HP 3D printing materials

Data courtesy of Vizua Heart of Bernard Werber and Invent Medical

1 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. We're doing this through a growing portfolio of HP-branded powders and an open platform model that encourages third-party collaboration and materials expansion.

HP 3D printing materials—providing optimal output quality and high reusability at a low cost per part

In addition to our flagship material, HP 3D High Reusability PA 12, HP is growing its portfolio of thermoplastics. New 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[3] and, in many cases, industry-leading reusability[4] at the lowest cost per part.[1]

HP 3D High Reusability PA 12—ideal for producing strong, quality parts at the lowest cost per part[1]

Picture taken after graphite post-processing

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[5]
- 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[6]

Quality at the lowest cost per part[1]

- Achieve the lowest cost per part[1] and reduce your total cost of ownership[7]
- Minimize waste—reuse surplus powder batch after batch and get functional parts, no throwing away anymore[4]
- Get consistent performance while achieving 80% surplus powder reusability[8]
- Optimize cost and part quality—cost-efficient material with industry-leading surplus powder reusability[4]

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[9]
- Achieves watertight properties without any additional post-processing
- Engineered to produce final parts and functional prototypes with fine detail and dimensional accuracy

Recognized certifications provide reassurance

HP 3D High Reusability PA 12 is compliant with a number of important certifications that help provide reassurance that parts produced with this thermoplastic material adhere to health and safety related restrictions.

- ☑ **Biocompatability**[6]
- ☑ **REACH**
- ☑ **RoHS**
- ☑ **PAHs (EU REACH)**
- ☑ **Statement of Composition for Toy Applications**
- ☑ **UL 94 and UL 746A Certification**

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

HP 3D High Reusability PA 12 Glass Beads—ideal for producing stiff, low-cost, quality parts

3D data courtesy of NACAR

Produce stiff, functional parts

- 40% glass bead filled thermoplastic material with both optimal mechanical properties and high reusability[3]
- Provides dimensional stability along with repeatability[2]
- Ideal for applications requiring high stiffness like enclosures and housings, fixtures and tooling

Quality at a low cost per part

- Produce at a low cost per part and reduce your total cost of ownership[7]
- Less waste—reuse surplus powder batch after batch and get functional parts, no throwing away anymore[4]
- Get consistent performance while achieving 70% surplus powder reusability[10]
- Optimize cost and part quality—cost-efficient material with high surplus powder reusability[3]

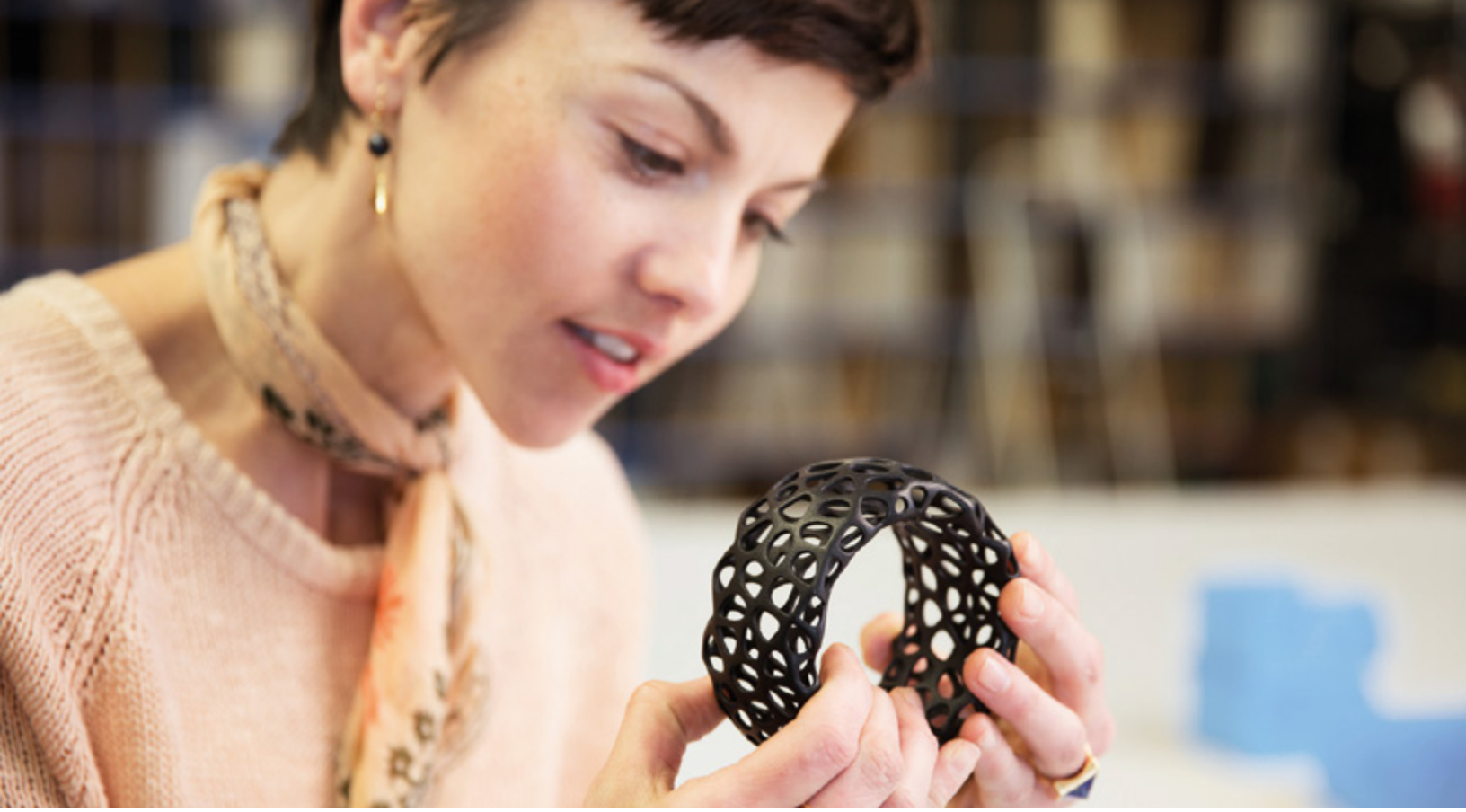
Engineered for HP Multi Jet Fusion technology

- Designed for production of functional parts across a variety of industries
- Provides the best balance between performance and reusability[11]
- Engineered to produce common glass bead applications with detail and dimensional accuracy

Recognized certifications provide reassurance

- ☑ **UL 94 and UL 746A Certification**

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



HP 3D High Reusability PA 11—ideal for producing ductile,[2] quality parts at the lowest cost per part[1]

3D data courtesy of NACAR

Produce strong, ductile,[2] functional parts

- Thermoplastic material delivering optimal mechanical properties
- Renewable raw material from vegetable castor oil (reduced environmental impact)[12]
- Provides excellent chemical resistance[5] and enhanced elongation-at-break[2]
- Impact resistance and ductility[2] for prostheses, insoles, sports goods, snap fits, living hinges, and more

Quality at the lowest cost per part[1]

- Achieve the lowest cost per part[1] and reduce your total cost of ownership[7]
- Minimize waste—reuse surplus powder batch after batch and get functional parts, no throwing away anymore[4]
- Get consistent performance while achieving 70% surplus powder reusability[13]
- Optimize cost and part quality—cost-efficient material with industry-leading surplus powder reusability[4]

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[14]
- Easy-to-process material enables high productivity, less waste, and lower cost[15]
- Engineered to reliably produce final parts and functional prototypes with fine detail, dimensional accuracy

Recognized certifications provide reassurance

Biocompatibility[6]

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

2 Accelerating materials innovation through the HP Multi Jet Fusion Open Platform

HP's unique Open Platform approach is fostering widespread adoption of 3D printing by expanding the availability of new materials to address a broader set of applications, lowering materials costs, driving performance improvements, and creating new possibilities for part properties that address specific industry needs.

HP Multi Jet Fusion is fast becoming the printing platform of choice to accelerate technology, materials, and software innovation. We're working diligently on our own and with others to:

- Spearhead the widespread adoption of 3D printing across industries
- Enable new 3D printing materials that combine lower costs with enhanced properties
- Facilitate the development of never-before-seen 3D printing materials and new software to expand applications
- Support the transformation from traditional manufacturing to a future of digital manufacturing
- Drive software innovation and standards such as 3MF, an improved 3D printing file format, through collaboration with partners

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. The certification process reassures customers that third-party powders work effectively and reliably with HP Multi Jet Fusion technology.

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.

HP is inviting partners to innovate in materials for specific customer/application needs for both broader market availability and exclusive customer needs. Material partners interested in engaging with HP are invited to:

1. Go to hp.com/go/3DPrint.
2. Visit hp.com/go/3Dcontactus and complete the "Connect with us" form.
3. Once the "Connect with us" form is submitted, the interested partner will receive a Questionnaire, internally known as the "Materials PQD," that helps us better understand partner needs and expectations.
4. The materials team receives the Questionnaire, evaluates possible areas of collaboration, and always contacts the potential partner to clarify next steps.

HP Open Platform certified materials

HP is committed to expanding our portfolio of materials certified for HP 3D Jet Fusion printers. Evonik's VESTOSINT® 3D Z2773 PA 12 is the first certified material. We're also working with a variety of other third-party vendors to increase the materials and application options available.

Certified for HP Jet Fusion 3D printers

VESTOSINT® 3D Z2773 PA 12 30L (14 kg) is a modified polyamide-based powder that is produced at Evonik's Marl site in Germany using the company's own special process. The powders are certified for the HP Jet Fusion 3D printer.[16]

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.

> "Four or five materials is not going to cut it. We need thousands of materials. This is where the open materials platform was born. There's no way we have the resources to do that. Materials companies have been doing it for years and years."
>
> **Dr. Tim Weber, Head of the HP 3D Open Platform Materials and Applications Lab**

ARKEMA

"By enabling us to directly develop 3D printing materials leveraging the HP Multi Jet Fusion Open Materials Platform, Arkema believes that we will be able to develop user-specific materials and uncover new applications for our customers and industry leaders. This great concept will accelerate the adoption of 3D printing and unlock its full potential. As a global designer of innovative, environmentally responsible Technical Polymer solutions for a wide variety of markets, Arkema is excited to collaborate with HP to change the way products are designed and produced and lead the way for the next industrial revolution."

Adrien Lapeyre
Global Market Manager — Technical Polymers Powders

Arkema

BASF

"BASF has one of the broadest 3D Material portfolios in the chemical industry, and therefore, we are proud to join the HP Multi Jet Fusion Open Platform. BASF is a founding member of this Open Platform, and with our experience, knowledge of customer needs and applications, we are motivated to collaborate. The HP Open Platform is a great foundation to develop new materials and enable economies of scale, making materials more affordable and enabling not only prototyping but unlocking the potential of 3D printing for production."

Dietmar Geiser
Senior Manager 3D-Printing Strategy & Planning

BASF New Business GmbH

dressler group

"With over 40 years of powder innovation and expertise, we're thrilled to help HP's 3D materials partners on its open platform accelerate the development of thermoplastic powders for Multi Jet Fusion use. We see our contribution to the HP ecosystem as enabling 3D materials development that is incredibly precise and cost-effective, or as we call it, 'on the dot."

Jan Dressler
Managing Director

Dressler Group

EVONIK

"Evonik is developing new materials leveraging the HP Multi Jet Fusion Open Materials Platform. Evonik believes that HP's Open Materials program provides a unique opportunity to expand the adoption of 3D printing and creates a new platform to drive materials innovation through development of materials specifically suited for this process. HP's new Multi Jet Fusion technology has the capabilities to create new applications for the 3D printing market by allowing us to develop new materials for the future."

Dr. Matthias Kottenhahn
Sr. VP & GM, High Performance Polymers

Evonik Resource Efficiency GmbH

Henkel

"The partnership between HP and Henkel is backed by strong market leadership, a legacy of innovation and an aligned commitment to additive manufacturing. With our broad material portfolio and customer base across diverse industries, Henkel is able to champion custom 3D solutions across various functional applications. This, combined with HP's vision for open materials innovation, enables us to develop materials and applications once thought impossible."

Michael Todd
Corporate Senior Vice President and Global Head of Innovation and New Business Development

Henkel Adhesive Technologies

Lehmann&Voss&Co. LUV

"Lehmann&Voss&Co. believes HP's Open Materials platform is a great concept and that with this approach HP can fulfill market needs that have so far limited the 3D printing market expansion. This platform will drive 3D adoption and will provide an on-ramp to companies to drive materials innovation using HP Multi Jet Fusion technology. Lehmann&Voss&Co. plans to collaborate with HP and looks forward to introducing a new material on this platform."

Dr. Marcus Rechberger
Market Development LUVOSINT©

Lehmann&Voss&Co.

Lubrizol

"As a global leader in specialty chemicals, we're excited to join HP's open 3D materials platform to help drive the digital manufacturing disruption being led by 3D printing. Having access to HP's industry-first 3D Open Materials and Applications Lab and its wealth of cutting-edge tools, while collaborating directly with our customers, will help secure our place at the forefront of materials innovation and development into the future, while advancing the development of our Estane® Engineered Polymers product line."

Rick Tolin
President

Lubrizol Advanced Materials

SIGMADESIGN

Materials Development Kit for HP Jet Fusion 3D Printers made by Sigma Design to accelerate materials innovation.

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 **SIGMA**DESIGN, 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

Multi Jet Fusion 3D printers prior to submitting the materials to HP for testing.

The Vision System Accessory works in conjunction with the MDK and facilitates the testing of new materials under development. It allows material suppliers to easily assess and quantify new material properties by automating the test coupon analysis.

"HP is leading the evolution of 3D printing from prototyping to production and **SIGMA**DESIGN understands how important each step of the manufacturing process is in this journey. Materials are at the center of successful manufacturing, and the combination of HP's Open Platform and the ability to enable voxel-level control will help expedite the digital transformation of this multi-trillion dollar market.

Many companies, both large and small, do not have the internal capabilities to execute their 3D printing vision as quickly or as broadly as they'd like. We are proud to provide world-class foundational tools such as the MDK and in-depth design expertise for organizations ready to innovate using HP Multi Jet Fusion technology right now."

Bill Huseby
President and CEO, **SIGMA**DESIGN

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 new 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.

"We are convening the world's leading materials companies and empowering them to disrupt and innovate."

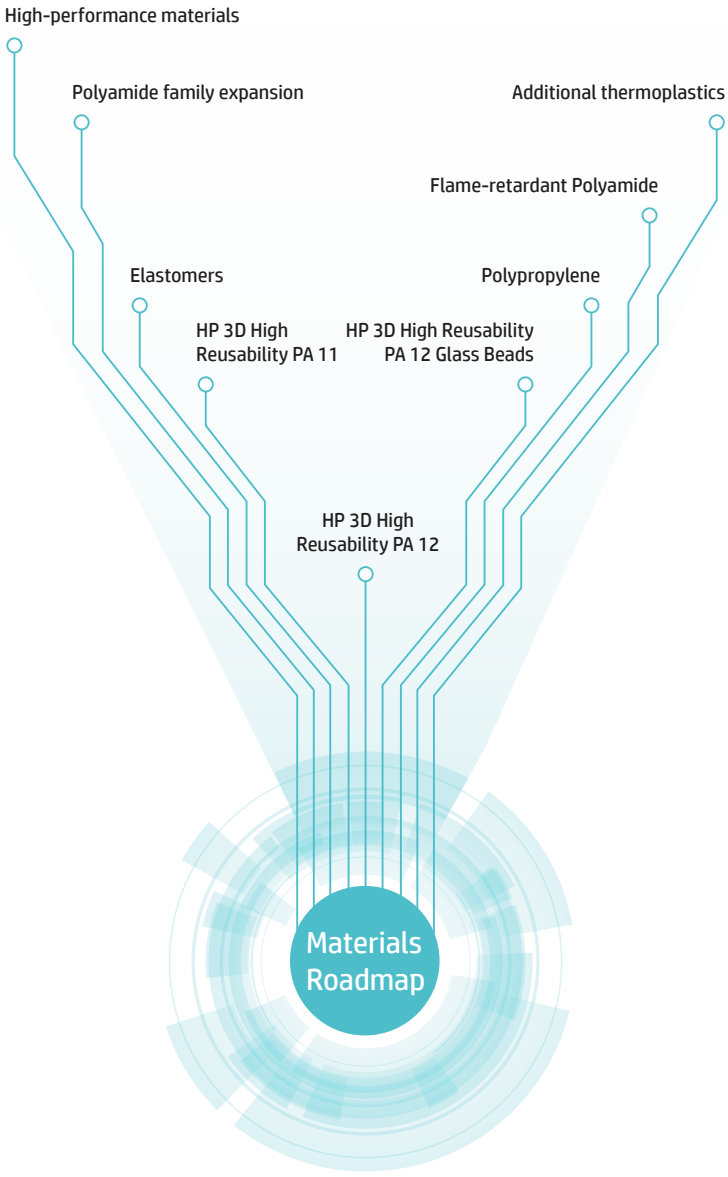
Dr. Tim Weber
Head of the HP 3D Open Platform Materials and Applications Lab

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. Learn more at hp.com/go/guidelinematerialdevelopment.

3 HP Multi Jet Fusion portfolio

Portfolio roadmap

HP plans to continue expanding the palette of material offerings even further—delivering a wider family of thermoplastics, including those with flame-retardant properties. And we're exploring new materials, such as elastomers, polyamides, commodity plastics, and high-performance materials. The HP Multi Jet Fusion Open Platform is a critical force in the process of accelerating materials innovation. By working together, we can enable a future where even not-yet-imagined applications become possible.



HP Open Platform

Bringing down the barriers to advance widespread 3D printing adoption across industries through materials innovation

Materials performance summary

Mechanical properties

Measurement	HP 3D HR PA12[18]	HP 3D HR PA12 GB[19]	HP 3D HR PA11[20]	VESTOSINT© 3D Z2773 PA 12
Tensile strength, max load[17], XY, XZ, YX, YZ, ZX, ZY	48 MPa/6960 psi	30 MPa/4351 psi	52 MPa/7542 psi	48 MPa/6960 psi
Tensile modulus[17], XY, XZ, YX, YZ, ZX, ZY	1800 MPa/261 ksi	2500 MPa/363 ksi	1800 MPa/261 ksi	1700 MPa/247 ksi
Elongation at break[17], XY, XZ, YX, YZ, ZX, ZY	15%	10%	35%	20%
Izod impact notched (@ 3.2 mm, 23 ºC), XY, XZ, YX, YZ, ZX, ZY	3.5 kJ/m²	3 kJ/m²	4.5 kJ/m²	-
Heat deflection temperature (@ 0.45 MPa, 66 psi) - XY, XZ, YX, YZ, ZX, ZY	175 °C/347 ºF	174 °C/345 °F	185 °C/365 °F	-
Heat deflection temperature (@ 1.82 MPa, 264 psi) - XY, XZ, YX, YZ, ZX, ZY	95°C/203 °F	114 °C/237 °F	54 °C/129 °F	-
Refresh ratio for stable performance	20%	30%	30%	50%
Applications examples				

Multi Jet Fusion Materials Portfolio selection guide

Usages and Properties	HP 3D HR PA12	HP 3D HR PA12 GB	HP 3D HR PA11	VESTOSINT© 3D Z2773 PA 12
Visual aids & presentation models	●	●	●	●
Functional prototyping	●	●	●	●
End-use parts	●	●	●	●
Dimensional stability	●	●	●	●
Functional rigid part (higher stiffness)	●	●	●	●
Flexible part (higher elongation at break)	●	●	●	●
Impact	●	●	●	●
HDT (heat deflection tempeature)	●	●	●	●
Medical bio-compatible (USP Class I-VI and US FDA guidance for Inact Skin Surface Devices)	●	●	●	●
Look and feel	●	●	●	●
Refresh ratio for stable performance/TCO	●	●	●	●

● Excellent ● Good ● Fair ● Not Recommended ● On testing process

Ordering information

Material	HP Jet Fusion 3D 4210 Printing Solution	HP Jet Fusion 3D 4200 Printing Solution
V1R10A—HP 3D High Reusability PA 12 30L (13 Kg)	Yes	Yes
V1R16A—HP 3D High Reusability PA 12 300L (130 Kg)	Yes	Yes
V1R12A—HP 3D High Reusability PA 11 30L (14 Kg)	Yes	Yes
V1R18A—HP 3D High Reusability PA 11 300L (140 Kg)	Yes	Yes
V1R11A—HP 3D High Reusability PA 12 Glass Beads 30L (15 Kg)	Yes	Yes
V1R22A—HP 3D High Reusability PA 12 Glass Beads 300L (150 Kg)	Yes	Yes
EVNV1R14A—VESTOSINT© 3D Z2773 PA 12 30L (14 Kg) Certified for HP Jet Fusion 3D printers	Yes	Yes
EVNV1R17A—VESTOSINT© 3D Z2773 PA 12 300L (140 Kg) Certified for HP Jet Fusion 3D printers	Yes	Yes

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

Eco Highlights

- Powders or agents are not classified as hazardous[21]
- Cleaner, more comfortable workplace—enclosed printing system, and automatic powder management[22]
- Minimizes waste due to industry-leading reusability of powder[23]

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

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

Data courtesy of Invent Medical

1. Based on internal testing and public data, HP Jet Fusion 3D printing solution average printing cost per part is half the cost of comparable fused deposition modeling (FDM) and selective laser sintering (SLS) printer solutions from $100,000 USD to $300,000 USD, when averaged together and not taken individually, in market as of April 2016. Cost analysis based on: standard solution configuration price, supplies price, and maintenance costs recommended by the manufacturer. Cost criteria: printing 1-2 buckets per day/5 days per week over 1 year of 30-gram parts at 10% packing density using the powder reusability ratio recommended by the manufacturer.
2. Testing according to ASTM D638, ASTM D256, and ASTM D648 using HDT at different loads with a 3D scanner for dimensional stability. Testing monitored using statistical process controls.
3. 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.
4. 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 and MFI test using HDT at different loads with a 3D scanner for dimensional stability. Testing monitored using statistical process controls. Liters refers to the materials container size and not the actual materials volume. Materials are measured in kilograms.
5. 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.
6. Based on HP internal testing, June 2017, 3D600/3D700/3D710 Fusing and Detailing Agents and HP 3D High Reusability PA 12 and HP 3D High Reusability PA 11 powders 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 hp.com/go/3DMaterials.
7. 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.
8. 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.
9. Compared to selective laser sintering (SLS) technology. Tested according to ASTM D638 and MFI test.
10. HP Jet Fusion 3D printing solutions using HP 3D High Reusability PA 12 Glass Beads provide 70% 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.
11. 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 recyclability). Parts are then made from each generation and tested for mechanical properties and accuracy.
12. 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.
13. HP Jet Fusion 3D printing solutions using HP 3D High Reusability PA 11 provide 70% 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.
14. Compared to selective laser sintering (SLS) technology. Providing an elongation at break XY of 50% with 80% post-production surplus power reusability 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 recyclability). Parts are then made from each generation and tested for mechanical properties and accuracy.
15. Easier to process than standard HP 3D High Reusability PA12, providing proper fusing along with good spreadability and compatibility due to its small particle size.
16. The only terms and conditions governing the sale of HP 3D printer solutions are those set forth in a written sales agreement. The only warranties for HP products and services are set forth in the express warranty statements for such products and services. Nothing herein should be construed as constituting an additional warranty or additional binding terms and conditions. HP shall not be liable for technical or editorial errors or omissions contained herein and the information herein is subject to change without notice. The Certified for HP Jet Fusion 3D Materials have not been designed, manufactured, or tested by HP for compliance with legal requirements and recipients are responsible for making their own determination as to the suitability of VESTOSINT® 3D Z2773 for their purposes, including but not limited as regards direct or indirect food contact applications.
17. Test results realized under the ASTM D638, specimens type V.
18. The following technical information should be considered representative of averages or typical values and should not be used for specification purposes. These values refer to a balanced print mode with FW TATDAG_15_18_11.69.
19. The following technical information should be considered representative of averages or typical values and should not be used for specification purposes. These values refer to a balanced print mode with FW TATDAG_15_18_11.69.
20. The following technical information obtained (November 2017) may change and is representative of averages or typical values of the testing date and should not be used for specification purposes. These values refer to a balanced print mode with FW TATDAG_15_18_11.69.
21. The HP powder and agents do not meet the criteria for classification as hazardous according to Regulation (EC) 1272/2008 as amended.
22. 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.
23. Compared to PA 12 and PA 11 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 and HP Jet Fusion 3D printing solutions using HP 3D High Reusability PA 11 provide 70% post-production surplus powder reusability, producing functional parts batch after batch.

4AA7-1533ENA, July 2018

This is an HP Indigo digital print.