasint® TPU01, based on testing by BASF, April 2020, according to ASTM D471 for select IRM oils and Fuel A.
10. For more information, see hp.com/go/statementsPA11, hp.com/go/statementsPA12, hp.com/go/statementsPA12GB, and hp.com/go/statementsPP.
11. HP 3D High Reusability PA 11 powder is made with 100% renewable carbon content derived from castor plants grown without GMOs in arid areas that do not compete with food crops. HP 3D High Reusability PA 11 is made using renewable sources, and may be made together with certain non-renewable sources. A renewable resource is a natural organic resource that can be renewed at the same speed in which it is consumed. Renewable stands for the number of carbon atoms in the chain coming from renewable sources (in this case, castor seeds) according to ASTM D6866.
12. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability PA 11 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.
13. Compared to selective laser sintering (SLS) technology. Providing an elongation at break XY of 50% with up to 70% powder reusability ratio according to the ASTM D638 test method. 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.
14. Easier to process than standard HP 3D High Reusability PA 12, providing proper fusing along with good spreadability and compatibility due to its small particle size.
15. 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.
16. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability PA 12 and HP 3D High Reusability CB PA 12 provide up to 80% 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.
17. Compared to selective laser sintering (SLS) technology. Tested according to ASTM D638, ASTM D256, ASTM D790, and ASTM D648.
18. Testing according to ASTM D638, ASTM D256, and ASTM D648 with a 3D scanner for dimensional stability. Testing monitored using statistical process controls.
19. 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.
20. 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.
21. For HP 3D High Reusability PP enabled by BASF, based on internal HP testing, May 2020, with tests for mechanical property retention, dimensional stability, and weight change after 7- and 30-day immersion with acids, bases, organic solvents, and aqueous solutions.
22. Compared to other materials in the HP 3D materials portfolio as of May, 2020.
23. Easier to process than standard HP 3D High Reusability PA 12, providing proper fusing along with good spreadability and compatibility due to its small particle size.
24. Based on internal HP testing, September 2020, compared to other HP 3D Printing materials compatible with the HP Jet Fusion 4200 3D Printing Solution. Testing variables: Part quantity: 1 full build chamber of parts from HP Jet Fusion 3D at 6.5% of packing density; Part size: 30 cm^3; Layer thickness: 0.08/0.003 - 0.1 mm/0.0039 inches.
25. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability TPA enabled by Evonik provide up to 80% 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.
26. Full color parts applicable only with the HP Jet Fusion color 3D printers.
27. Nothing herein should be construed as constituting an additional HP 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 for such HP products and services. 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 contained herein and the information herein is subject to change without notice. HP shall not be liable for damages or losses of any kind or nature that result from the use of or reliance upon this information. The HP Jet Fusion 3D Materials have not been designed, manufactured or tested by HP for compliance with legal requirements for 3D printed parts and their uses and recipients are responsible for making their own determination as to the suitability of HP Jet Fusion 3D Materials for their purposes and uses, ensure compliance with applicable laws and regulations, and be aware that other safety or performance considerations may arise when using, handling or storing the product.
28. Based on internal HP testing, March 2020. For testing methodology and results, see hp.com/go/3Dprintingmaterialswhitepapers. Please consult your local sales representative for more information.
29. Low carbon footprint per printed HP Multi Jet Fusion part for runs of 1500 or less when compared to injection molded parts. Data comes from an ISO 14040/44 compliant and peer reviewed LCA study, January 2018.
30. See statements, page 5. For more information, see hp.com/go/statementsPA11, hp.com/go/statementsPA12, hp.com/go/statementsPA12GB, and hp.com/go/statementsPP.
31. Only compatible with the HP Jet Fusion 5210 Pro/5210/4210/4210B 3D Printing Solutions.
32. Additional material management equipment is required.
33. Only compatible with the HP Jet Fusion 5210 Pro/4210B 3D Printing Solutions.
34. This product number is sold directly by HP.
35. Only compatible with the HP Jet Fusion 5210 Pro/5210 3D Printing Solutions.
36. Only compatible with the HP Jet Fusion 4210B 3D Printing Solution.
37. Only compatible with the HP Jet Fusion 5210 Pro 3D Printing Solution.
38. 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.
39. Printing supplies eligible for recycling vary by supply and by printer. Visit hp.com/recycle to see how to participate and for HP Planet Partners program availability; program may not be available in your area. Where this program is not available, and for other consumables not included in the program, consult your local waste authorities on appropriate disposal.

4AA7-1533ENA, October 2020

This is an HP Indigo digital print.