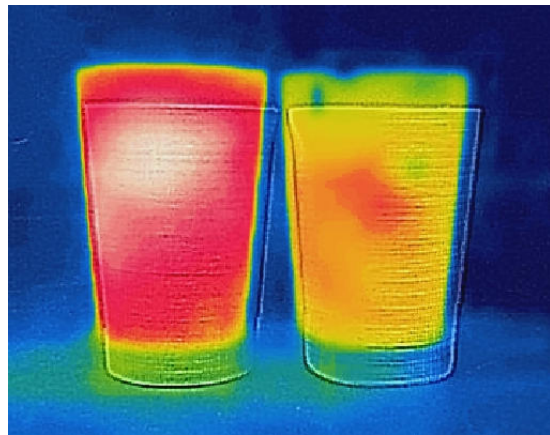
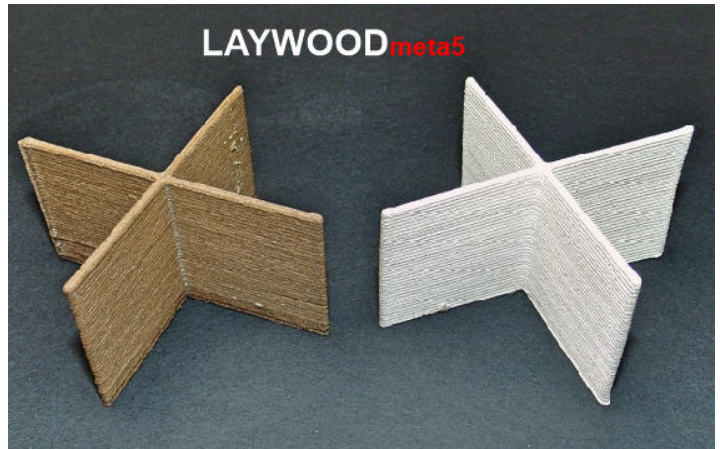
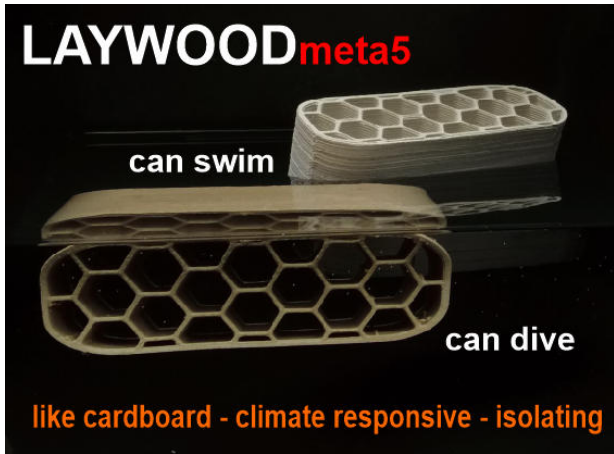


- floats on water, light as Balsa after rinsing in water, can swim, can dive, sucks water fast
- porous, density: ~ 0.5 gr/ccm; rough, feels as cardboard
- thermal isolating, low thermal conductivity
- climate responsive (elongation)
- absorptive carrier for agents

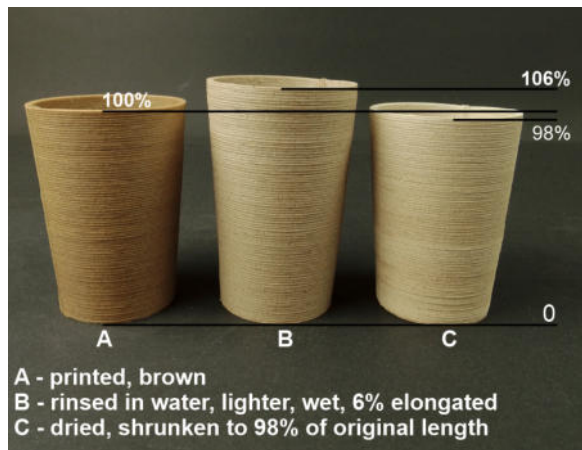
- print at: 225 – 250°C, cold! platform,
- zero warp, sticks well as ABS at platform
- only 50% density of standard 3d printing filaments
- contains open cell pores inside after rinsing with water for 2 days, dry the object with a fan, not in oven
- cell structure as mycellium
- possible to paint with waterbased inks

THE NEW ORIGINAL

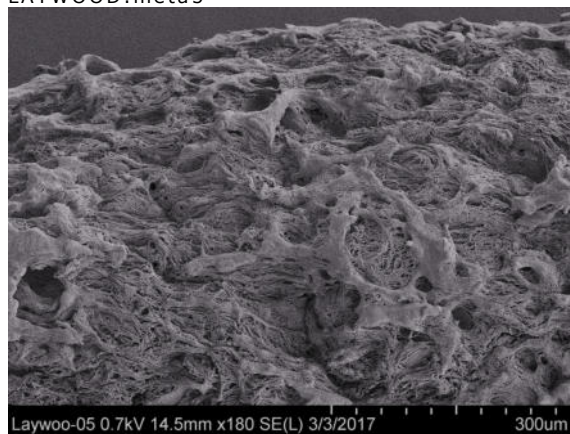


thermal isolating because of pores
low thermal conductivity

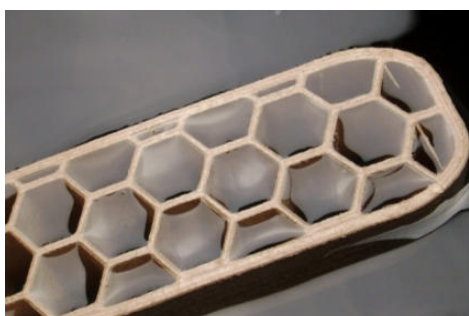
left: hot water in a cup wrapped with massive Original Laywood
right: hot water in a cup wrapped with porous LAYWOOD.meta5



climate responsive with reversable elongation
if wet or dry



scanning electron microscope / micro porous



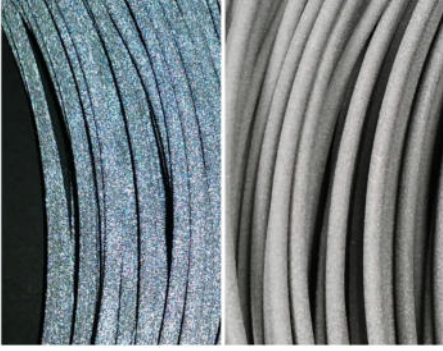
Unrinsed Laywood.meta5 has a density as standard thermoplasts of about 1.1 gramms per ccm, thats why printed objects will dive in water



rinsed Laywood.meta5
floating on water

REFLECT-o-LAY

FOR DESIGNERS



retro-reflective objects - what things may you print?

- fashion accessoires,
- savety gadgets for bikers
- to sew on patches,
- laser reflective big distance marking points
- parts for experimental cars

printing:

- 0.4 mm nozzle, sticks well at roughened PET-Tape and most other,
- cold to 60° platform
- 210°C / cold (20°C) or hot platform
- best refl. effect with low !!! feeding rate

FOR DESIGNERS

they will „glow“ when lighted up by other light beams at road or highways. The filament is flexible and filled with millions of reflective pigments.

retro-reflective, flexible, sew-able

This pigments occur as little dots out of the surface of filament and ofcourse after printing. They send incoming light back, as the drawing describes.

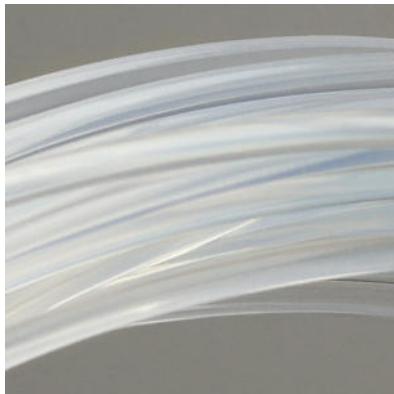
FOR DESIGNERS



- <http://3druck.com/3d-druckmaterialien/42582-3942582/>
- <http://3dprintingindustry.com/2016/02/25/new-reflective-filament-shines-light-kai-parthys-3d-printing-brilliance-part-1/>
- <http://www.3ders.org/articles/20160229-kai-parthy-reveals-new-reflect-o-lay-3d-printable-filament-that-reflects-light-in-the-dark.html>

BENDLAY-series (1 tough, 2 flex)

CLEAR AS GLASS



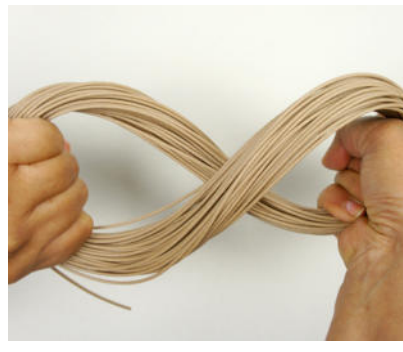
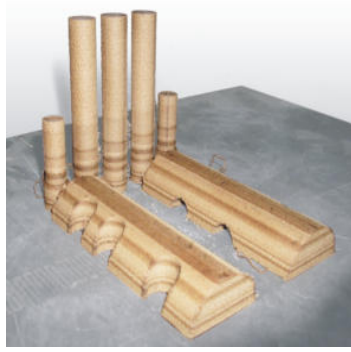
BENDLAY tough vs. BENDLAY flex clear, tough, flexible, bendable,

- <http://www.3ders.org/articles/20130614-bendlay-a-new-clear-tough-and-bendable-3d-printer-filament-from-germany.html>
- <http://www.3ders.org/articles/20150114-laywoo-d3-inventor-kai-parthy-unveils-bendlay-flex-3d-printing-filament.html>
- <https://3druck.com/tags/bendlay/>

LAYWOO-D3 / LAYBRICK lowest warp / tree-ring effect

Sept. 2012

THE ORIGINALS



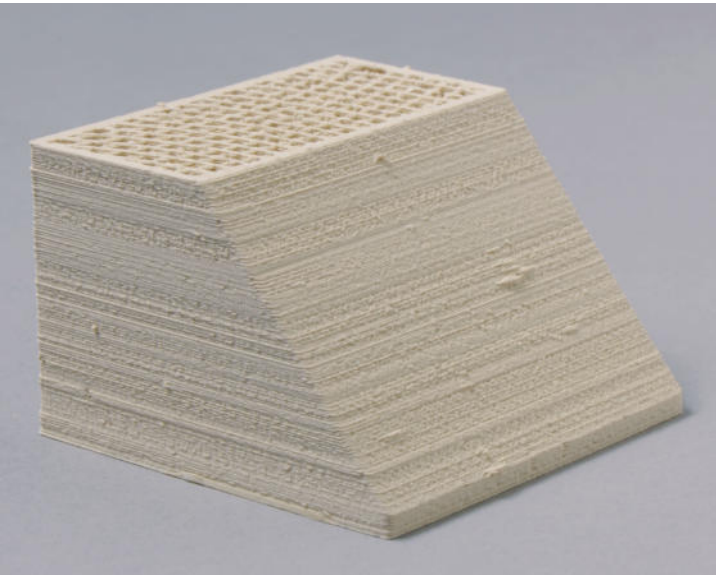
LAYWOO-D3 / 170 – 245°C

LAYWOOD-FLEX / 190 – 250°C

- <http://www.3ders.org/articles/20120920-laywoo-d3-new-fdm-filament-can-print-wood-with-tree-rings.html>
- <https://3dprintingindustry.com/news/the-last-wood-bender-kai-flexes-his-new-wood-3d-printing-filament-49540/>
- <http://www.3ders.org/articles/20150513-kai-parthy-is-back-with-laywood-flex-a-flexible-version-of-laywood-3d-printer-filament.html>

LAYBRICK lowest warp / tree-ring effect

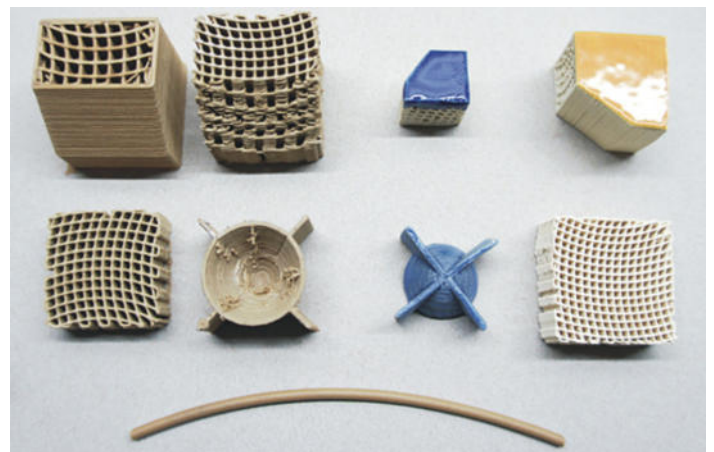
THE ORIGINALS



- <http://www.3ders.org/articles/20130527-laybrick-a-new-rough-3d-printer-filament-near-zero-warp.html>
- <https://3dprintingindustry.com/news/laybrick-a-new-filament-from-the-creator-of-laywoo-d3-12164/>
- <https://3druck.com/objects/laybrick-neues-sandsteinartiges-filament-2110754/>

LAYCERAMIC

CERAMIC / POTTERY



- <https://www.dropbox.com/s/3mst782b64mutzb/LAYCERAMIC-Instructions-7-2017-public.pdf?dl=0>
- <http://www.3ders.org/articles/20140310-3d-printing-branches-out-with-new-clay-based-filament-for-ceramics.html>
- <https://3dprintingindustry.com/news/3d-printing-filament-kai-parthy-24978/>

MOLDLAY / wax-alike / for lost wax casting / permanent mold casting

CASTING

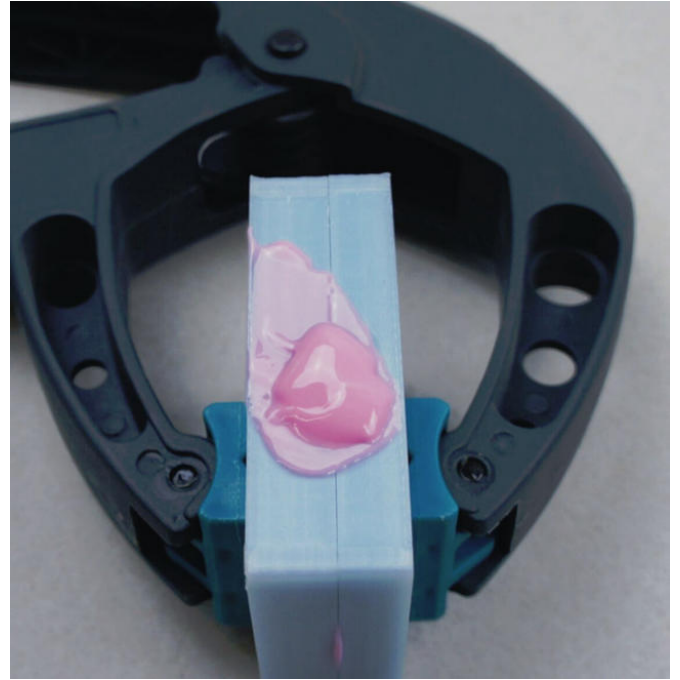


**for lost wax casting
bronze , silver**



**permanent mold casting
for 2 component resins too**

CASTING



super dimension stabil, stiff, rigid at room temperature; near zero warp, printable without heated bed, print at 170 – 180° C, heated bed max. 40°C, treat your mold at ~ 270°C in an old baking oven only, the wax flows restless out the mold, similar as hot paraffin,

- <http://www.3ders.org/articles/20150128-filament-wizard-kai-parthy-unveils-his-new-moldlay-wax-3d-printing-filament.html>
- <https://3dprintingindustry.com/news/industrial-manufacturing-desktop-new-moldlay-3d-printing-filament-42481/>
- <https://www.youtube.com/watch?v=3RdwKWxnrM>
- <https://3druck.com/3d-druckmaterialien/moldlay-kai-parthy-stellt-filament-fuer-giessverfahren-vor-5129578/>

POROLAY-series patent pending / experimental filament / to print porous, felty structures; print foams, floatables, leather-likes, extendables

POROUS / 4D



LAYFOMM-40



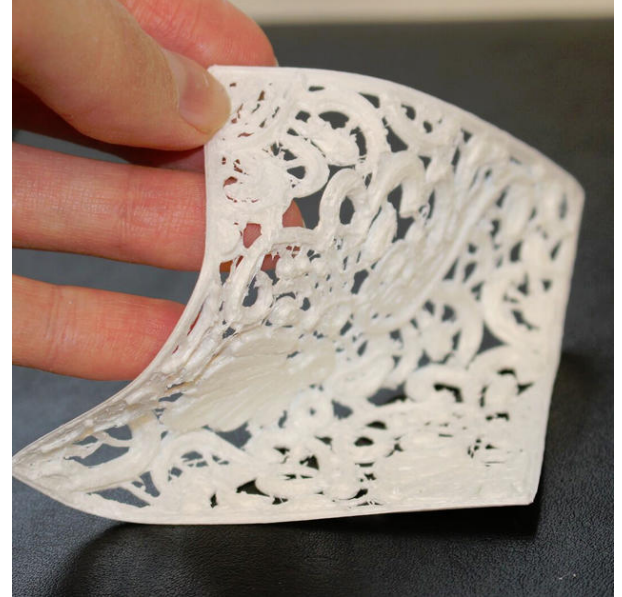
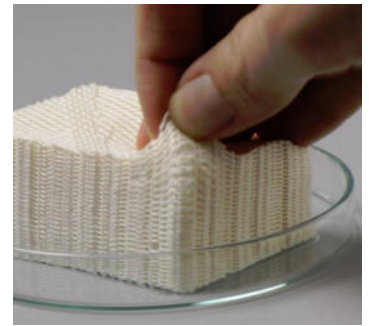
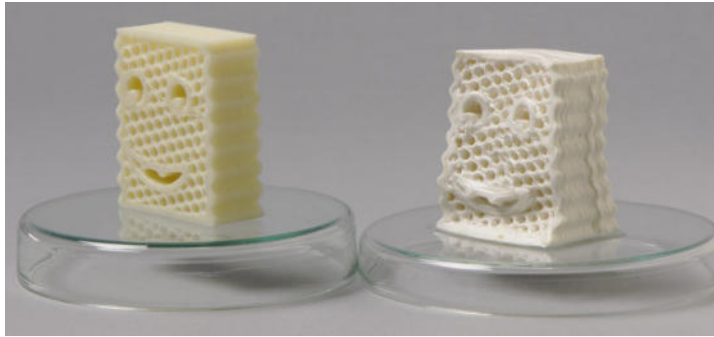
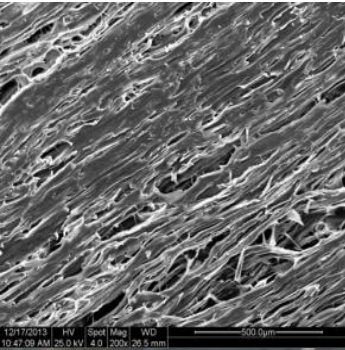
LAYFOMM-60



GELLAY



LAYFELT



POROLAY series / LAYFOMM-40 / LAYFOMM-60 / GELLAY / LAYFELT

- <https://3dprintingindustry.com/news/kai-parthy-gets-felty-foamy-porous-poro-lay-line-filaments-21636/>
- <http://www.3ders.org/articles/20131222-printing-porous-and-fibrous-3d-objects-with-new-filament-line-poro-lay.html>
- <https://www.youtube.com/watch?v=2w-9KvBHago>
- <https://www.youtube.com/watch?v=Pkaus3DN2w0>



magnetic to magnets, filled with **carbonyl-iron**



DI-ELECTRO-LAY, filled with TiO2 72%

- <http://www.3ders.org/articles/20140627-fdm-printing-ceramic-filled-polymers-for-electromagnetic-applications.html>

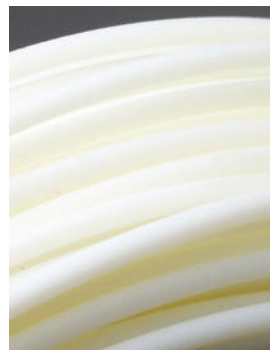
smartABS / PLA-Y-SOFT / LAY-PVA



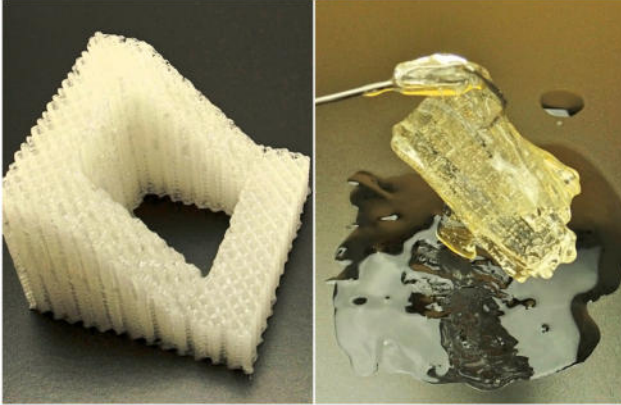
- smartABS**
- enhanced inter-layer adhesion
 - low warp at cold bed
 - 235°C
 - smoothable with acetone



- PLA-Y-SOFT**
- soft PLA
 - high % of bio material
 - of course lowest deformation at cold bed

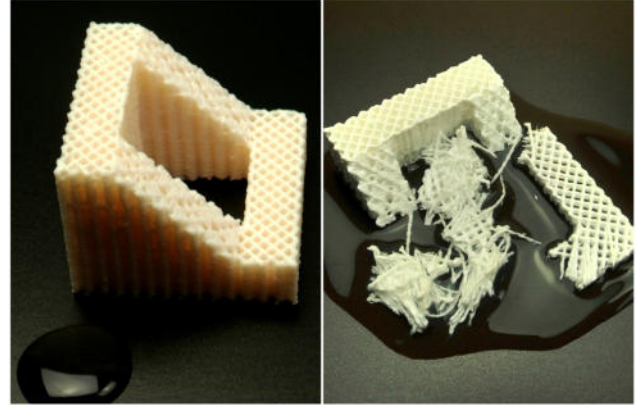


- LAY-a-PVA**
- PVA water-soluble filament to print support-structures
 print-temp: 235 – 245°C
 improved adhesion to ABS
 no risk to remain in hotend at high temperatures
 dissolvable in cold water
 enhanced temp-stability,
 (10 °C higher stiff in hot environment than standard PVA)



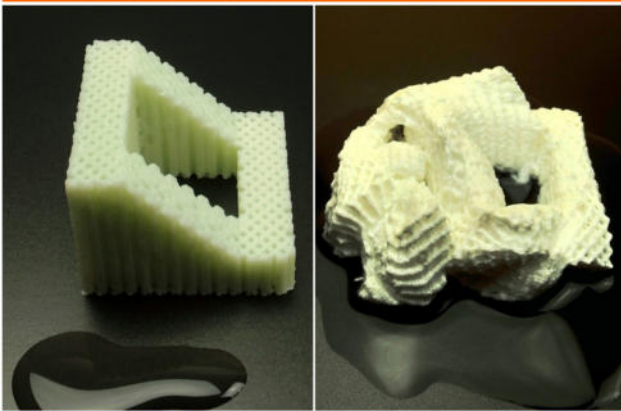
ETHY-LAY

- dissolve restles with alcohol
- total clear, cold platform
- for sensitive bio prints
- print-temp. 165C



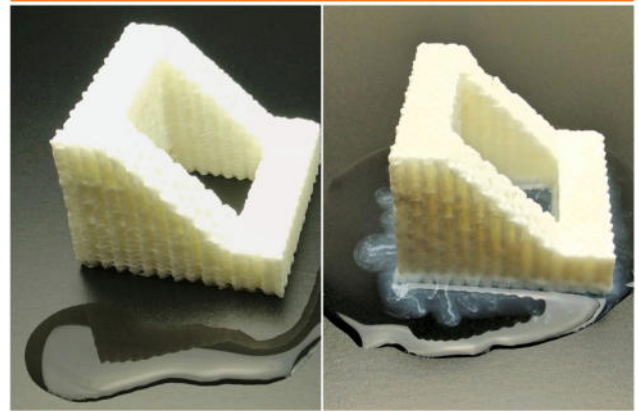
HIGH-T-LAY

- for hot build room 100C, printT ~240C
- fast dissolve in water
- forget HIPS-Limonene stink
- remove flaky residute with brush



LAY-CLOUD

- dedicated for flexible prints
- best polyurethane adhesion
- cloudy residute, simply drops
- printT ~240+-5C



LAYaPVA

- best print viscosity, printT ~230C
- stabile at long tool-change periods
- improved thermal stability
- very fast dissolvable

ETHY-LAY

- **dissolve restles with alcohol**
- total clear, cold platform
- for sensitive bio prints
- print-temp. 165C+
- store dry, if wet – dry in oven at max. 50°C

LAY-CLOUD:

- dedicated for flexible prints
 - best **polyurethane adhesion**
 - cloudy residute, simply drops
 - printT ~240+-5C
 - store dry,
- dry in oven at max. 80°C, 3-4 hours

HIGHT-T-LAY:

- for hot build room 100C, printT ~240C+
- fast dissolve in water
- **forget HIPS-Limonene stink**
- remove flaky residute with brush
- store dry,
- if wet - furthermore easy to print, you hear quiet crackle,
- dry in oven at max. 90°C, 3-4 hours

LAYaPVA

- advanced print viscosity, printT ~230C
- stabile at long tool-change periods
- improved thermal stability
- **very fast dissolvable**
- store dry, if wet – dry in oven at max. 70°C
- if wet, not as soft as yellow standard PVA

SOLAY dedicated for rubber-things, as shoes-soles, allows vintage optic

FOR DESIGNERS



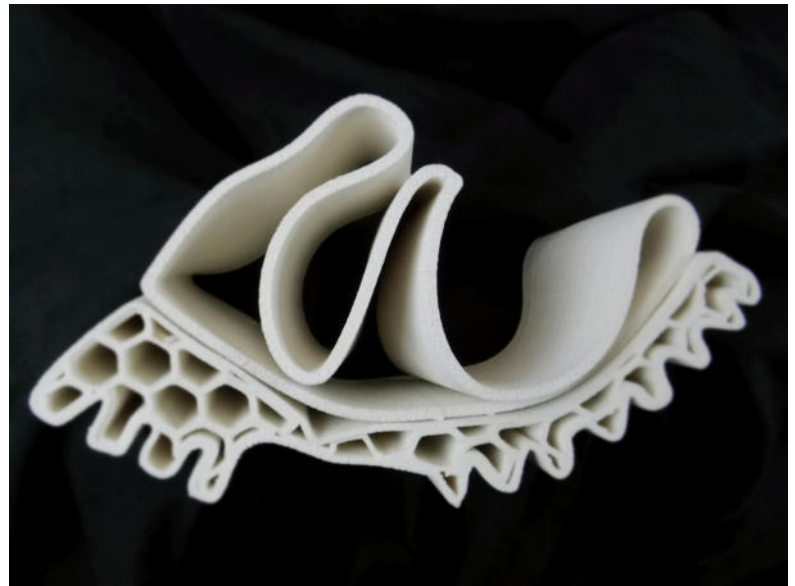
- elastic as caoutchouc
- Shore A / ~ 90
- high filled with nature born organic pigments (over 30%)
- paintable with permanent markers
- colorable with inks (ethylalcohol marker inks)
- make your *vintage style*
- as stone washed effect / blue jeans effect
- for dampers, running shoes, experimental shoe-wear

printing:

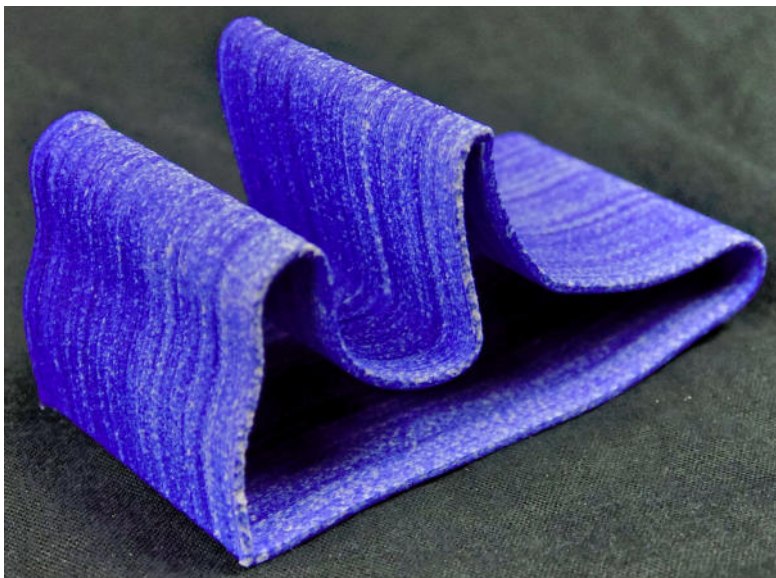
- 0.4 mm nozzle, sticks well at roughened capton and most other, cold to 60° platform
- 0.2 mm layer, thicker the more rough surface
- 175°C to 190° white colour, goes brownish when long under heat,
- rough and easy to feed filament
- experimental filament

FOR DESIGNERS

FOR DESIGNERS



VINTAGE



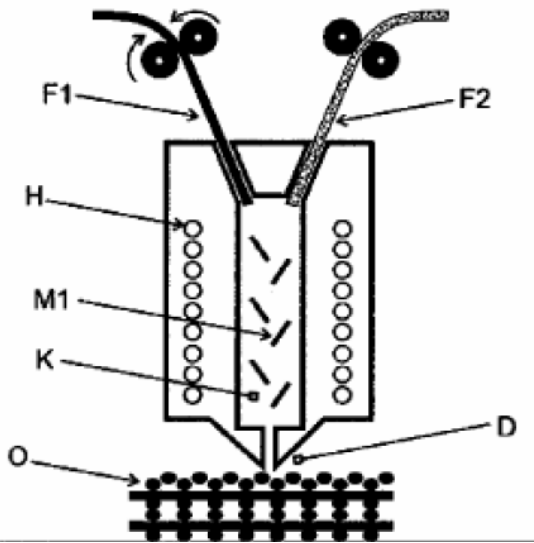
- <https://3druck.com/3d-druckmaterialien/solay-neues-elastisches-3d-druckmaterial-aus-der-rubberlay-serie-von-kai-parthy-0440295/>
- <http://www.3ders.org/articles/20151215-kai-parthy-unveils-rubber-like-solay-3d-printing-filament-for-your-future-shoes.html>

selected 3D-printing INVENTIONS by Kai Parthy

hot ends / concepts / patent applications

EARLY BIRD

dual colour - dual filament hot end / concept



german patent application from 2010
first concept for a hot end to blend filaments

Multi-Filament Printhead

filled: **16.12. 2010**
published: 21.06.2012
DE102010054824A1

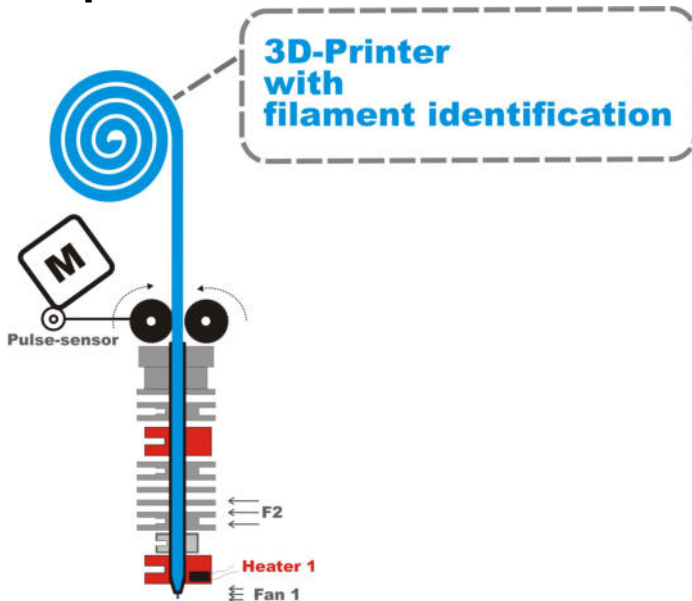
M1: static or dynamic mixing elements

[EN] Print head for rapid prototyping printer for extruding thermoplastic or reactive ...

[DE] Druckkopf für FDM-Verfahren mit mehrfacher Drahtzufuhr und Mischkammer zum Erzeugen von Objekten aus Polymerblends

HOT END CONCEPT

complex hot end with lab inside / concept / patent pending



filament detecting?

Each filament has specific viscosity-properties of it's molten mass,
if we know the pressure & temperature under which the filament is feeded trough the feed-channel and the nozzle,

what for ?

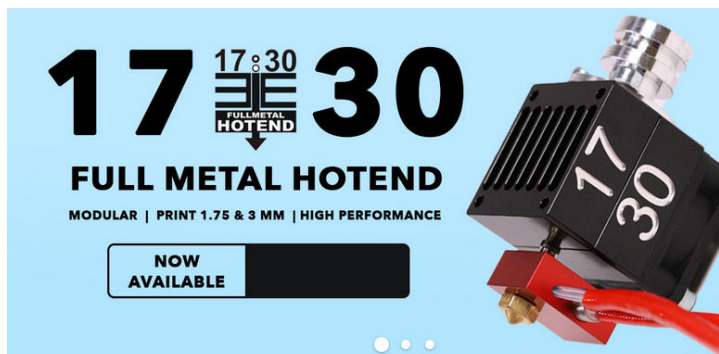
- the printers software can find out what filament you are using,
- can calculate best printing properties without blockages, f.e.
- flow rate, head-speed,
- retract parameters, acceleration-rates and some more
- sophisticated values, also to prevent
- stringy objects,
- you may print smooth, rough or cratered surfaces
- being able to print future filaments !

**You don't need to be an expert for successful 3d-printing.
The machine helps you!**

<http://www.3ders.org/articles/20150624-commentary-smart-hotends-and-the-need-to-truly-innovate-in-3d-printing.html>

1730hotend / a cooperation with ReprapUniverse / Netherlands / patent pending

HOT END



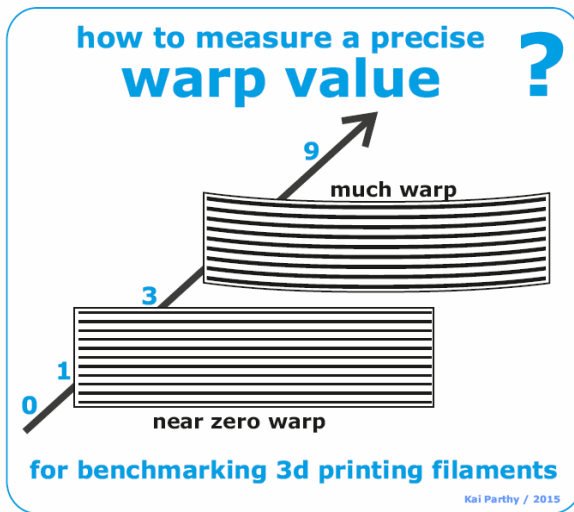
The 1730 Full Metal Hotend enables switching Nozzles between 1.75 mm and 3 mm in less than 5 minutes.
Experience total 3D-Printing freedom and enjoy the best of both worlds.

<http://www.1730hotend.com/>

<http://www.3ders.org/articles/20160126-kai-parthy-reprapuniverse-launch-modular-175-3mm-3d-printer-hotend-on-kickstarter.html>
<https://3druck.com/tags/1730-fullmetal-hotend/80>

WARP - INDEX

MEASURING PRINCIPLE



The biggest obstacle for exact printing needs a measurement standard / Warp-Index found
The control of the warp is the everlasting problem of the 3D print scene - but at least we now can measure and classify the warp.

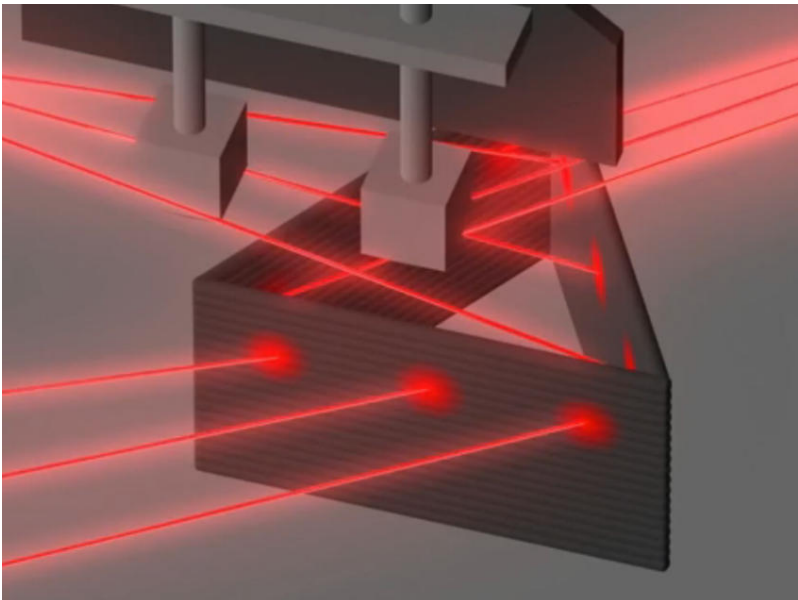
<https://all3dp.com/warp-finally-theres-way-measure/>

<http://www.3ders.org/articles/20151130-kai-parthy-develops-low-bondage-warp-index-for-3d-printing-filaments.html>

<https://3druck.com/3d-druckmaterialien/kai-parthy-veroeffentlicht-white-paper-zum-thema-warping-5239934/>

WARP-fighting CONCEPT

REDUCE DEFORMATIONS



animation:

<https://youtu.be/xgWQPULu-U>

BIONIC MESH STEEL FIBRE / patent pending

PROOF OF CONCEPT



reinforcement of

freeform
architecture

using a new

bionic-mesh
steel-fibre

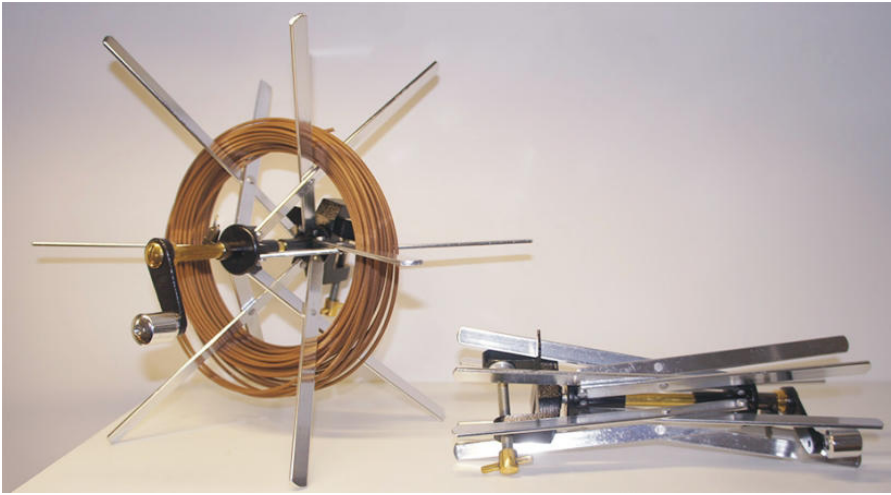
<http://www.3ders.org/articles/20161110-kai-parthy-makes-construction-3d-printing-viable-with-scalable-bmsf-steel-reinforcement-inserts.html>

<https://3druck.com/3d-druckmaterialien/bionic-mesh-steel-fibre-von-kai-parthy-macht-3d-druck-von-freiformstrukturen-aus-beton-moeglich-1451080/>

patent pending /
Kai Parthy / Germany

FILAMENT EQUIPMENT

HELPFUL



universal filament holder with extra long arms

EDU-KITS

FOR SCHOOLS



low priced pack of 2 coils combined = 0.250 Kg

Kai Parthy . CC-Products . Koeln . Germany
Productdevelopment & Innovations
kp@cc-products.de

LAY
FILAMENTS