



Desktop Health[™]



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Turnkey solutions, industrial-grade materials, and high-throughput deliver end-use polymer parts at low cost

DESKTOP SOLUTIONS

STANDALONE SOLUTIONS



D4K

Desktop production of high-resolution, jewelry, dental, and other small parts.



Envision One

Rapid production of strong, fully-isotropic end-use parts.



P4K

24/7 production of small, ultra-high resolution end-use parts.



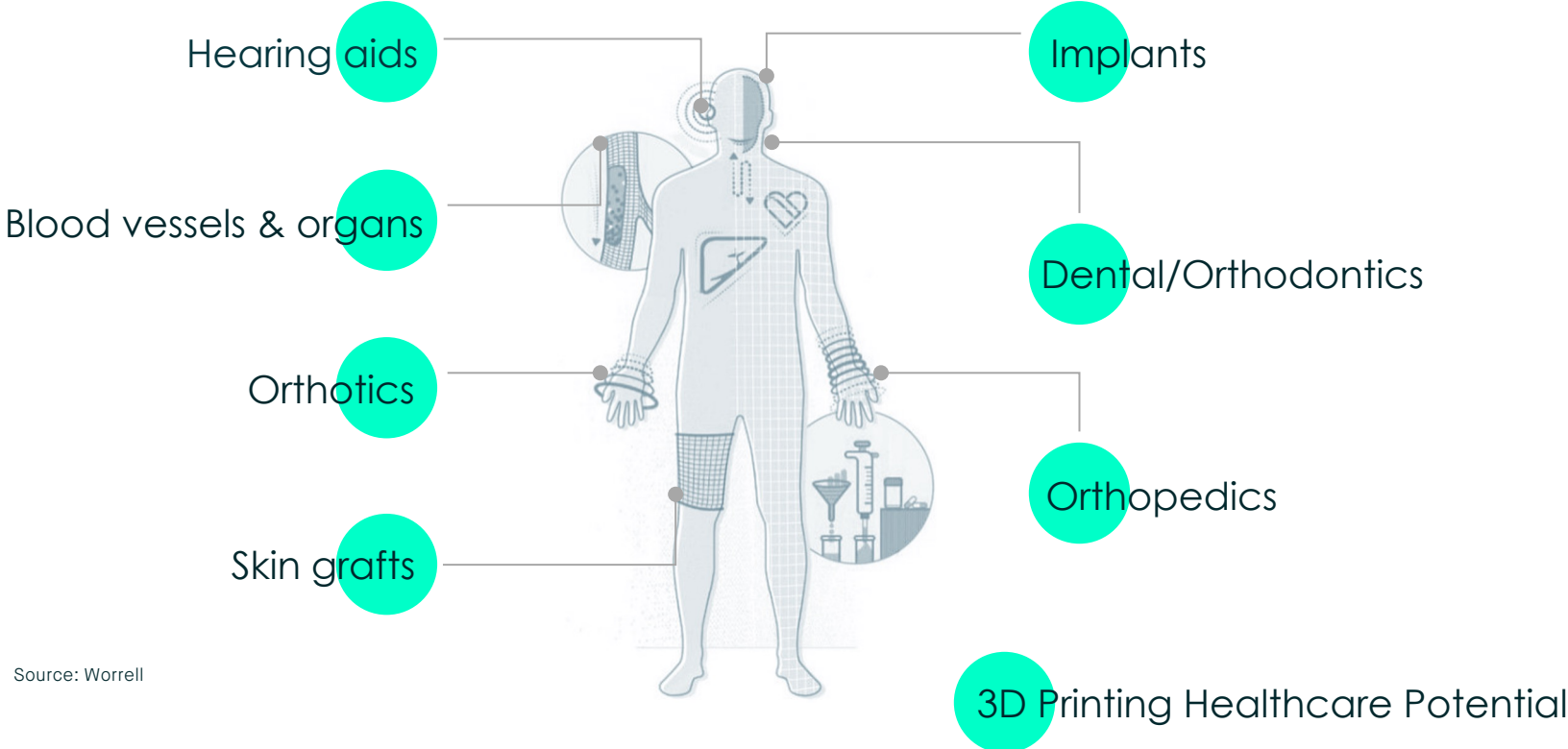
Xtreme 8K

High-volume production of end-use parts.

Ease of use with automated workflows and turnkey solutions

Volume production with attractive part economics

The **Future** of Healthcare in Mind



Source: Worrell

Meet the Einstein™ 3D Printer Series

Einstein

For **fast**-production

- ✓ **6 models** in **13 min** horizontal
- ✓ 6 guides in 31 min horizontal
- ✓ 6 guards in ~30 min horizontal
- ✓ 6 full arch teeth in 30 min horizontal
- ✓ 9 denture bases in 97 min vertical

High-accuracy and esthetic dental applications



Einstein Pro XL*

For **high**-production

- ✓ **17 models** in **75 min** vertical
- ✓ 11 models in 25 min horizontal



*beta results on file

The 3D-BIOPLOTTER[®] Family



Manufacturer Series
for Commercialization



Developer Series
for Research & Development

Tissue Engineering Applications



- Bone Regeneration
- Cartilage Regeneration
- Soft Tissue Regeneration
- Controlled Drug Release
- Cell Printing
- Organ Printing

The DNA

Developer Series

Manufacturer Series

Max build envelope (L x W x H)	200 x 220 x 140 mm	200 x 220 x 140 mm
Temperature-controlled build platform — heated and cooled; -10 °C to 80 °C	Optional feature	Standard feature
Needle tip calibration accuracy (XY)	30 µm	9 µm
Needle tip calibration accuracy (Z)	30 µm	1 µm
High-resolution camera for recording logs	Not offered	Standard
Method of calibration	Automated with light sensor for XYZ	Automated with on board camera for XY; Needle tip pressure sensor for Z
Modular printhead stations	3 available	5 available
Module printhead availability	2 come standard with system, 8 available	2 come standard with system, 8 available
Filters, particle and sterile	Standard	Standard
Industrial PC with automatic hard drive backup system	Standard	Standard

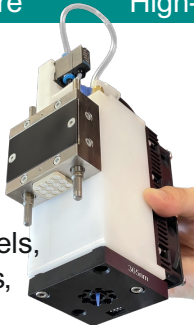
Printheads

Desktop Health

Print and Cure

Temperature control:
2°C – 70°C

Materials: Light curable hydrogels, pastes, silicones, etc.



High-Temperature (HT)

Temperature control:
30°C – 250°C

Materials: Thermoplastic materials, thermosensitive hydrogels.



Ultra-High-Temperature (UHT)

Temperature control:
30°C – 500°C

Materials: Thermoplastic materials, thermosensitive hydrogels, PEEK



Inkjet

Temperature control:
30°C – 70°C

Materials: Low viscous hydrogels, cell suspensions, solutions



Low-Temperature (LT)

Temperature control:
2°C – 70°C

Materials: Hydrogels, ceramic and metal pastes, mixtures with organic solvents, silicones, etc.



2-Component (2K)

Temperature control:
30°C – 70°C

Materials: 2-component silicones



Co-Axial (COAX)

Temperature control: 2°C – 70°C (dependent on room temperature, 0°C may be reached)

Materials: Hydrogels, 2-component materials with fast solidification upon contact (e.g., sodium alginate and calcium chloride)



Photo Curing (UV)

Temperature control: fixed at 25°C

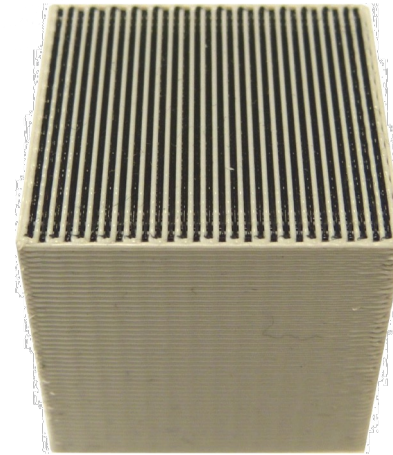
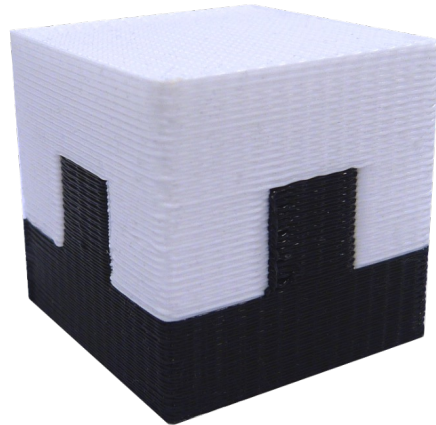
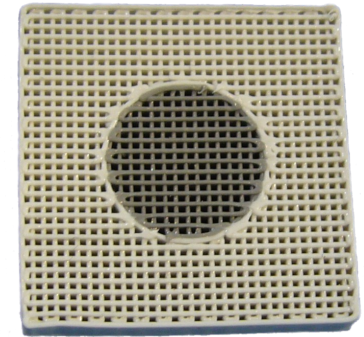
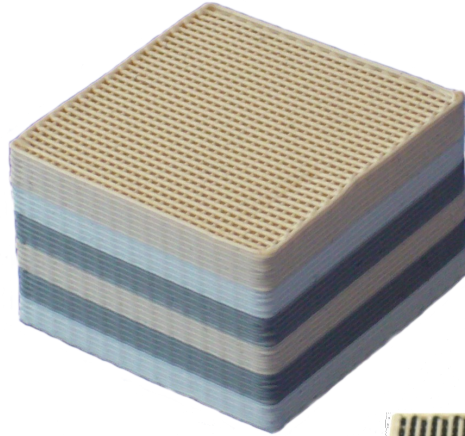
Materials: None. Head does not contain a material chamber, only a light source



3D-Bioplotter – Key features

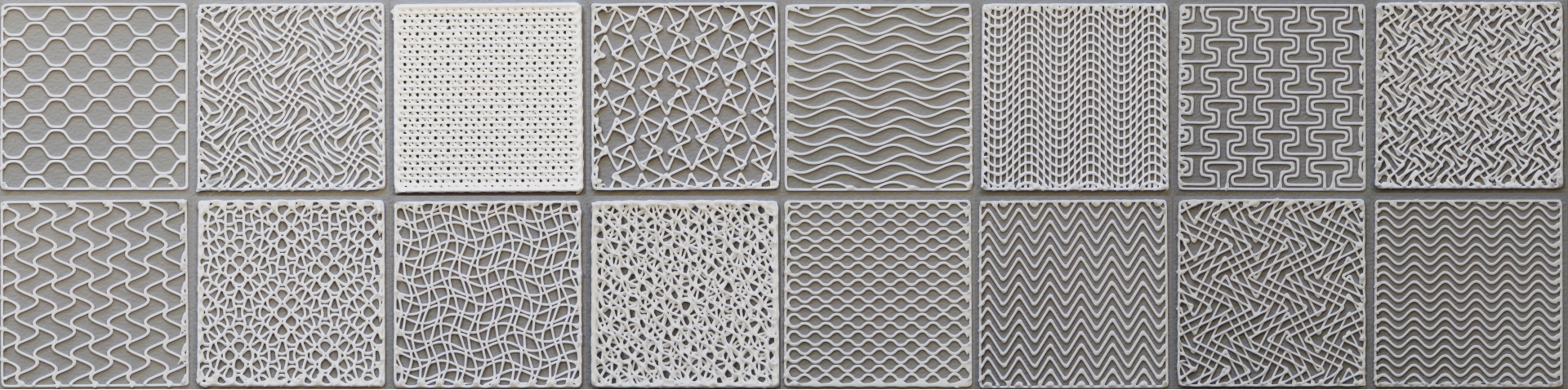
Up to 5 materials per object

Individual material deposits and needles – no contamination



Principle of the 3D-Bioplotter

Complex patterns defined in the 3D-Bioplotter



Material Capabilities

Thermoplasts

PCL

PLLA

PLGA

Phase Transition

Material Capabilities

Ceramic/Metal Pastes

Hydroxyapatite

Titanium

Tricalcium Phosphate

Sintering

Material Capabilities

Hydrogels			
Agar	Silk	Alginate	Chitosan
Gelatin	Hyaluronic Acid	Fibrin	Collagen
Phase Transition		2 Component System	Precipitation

Material Capabilities

Other Materials			
Polyurethane	Silicone	Acrylates	Graphene
Phase Transition	RTV 1	UV Curing	Evaporation

Ready to print materials

TG = Technical Grade – not aimed at medical applications with the exception
of visual models

RG = Research Grade – aimed at in-vitro testing and in-vivo animal tests.

MG = Medical Grade – aimed at in-vitro testing and in-vivo testing. Provided
with USP Class VI certificates or similar.

**Ready to print = Provided with full instructions for immediate use
without requiring parameter discovery**

Ready to print materials

Bone/Cartilage Regeneration materials

Product Name	Material
LT Hydroxyapatite RG	Hydroxyapatite, self-settling
HT PCL 45K RG	Polycaprolactone, MW 45 kDA
HT PCL 80K MG	Polycaprolactone, MW 80 kDA
HT PCL 120K MG	Polycaprolactone, MW 120 kDA

Self-settling pre-mixed paste. Results in ceramic scaffold after several hours/days.

Medical grade PCL for bone or cartilage regeneration. ~10mm/sec @400 μ m @130°C



Ready to print materials

Soft Tissue Regeneration materials

Product Name	Material
UV Silicone 60A MG	Silicone, short term only, 365nm
LT TissueInk RG	Gelatin-based hydrogel mixture for cell printing
2K Silicone 50A RG	Silicone, 2 component, heat post cured

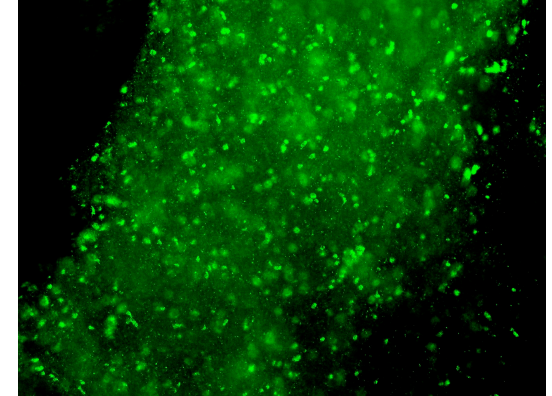
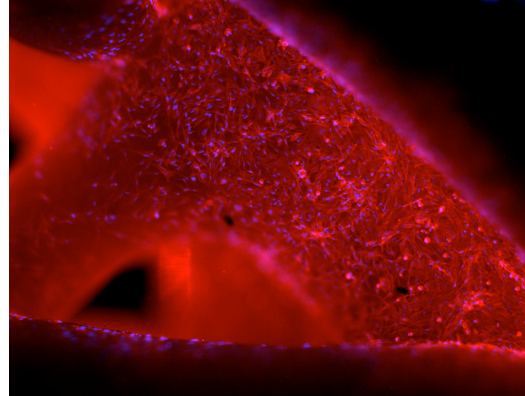
UV curable silicone, 1 component, 365 nm.
Medical grade, short term use only (<30 days)

Bio-ink for cell printing applications with good structural reliability

2 component silicone

Research grade

Medical grade and other modifications available in cooperation with manufacturer



Pictures from NanotecMarin GmbH

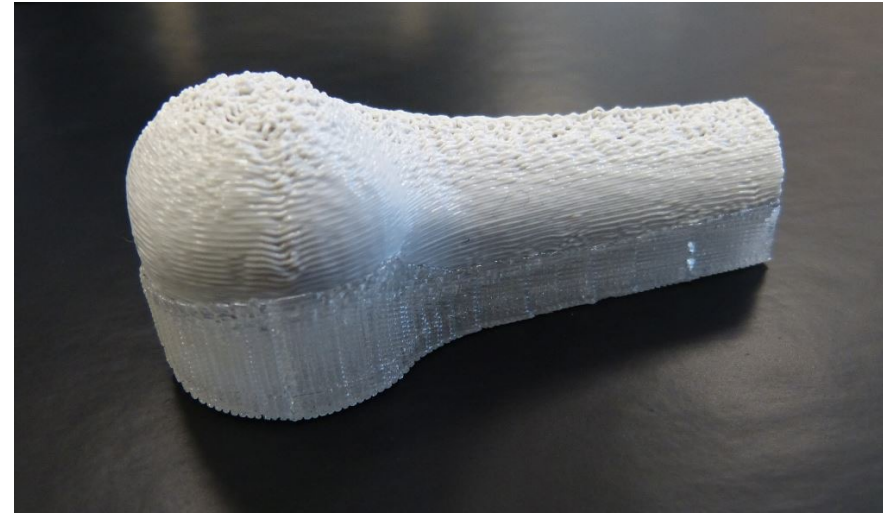
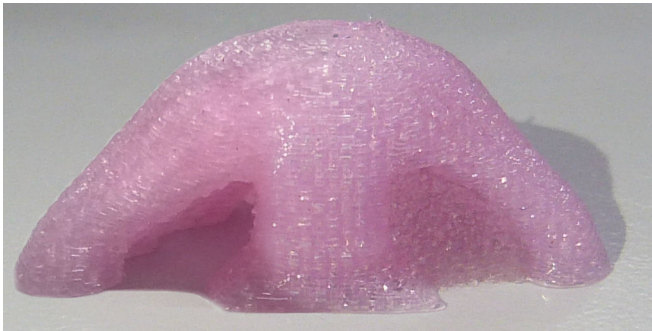
Ready to print materials

Support materials / others

Product Name	Material
HT Support RG	Sugar-based
LT Support RG	Cellulose-based
LT Silicone TG	Silicone, RTV1

Processing temperature $\sim 150^{\circ}\text{C}$, dissolves in water in a matter of minutes, recommended for large parts

Hydrogel, processing temperature $\sim \text{RT}$, dissolves in water in a matter of hours, recommended for cell printing and small parts



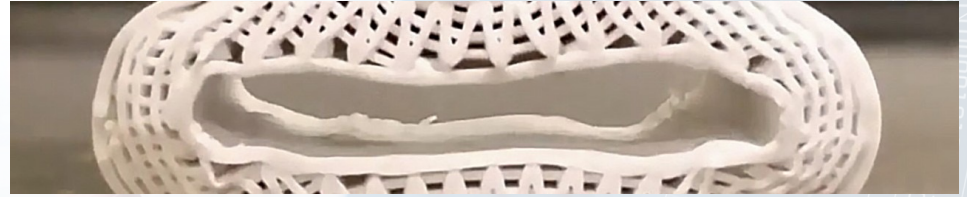
Target Group



Customer segments:

- Government/Public Research Institutes
- Private Research Institutes
- University

BONE REGENERATION



DRUG RELEASE



Leading Keywords citing the 3D- Bioplotter Applications
Published Peer-Reviewed Research Papers

