BESAFILM

3D BESA

the impossible is just an illusion

BESAFILM

CERTIFICAZIONE
DI PRODOTTO
BUREAU VERITAS
Certification

«There are plenty of 'cutters' the length and breadth of Italy. But if you're looking for a company able to handle a huge range of particular sizes and dimensions, with tolerances close to those guaranteed by precision mechanics, then we are the one you're looking for»

Let me introduce myself: my name is Youri Beltrame, and I have thirty years' experience in cutting and rewinding from reel to reel, working in particular with plastic film and paper. Here at Besafilm, we're also pleased to cut any other material to meet our customers' requirements, providing a service that lives up to expectations every time».

"Diversified business based on technology, service and a team of people with the experience and qualifications to meet customers' expectations and their every need"

Besafilm is a family business based in Colognola ai Colli (Verona). It was founded in 1987 thanks to a fortunate insight on the part of Youri Beltrame's father Santino, today sole director of a business with a long-standing tradition, able to provide subcontracting services for any sector of industry. The company's thirty or so operators work shifts round the clock, six days a week, using cutting and rewinding machines unrivalled on the market. The further customised adjustments made allow us to deliver high-precision cutting services from 8.00 mm upwards, including 8.1 mm - 8.2 mm etc.».

Besafilm has recently completed work on the company's warehouse, boosting capacity from approximately 600 euro pallets to 2032. 2019 will see further modernisation work of both a structural and IT nature, taking Besafilm one step further down the road of technological development, with a view to responding to our customers' every request...

...including 3D printing...

CUTTING AND REWINDING

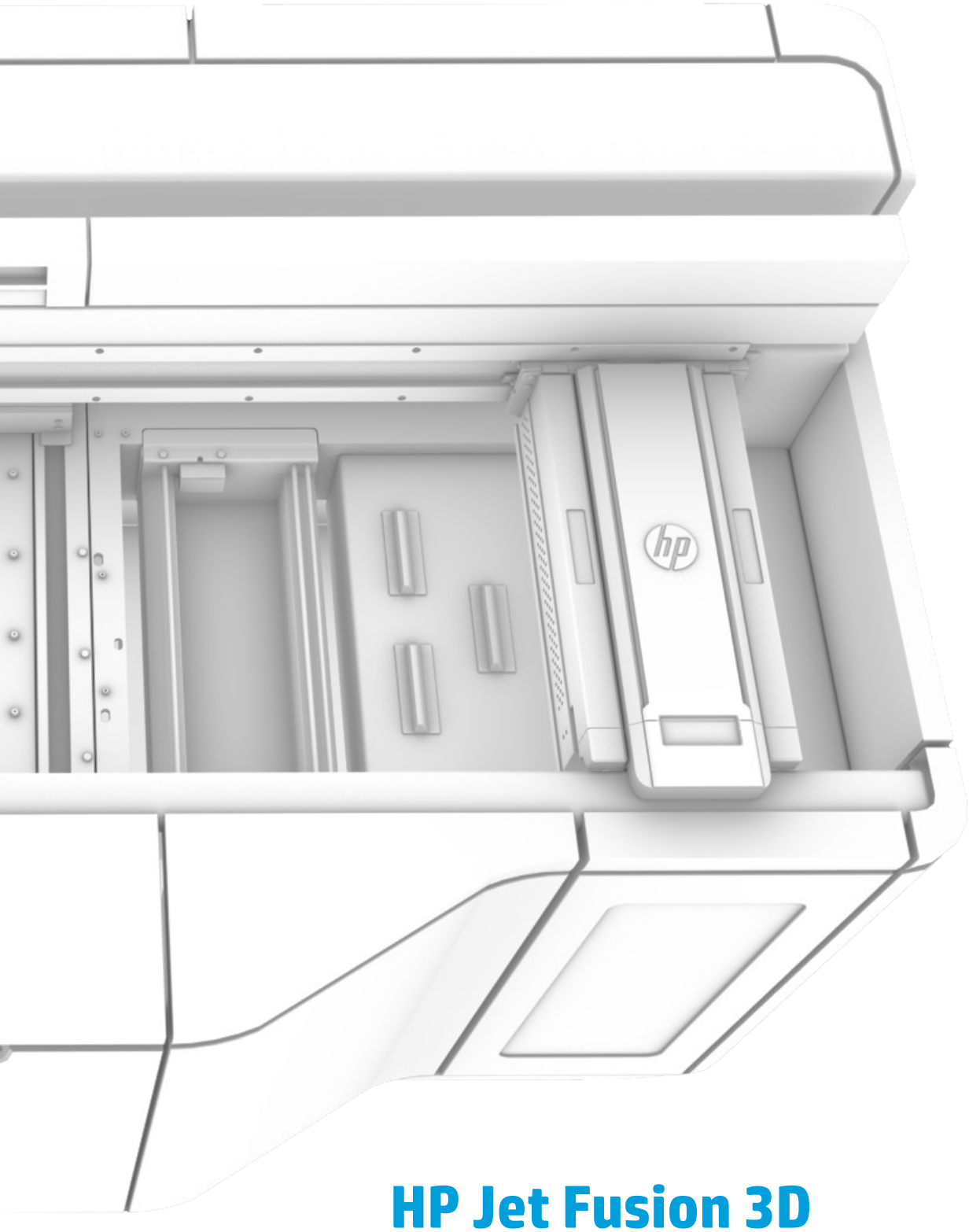
from reel to reel of plastic film and paper

We've been bringing skill and passion to every sector of industry for over thirty years now

30 YEARS

3D BESA

the impossible is just an illusion



HP Jet Fusion 3D Printing Solutions

Reinventing the work process

3D BESA
the impossible is just an illusion

WHY CHOOSE 3D *PRINTING?*

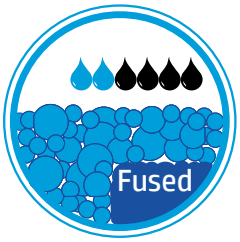
3D printing is able to produce real objects, adding layer upon layer of materials to obtain the desired result: fast, precise, functional production and prototyping
This procedure offers numerous advantages compared to traditional production technologies:

SPEED

- Both simple and more complex models can be printed in a matter of hours.
- The feasibility of a project can be verified, with no limits on creativity.
- Additive manufacturing is able to shape the imagination of the creative team in a matter of hours.
- Production times are considerably reduced, so any errors can be swiftly corrected.

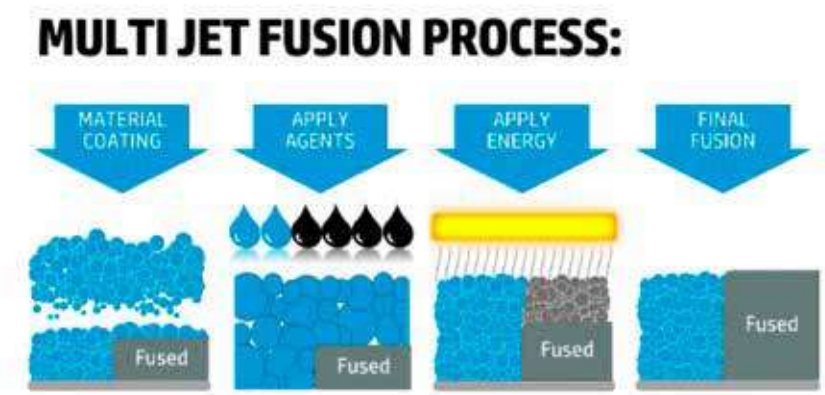
SINGLE-PHASE PRODUCTION

Single-phase production means there's no need to interfere during the production process.
Once the CAD file has been completed, it can be sent to the printer, which will take care of production entirely independently.



HP FUSING AND DETAILING AGENTS

Work together with the materials and HP Multi Jet Fusion technology to offer precise details and dimensional accuracy.



COSTS AND BENEFITS

- Small and medium quantities can be produced, without restrictions.
- Complex models - difficult to produce using traditional methods - can be created at a relatively low cost.
- Printing costs and lengthy waiting times can be cut to just a few days with a 3D drawing.
- Any further assembly costs are removed, with a view to a new, improved approach to design.
- Any parts glued together can be replaced, meaning
  one piece = one management process.

3D BESA
the impossible is just an illusion

RISK REDUCTION

Alterations and corrections can have a significant impact on the final design costs for a product. Being able to verify a design by printing it and making the necessary changes until a product ready for use can be obtained cuts production times and costs considerably.

THE MATERIALS CURRENTLY AVAILABLE ARE:

PA12 , PA11, GLASS-FILLED PA12, TPU (IN FUTURE ALSO PP).

CREATIVE FREEDOM

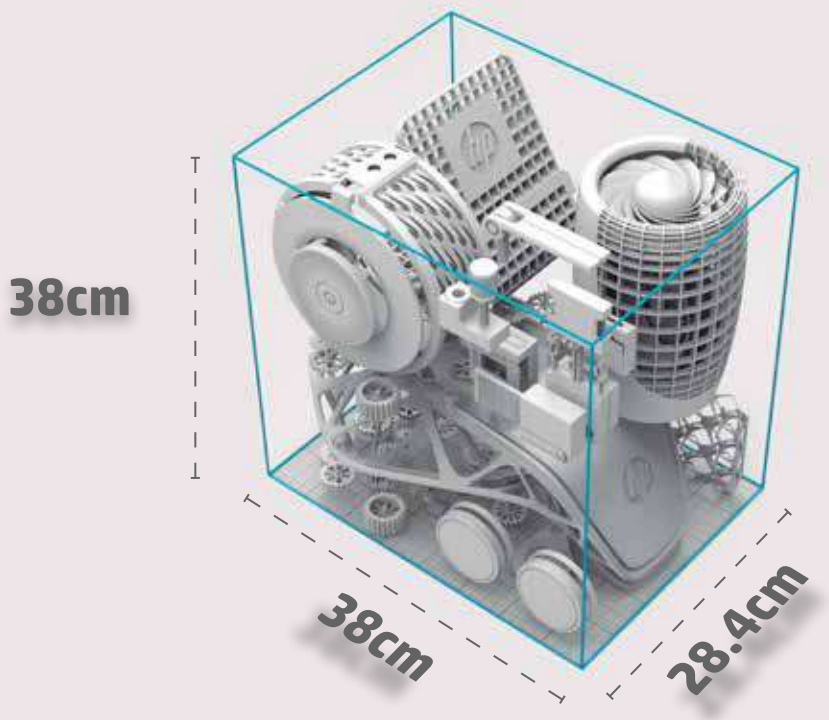
Although there are limits to the dimensions of objects

THAT CAN BE PRINTED WITH A MAXIMUM CLEARANCE OF:

38cm X 28.4cm X 38cm (XYZ),

most of the limits of traditional printing are eliminated.

This allows designers to effectively shape ideas without placing limits on their creative freedom.



THE ADVANTAGE OF BEING ABLE TO TEST AND ALTER AN ITEM IN PRODUCTION

*Example of a piece not assembled but designed and output directly from the 3D printer...**ready to use!!***

CHOOSE MULTI JET FUSION IF YOU NEED...

- The physical properties to remain constant in all directions. (high isotropy)
- Low porosity
- Integrated hinges, interconnected parts printed in a single piece
- Ultra-slim layers for a higher resolution

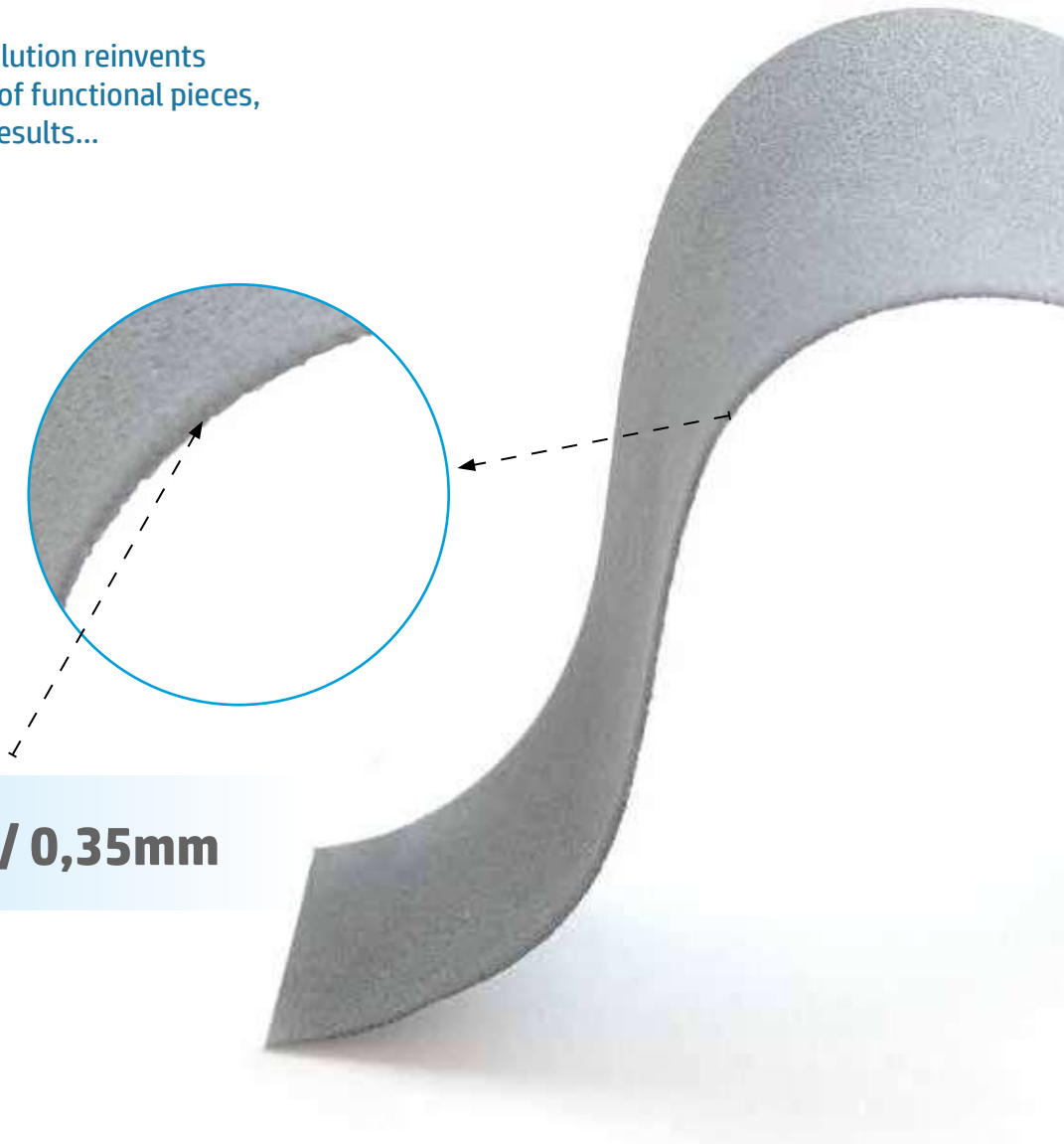
3D BESA
the impossible is just an illusion

3D MULTI JET FUSION PRINTING
Why choose BESA 3D?

- Highly qualified in-house staff with expert knowledge of 3D printing, trained directly by HP and its partners.
- The technology we use **GUARANTEES EQUAL FUSION ON EACH PIECE,** with the same characteristics as injection printing, using the same material.
- Production **in just THREE days**, excluding delivery times.
- 30 years of service.

REINVENTING
production and prototyping

The 3D HP Jet Fusion printing solution reinvents the prototyping and production of functional pieces, offering more than just quality results...

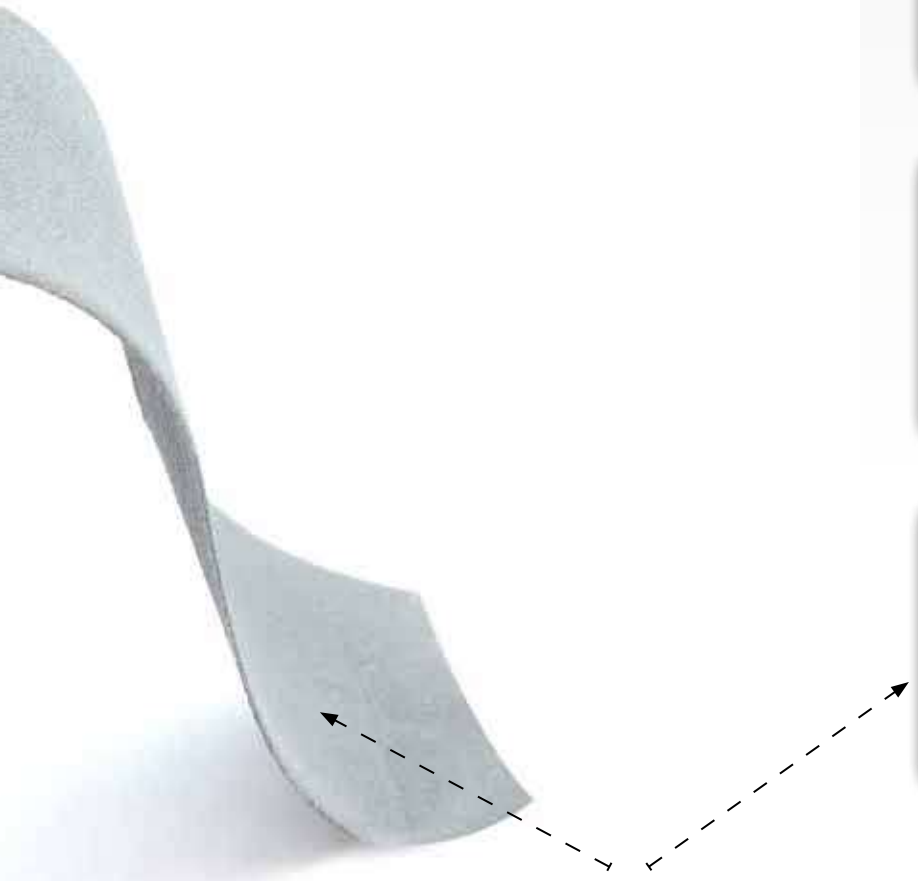


thickness 0,33mm / 0,35mm

IMPROVING
productivity processes

There is currently no other printing process on the market comparable to 3D Multijet Fusion (MJF) in terms of fast, quality results.
It takes just days to produce functional prototypes in nylon and production pieces for end users featuring quality surface finishes and high resolution on fine characteristics.

Equally impressive are the mechanical properties, offering greater uniformity than similar process such as selective laser sintering.



*Example of **sheet** created*
directly from the 3D printer

3D BESA
the impossible is just an illusion

TECHNICAL SPECIFICATIONS PA12 / PA11 / glass-filled PA12

PA12 Technical Specifications

Category	Measurement	Value	Method
General properties	Powder melting point (DSC)	187 °C	ASTM D3418
	Particle size	60 µm	ASTM 03451
	Powder apparent density	0.425 g/cm3	ASTM D1895
	Density of parts	1.01 g/cm3	ASTM D792
Mechanical properties	Tensile strength, Max load[1] - XYZ	48 MPa/6.960 psi	ASTM D638
	Tensile modulus[1] - XYZ	1.800 MPa/261 ksi	ASTM D638
	Elongation at break[1] - XY	20%	ASTM D638
	Elongation at break[1] - Z	15%	ASTM D638
	Bending strength(@5%)[2], XY	65 MPa/9.425 psi	ASTM D790
	Bending strength(@5%)[2], Z	65 MPa/10.150 psi	ASTM D790
	Modulus of resistance[2], XYZ	1730 MPa/251ksi	ASTM D790
	notched Izod impact(@3.2mm, 23°C), XYZ	3.5kJ/m²	ASTM D256 test method A
Thermal properties	Softening temperature (@0.45 MPa, 66psi), XYZ	175 °C	ASTM D648 test method A

PA11 Technical Specifications

Category	Measurement	Value	Method
General properties	Powder melting point (DSC)	202 °C	ASTM D3418
	Particle size	50 µm	ASTM 03451
	Powder apparent density	0.48 g/cm3	ASTM D1895
	Density of parts	1.04 g/cm3	ASTM D792
Mechanical properties	Tensile strength, Max load[3] - XYZ	50 MPa/7.250 psi	ASTM D638
	Tensile modulus[3] - XYZ	1.800 MPa/261 ksi	ASTM D638
	Elongation at break[3] - XYZ	50%	ASTM D638
	Bending strength(@5%)[4], XYZ	60 MPa/8.700 psi	ASTM D790
	Modulus of resistance[4], XYZ	1.600 MPa/232ksi	ASTM D790
	notched Izod impact(@3.2mm, 23°C), XYZ	6.0kJ/m²	ASTM D256 test method A
Thermal properties	Softening temperature (@0.45 MPa, 66psi), XYZ	183 °C	ASTM D648 test method A
	Softening temperature (@1.82 MPa, 264psi), XYZ	50 °C	ASTM D648 test method A

Technical specifications glass-filled PA12

Category	Measurement	Value	Method
General properties	Powder melting point (DSC)	186 °C	ASTM D3418
	Particle size	58 µm	ASTM 03451
	Powder apparent density	0.48 g/cm3	ASTM D1895
	Density of parts	1.30 g/cm3	ASTM D792
Mechanical properties	Tensile strength, Max load[5] - XYZ	31 MPa/4496 psi	ASTM D638
	Tensile modulus[5] - XY	2.700 MPa/392 ksi	ASTM D638
	Tensile modulus[5] - Z	2.800 MPa/406 ksi	ASTM D638
	Elongation at break[5] - XY	7.8%	ASTM D638
	Elongation at break[5] - Z	6.1%	ASTM D638
	notched Izod impact(@3.2mm, 23°C), XYZ	2.9kJ/m²	ASTM D256 test method A
	Shore hardness D, XYZ	82	ASTM D2240
Thermal properties	Softening temperature (@0.45 MPa, 66psi), XY	174 °C	ASTM D648 test method A
	Softening temperature (@0.45 MPa, 66psi), Z	175 °C	ASTM D648 test method A
	Softening temperature (@1.82 MPa, 264psi), XY	111 °C	ASTM D648 test method A
	Softening temperature (@1.82 MPa, 264psi), Z	118 °C	ASTM D648 test method A
Certification	UL 94, UL 746A		

1. Results of the tests conducted with ASTM D638 with a test speed of 10 mm / min, type V specimens.

2. Results of the tests conducted according to the ASTM D790 B procedure with a test frequency of 13.55 mm / min.

3. Dimensional precision of ± 0.2 mm / 0.008 inches on XY for hollow parts inferior to 100 mm / 3.94 inches and ± 0.2% for empty parts superior to 100 mm / 3.94 inches, using HP 12 high reusability PA 3D material measured after sandblasting.

4. RoHS certification for EU, Bosnia-Herzegovina, China, India, Japan, Jordan, Korea, Serbia, Singapore, Turkey, Ukraine, Vietnam

5. Compared with selective laser sintering (SLS) technology. Tested according to ASTM D638, ASTM D256, ASTM D790 and ASTM D648.

Effective values may vary depending on production conditions.

3D BESA
the impossible is just an illusion

HIGH, CONSISTENT QUALITY OF PIECES

- Extreme dimensional precision and accurate details guaranteed, thanks to the original HP Multi-Agent printing process.
- Tolerance +/- 2 tenths.
- Reliable, repeatable finished parts that correspond perfectly to your project.
- Access the new materials of the future and discover new applications, thanks to the HP Multi Jet Fusion open platform.

CUSTOMISATION

3D printing allows not only for a reduction in production costs and design risks, the removal of all limits and rapid, single-phase production;
it also allows you to **customise** your creations.

THE ADVANTAGES OF 3D TECHNOLOGY

The Rapid Prototyping and Additive Manufacturing technologies can be used to create prototypes, and above all small series of pieces,
very quickly and without the use of equipment.

THE MAIN ADVANTAGES OF THESE TECHNOLOGIES ARE:

- a one-of-a-kind HP technology
- the opportunity to think and create without limits, making the very most of the potential offered by 3D printing
- the possibility to create details with particularly complex geometries
- high levels of precision
- the flexibility to make changes at any time to a series of production pieces
- a reduction in costs for complex pieces or pieces that require a mould
- fewer or no problems with assembly
- the same resistance that can be obtained by injection moulding

POSSIBLE LIMITATIONS

- very simple pieces are not cost-effective to print, unless...
- the mould is less expensive for the production of large quantities
- however good the surface is, it will never be like an injection-moulded piece
- the colour is grey or tends towards black, depending on the process used, but it may be coloured

3D BESA
the impossible is just an illusion

The machine operates in 4 modes

- **FAST**: with double fusion, ideal for prototypes.
- **BALANCE**: with fusion, ideal for production.
- **COSMETIC**: guarantees smooth surfaces, but neglects mechanical aspects.
- **MECHANICAL**: with fusion, ideal for production, with particular attention to the mechanical aspects of the materials.

BALANCE and MECHANICAL are the ideal modes for production

Ecological information Respect for nature

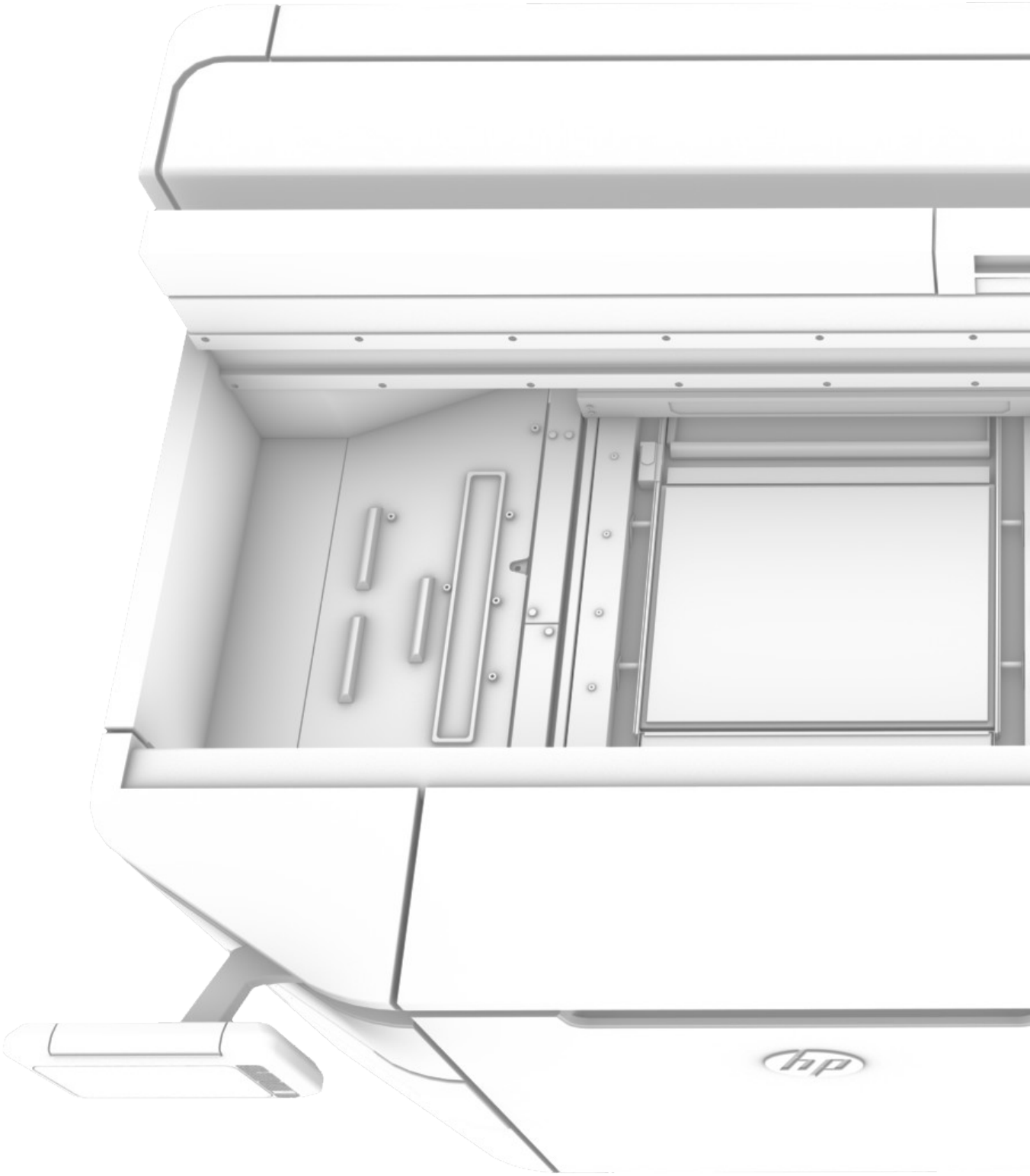
- The powders and agents are not classed as hazardous [1]
- Closed printing system and automatic powder management system, including post-production, for a cleaner, more comfortable environment [1]
- Minimum waste thanks to the high reusability of the powders [2]
- Collection programme for printing heads [3]

More information on HP's sustainable solutions can be found at hp.com/ecosolutions

1. Compared to the manual printing resumption processes used by other powder-based technologies. The term "cleaner" does not refer to indoor air quality requisites or to regulations regarding air quality or pertinent applicable tests. HP agents and powder cannot be classed based on EC Regulation 1272/2008 as amended applicable to hazardous substances.

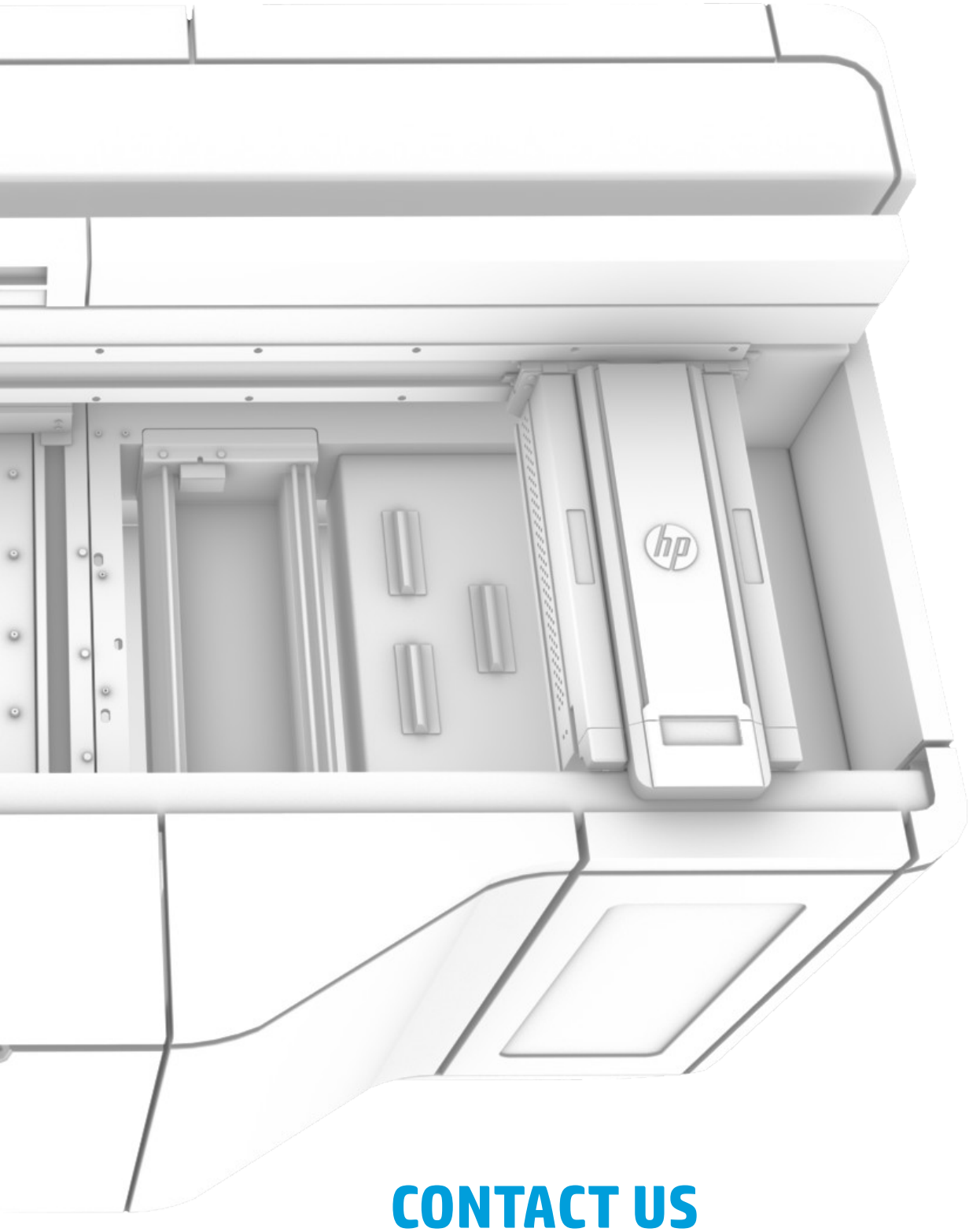
2. The HP Jet Fusion 3D printing solution with HP 3D High Reusability PA 12 and HP 3D High Reusability PA 11 boasts the highest excess post-production powder reusability, with a level of 80%, producing functional components with each batch. For the purpose of the tests, the materials are left to age in real print conditions and the powders monitored based on production, for recycling at worst. The components are thus created from each production and tested to verify their properties and accuracy

3. The printing supplies suitable for recycling vary depending on the printer. Visit hp.com/recycle to find out more about how to take part and about the availability of the HP Planet Partners programme; the programme may not be available in your area. In this case, and for other consumables not included in the programme, consult your local waste collection entity for appropriate disposal.



3D BESA

the impossible is just an illusion



CONTACT US

It’s time to change

3D BESA

the impossible is just an illusion

is a trademark of **BESAFILM S.R.L.**

BESAFILM

Cutting and rewinding from reel to reel of plastic film and paper

Via Strà, 171 - 37030 - Colognola Ai Colli (VR)
Tel. +39 045 7651700
commerciale@besafilm.com
www.besafilm.com